Kentucky Academic Standards - October 2018

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Education Goals

These capacity and goal statements of the Kentucky Education Reform Act of 1990, as found in Kentucky Revised Statute (KRS) 158.645 and KRS 158.6451, are the basis for instructional programs in Kentucky public schools. All students shall have the opportunity to acquire the following capacities and learning goals:

- Communication skills necessary to function in a complex and changing civilization
- Knowledge to make economic, social and political choices
- Understanding of governmental processes as they affect the community, the state and the nation
- Sufficient self-knowledge and knowledge of their mental health and physical wellness
- Sufficient grounding in the arts to enable each student to appreciate their cultural and historical heritage
- Sufficient preparation to choose and pursue their life's work intelligently
- Skills to enable students to compete favorably with students in other states and other parts of the world

Furthermore, schools shall

- expect a high level of achievement from all students.
- develop their students' abilities to:
  - use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives;
  - apply core concepts and principles from mathematics, the sciences, the arts ~~and~~ the humanities, social studies, English/language arts, health, ~~mathematics,~~ practical living, including, physical education, to situations they will encounter throughout their lives;
  - become self-sufficient individuals;
  - become responsible members of a family, work group or community as well as an effective participant in community service;
  - think and solve problems in school situations and in a variety of situations they will encounter in life;
  - connect and integrate experiences and new knowledge from all subject matter fields with what students have previously learned and build on past learning experiences to acquire new information through various media sources;
  - Express their creative talents and interests in visual arts, music, dance, and dramatic arts.

- increase student attendance rates
- reduce dropout and retention rates
- reduce physical and mental health barriers to learning
- be measured on the proportion of students who make a successful transition to work, postsecondary education and the military

Legal Base

The following Kentucky Revised Statutes (KRS) and Kentucky Administrative Regulations (KAR) provide a legal base for this publication:

KRS 156:160 Promulgation of administrative regulations by the Kentucky Board of Education
With the advice of the Local Superintendents Advisory Council, the Kentucky Board of Education shall promulgate administrative regulations establishing standards that public school districts shall meet in student, program, service and operational performance. These regulations shall comply with the expected outcomes for students and schools set forth in KRS 158:6451.

Administrative regulations shall be promulgated for:

- Courses of study for the different grades and kinds of common schools; and
- The minimum requirements for high school graduation.

704 KAR 3:305 Minimum high school graduation requirements
This administrative regulation establishes the minimum high school graduation requirements necessary for entitlement to a public high school diploma, including the requirements for the graduating class of 2012.

704 KAR 3:303 Required Kentucky Academic Standards
This administrative regulation adopts into law the *Kentucky Academic Standards February 2010.*

Scope and Purpose

Preparation of Kentucky's students for the demands of the 21st Century requires districts and schools to prepare every student for successful transition to post-secondary education, work and the community. The Kentucky Academic Standards helps ensure that all students throughout Kentucky are provided with common content and have opportunities to learn at high levels. The document provides administrators, teachers, parents and other stakeholders in local school districts with a basis for establishing and/or revising standards-based curricula and instruction for public schools.

The instructional programs for Kentucky's public schools emphasize the development of students' abilities to acquire, apply and integrate knowledge, skills, and understandings in real-life contexts and to problem-solve, make decisions, and think critically and creatively. They assist students in connecting learning to the world beyond the classroom by exploring and investigating real issues and problems of communities, states, the nation, and the world. Well-designed curriculum and instruction recognizes the diversity of students and how children learn, construct knowledge and acquire skills and concepts of the disciplines. The curriculum and instruction incorporate an understanding of students' families, cultures and communities and draw on these understandings to create a rich context and environment for learning. Curriculum and instruction are culturally responsive and provide for the diversity of students to assure that all students in Kentucky public schools have the opportunity to learn (time, support, access, equity, resources, and quality educational design and practices) at high levels. Schools provide appropriate supports and accommodations to facilitate student learning and preparation for the 21st century.

The purpose of the *Kentucky Academic Standards* is to outline the **minimum** content standards required for all students before graduating from Kentucky public high schools. This document specifies ~~the~~ content standards for ~~the~~ required credits for high school graduation and the primary, intermediate and middle level content standards leading up to these requirements.

Schools and school districts are also responsible for coordinating curricula across grade levels and among schools within districts. A coordinated curricular approach ensures that all students have opportunities to achieve *Kentucky's Learning Goals and Academic Expectations* and the content standards. It also provides for a thoughtful continuum of content and skills across grade levels while assuring the teaching and learning of all content in the *Kentucky Academic Standards*. Districts and schools are accountable for making sure that each student's education program includes the minimum content standards as specified in the *Kentucky Academic Standards* and provides the student with the opportunity to learn the standards. Schools provide individual supports for learning that are essential for students to access the curriculum, achieve at high levels and maximize successful transition to postsecondary. Schools have the flexibility in how to organize (e.g., discipline based, integrated, interdisciplinary, applied, or occupational/technical approaches) the standards for instruction to best meet the needs of students in the schools and districts and how to deliver instruction

Organization of the Kentucky Academic Standards

This document contains the following sections: Introduction, Preschool Education, Primary Education, Intermediate Education, Secondary Education with specific sections for Middle Education and High School Education, Career and Technical Education and Additional Curriculum Guidelines. Each section (e.g., Primary, Intermediate, Secondary, etc.) begins with general information followed by the minimum content standards for each content area. Each content area (i.e., ~~mathematics,~~ science, social studies, ~~English Language arts,~~ etc.) subsection begins with an introduction to the content area, followed by the charts by grade levels that specify the required minimum content that all students shall have the opportunity to learn. The content is based on Kentucky's learning goals, academic expectations, national and international standards and input from education professional organizations, teachers, administrators, higher education, the business community and parents.

Learning Goal 1 (Basic Communication and mathematics Skills) and Goal 2 (Application of Core Concepts) are cited most often within this document. These two goals provide the basic academic skills and content for what Kentucky high school graduates should know when they exit public school. However, the skills identified in the other goals are equally important. Goal 5 (Think and Solve Problems) and Goal 6 (Connect and Integrate Knowledge) provide students with strategies for lifelong learning and are embedded in the specific content areas. They are also reflected in the Inquiry and Research section for each content area.

The Academic Expectations within each of these four goals (Goals 1, 2, 5 and 6) are referenced throughout the content descriptions in the *Kentucky Academic Standards*.

Although Goal 3 (Developing Self-Sufficiency) and Goal 4 (Responsible Group Membership) are not being assessed on a statewide level, the Kentucky Board of Education expects all educators, school boards and councils, parents and students to give continued emphasis to the development of responsible group membership and personal self-sufficiency because of the importance of these skills and attributes in the workplace and the larger community. Goals 3 and 4 and the Academic Expectations for these goals are included below:

Goal 3: Students shall develop their abilities to become self-sufficient individuals.

Academic Expectations for Goal 3:

3.1 Students demonstrate positive growth in self-concept through appropriate tasks or projects.
3.2 Students demonstrate the ability to maintain a healthy lifestyle.
3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.
3.4 Students demonstrate the ability to be resourceful and creative.
3.5 Students demonstrate self-control and self discipline.
3.6 Students demonstrate the ability to make decisions based on ethical values.
3.7 Students demonstrate the ability to learn on one's own.

Goal 4: Students shall develop their abilities to become responsible members of a family, work group, or community, including demonstrating effectiveness in community service.

Academic Expectations for Goal 4:

4.1 Students effectively use interpersonal skills.
4.2 Students use productive team membership skills.
4.3 Students individually demonstrate consistent, responsive, and caring behavior.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multi-cultural and world view.
4.6 Students demonstrate an open mind to alternative perspectives.

It is the belief of the Kentucky Board of Education that the Kentucky Academic Standards frames the critical standards necessary to prepare Kentucky students for successful transition to postsecondary options and the changing workplace and the next generation of learning. Schools and districts are responsible for translating these standards into practice

PRESCHOOL EDUCATION

Preschool Education

For many students, the preschool program is their introduction to the educational environment. Preschool education programs are available in Kentucky for all 4-year-old children who are eligible for free lunch; all 3- and 4-year-old children with disabilities, regardless of income; and other 4-year-old children as placements are available. The preschool program is designed to be developmentally appropriate for young children.

"Developmentally appropriate" is defined in Kentucky law to mean that the program focuses on the child's physical, intellectual, social and emotional development, including interpersonal, intrapersonal and socialization skills. Intellectual skills are promoted by encouraging children to solve problems, initiate activities and learn through active explorations.

The preschool curriculum addresses early-learning standards that are integrated into a variety of activities within an environment that supports optimal development for the whole child. A major focus of the preschool program is language development – listening, speaking and becoming familiar with books. As they are developmentally ready, children begin to explore and learn about writing, letters and sounds, and mathematics concepts. Teachers promote child learning and development by embedding assessment activities within the curriculum and daily schedule.

The preschool curriculum supports a daily balance of large and small group activities, indoors and outdoors, that are designed to provide individual and group instruction to meet the needs of all children. Child-initiated and teacher-supported play is encouraged through the use of a variety of learning centers and areas in the classroom that allow students to participate in art, block building, cooking, gross motor activities, dramatic play, language arts/library, using manipulative materials, mathematics/problem solving, multimedia activities, music and science/social studies.

ELEMENTARY EDUCATION

PRIMARY EDUCATION

Primary Education

The primary program is that part of the Kentucky education system in which children are enrolled from the time they begin elementary school until they are ready to enter the fourth grade. The critical attributes of the primary program include developmentally appropriate practices, multi-age and multi-ability classrooms, continuous progress, authentic assessment, qualitative reporting methods, professional teamwork and positive parent involvement.

The primary curriculum is grounded in these critical attributes. It provides opportunities for students to learn basic skills, social behaviors (e.g., working with others, taking turns) and skills students must acquire to be successful in school (e.g., study skills, organization). Teachers use an integrated approach to curriculum and instructional design, addressing the intellectual, social, emotional, aesthetic and physical needs of young children to provide optimum learning environments.

Standards are presented grade by grade in most areas to provide a general guide for the progression of learning throughout the primary grades. When not presented grade by grade, it is expected that students should have had opportunities to be successful with the standards before transitioning to fourth grade.

PRIMARY ~~ARTS AND HUMANITIES~~ VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – ~~Arts and Humanities~~ Visual and Performing Arts – Primary Level

Grades K-3

The ~~arts and humanities~~ visual and performing arts instructional program in the primary level centers on an exploration of the art forms of dance, media arts, music, theatre, and visual arts. Instructional emphasis at the primary level should be placed on exposing students to a variety of arts through active experiences. This exploration includes a beginning of arts literacy development, simple analysis and critique of the arts, and active sharing of their work with others. Students should also begin making connections between the arts and their own personal experiences, along with beginning to realize how the arts convey meaning and reflect human experience. Students can begin to learn how they can use the arts to communicate meaning through their choices in the use of arts elements and principles.

The Standards
The standards are directly related to the *National Core Arts Standards*. These are process standards, which are designed to engage students in artistic processes and creative expression as put forward in Senate Bill 1 (2009), KRS 158:6451, Section 1, Schools shall develop their students' ability to: "Express their creative talents and interests in visual arts, music, dance, and dramatic arts".

Standards Organization
The standards are organized around four arts processes:

1. **Creating:** Conceiving and developing new artistic ideas and work

   Creating involves planning and creating new dance, media arts, music, theatre, or visual arts. Creating may involve improvising in music, dance or theatre. Improvising is the composing of new music, reciting/acting new dramatic material, or creating new dance movements on the spur of the moment.

2. **Performing/Producing/Presenting:** Realizing artistic ideas and work through interpretation and presentation

   Performing is limited to the performing arts of music, dance and theatre. Performing generally involves sharing previously created works with an audience. Although the process of performing involves following a creative plan conceived by a composer, playwright or choreographer, there is still opportunity for creative interpretations within the performance.

   Producing is the process of sharing work in the area of media arts. Since media arts productions do not result in performances, the sharing process is different from the performing arts. Media artists still follow the same steps in the creation of works and preparation of works for sharing with others; however the result is more often a product such as a video or video game.

   Presenting is often associated with sharing in more formal settings such as exhibition in the visual arts. The same steps to prepare works for presenting are considered-the audience, venue and communication aspects of an exhibition.

3. **Responding:** Understanding and evaluating how the arts convey meaning

   Responding to the arts involves having the viewer take a close look to interpret the meanings in artistic works. The arts are created for the purpose of communication. Responding to them engages a thinking process that enables the viewer/audience to gather the intent of the work and the message being share by the artist.

   Responding also involves the process of evaluating art works. The viewer/audience will apply criteria to evaluate the effectiveness of artistic works.

4. **Connecting:** Relating artistic ideas and work with personal meaning and external context

   Connecting involves both looking inward and outward. Artists use personal experiences and gained knowledge to inform their own creative works. They also relate artistic ideas with the world around them; to society, culture, and history. This deepens the understanding of the work and appreciation of those who create the arts.

Anchor Standards
There are eleven Anchor Standards that are common across all art forms. These standards illustrate steps that are taken within each of the Artistic Processes.

Performance Standards
Each artistic discipline has a set of performance standards. These standards illustrate what each of the Anchor Standards might look like as students engage in the Artistic Processes within an artistic discipline. Performance standard are written for pre-kindergarten through eighth grade as grade level standards, and at the high school in three proficiency levels; Proficient, Accomplished and Advanced. All Performance Standards align to the eleven overarching Anchor Standards.

Discipline: Dance	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Explore

Enduring Understanding: Choreographers use a variety of sources as inspiration and transform concepts and ideas into movement for artistic expression.

Essential Question: Where do choreographers get ideas for dances?

Kindergarten **DA:Cr1.1.K**	**1st** **DA:Cr1.1.1**	**2nd** **DA:Cr1.1.2**	**3rd** **DA:Cr1.1.3**
a. Respond in movement to a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance).	a. Explore movement inspired by a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance, experiences) and identify the source.	a. Explore movement inspired by a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance, experiences) and suggest additional sources for movement ideas.	a. Experiment with a variety of self-identified stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences) for movement.
b. Explore different ways to do basic locomotor and non-locomotor movements by changing at least one of the elements of dance.	b. Explore a variety of locomotor and non-locomotor movements by experimenting with and changing the elements of dance.	b. Combine a variety of movements while manipulating the elements of dance.	b. Explore a given movement problem. Select and demonstrate a solution.

Discipline: Dance		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work **Process Component:** Plan **Enduring Understanding**: The elements of dance, dance structures, and choreographic devices serve as both a foundation and a departure point for choreographers. **Essential Question**: What influences choice-making in creating choreography?			
Kindergarten **DA:Cr2.1.K**	**1st** **DA:Cr2.1.1**	**2nd** **DA:Cr2.1.2**	**3rd** **DA:Cr2.1.3**
a. Improvise dance that has a beginning, middle, and end. b. Express an idea, feeling, or image, through improvised movement moving alone or with a partner	a. Improvise a series of movements that have a beginning, middle, and end, and describe movement choices. b. Choose movements that express an idea or emotion, or follow a musical phrase.	a. Improvise a dance phrase with a beginning, a middle that has a main idea, and a clear end. b. Choose movements that express a main idea or emotion, or follow a musical phrase. Explain reasons for movement choices.	a. Identify and experiment with choreographic devices to create simple movement patterns and dance structures (for example, AB, ABA, theme and development). b. Develop a dance phrase that expresses and communicates an idea or feeling. Discuss the effect of the movement choices.

Discipline: Dance		**Artistic Process**: Creating	
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Revise **Enduring Understanding**: Choreographers analyze, evaluate, refine, and document their work to communicate meaning. **Essential Question**: How do choreographers use self-reflection, feedback from others, and documentation to improve the quality of their work?			
Kindergarten **DA:Cr3.1.K**	**1st** **DA:Cr3.1.1**	**2nd** **DA:Cr3.1.2**	**3rd** **DA:Cr3.1.3**
a. Apply suggestions for changing movement through guided improvisational experiences.	a. Explore suggestions to change movement from guided improvisation and/or short remembered sequences.	a. Explore suggestions and make choices to change movement from guided improvisation and/or short remembered sequences.	a. Revise movement choices in response to feedback to improve a short dance study. Describe the differences the changes made in the movements.
b. Depict a dance movement by drawing a picture or using a symbol.	b. Depict several different types of movements of a dance by drawing a picture or using a symbol (for example, jump, turn, slide, bend, reach).	b. Depict the levels of movements in a variety of dance movements by drawing a picture or using symbols (for example, high, middle, low).	b. Depict directions or spatial pathways in a dance phrase by drawing a picture map or using a symbol.

Discipline: Dance	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Express

Enduring Understanding: Space, time, and energy are basic elements of dance.

Essential Question: How do dancers work with space, time and energy to communicate artistic expression?

Kindergarten **DA:Pr4.1.K**	**1st** **DA:Pr4.1.1**	**2nd** **DA:Pr4.1.2**	**3rd** **DA:Pr4.1.3**
a. Make still and moving body shapes that show lines (for example, straight, bent, and curved), changes levels, and vary in size (large/small). Join with others to make a circle formation and work with others to change its dimensions.	a. Demonstrate locomotor and non-locomotor movements that change body shapes, levels, and facings. Move in straight, curved, and zig-zagged pathways. Find and return to place in space. Move with others to form straight lines and circles.	a. Demonstrate clear directionality and intent when performing locomotor and non-locomotor movements that change body shapes, facings, and pathways in space. Identify symmetrical and asymmetrical body shapes and examine relationships between body parts. Differentiate between circling and turning as two separate ways of continuous directional change.	a. Judge spaces as distance traveled and use space three-dimensionally. Demonstrate shapes with positive and negative space. Perform movement sequences in and through space with intentionality and focus.
b. Demonstrate tempo contrasts with movements that match to tempo of sound stimuli.	b. Relate quick, moderate and slow movements to duration in time. Recognize steady beat and move to varying tempi of steady beat.	b. Identify the length of time a move or phrase takes (for example, whether it is long or short). Identify and move on the downbeat in duple and triple meter. Correlate metric phrasing with movement phrasing.	b. Fulfill specified duration of time with improvised locomotor and non-locomotor movements. Differentiate between "in time" and "out of time" to music. Perform movements that are the same or of a different time orientation to accompaniment. Use metric and kinesthetic phrasing.

c. Identify and apply different characteristics to movements (for example, slow, smooth, or wavy).	c. Demonstrate movement characteristics along with movement vocabulary (for example, use adverbs and adjectives that apply to movement such as a bouncy leap, a floppy fall, a jolly jump, and joyful spin).	c. Select and apply appropriate characteristics to movements (for example, selecting specific adverbs and adjectives and apply them to movements). Demonstrate kinesthetic awareness while dancing the movement characteristics.	c. Change use of energy and dynamics by modifying movements and applying specific characteristics to heighten the effect of their intent.

Discipline: Dance		**Artistic Process**: Performing	
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Embody **Enduring Understanding**: Dancers use the mind-body connection and develop the body as an instrument for artistry and artistic expression. **Essential Question**: What must a dancer do to prepare the mind and body for artistic expression?			
Kindergarten **DA:Pr5.1.K**	**1st** **DA:Pr5.1.1**	**2nd** **DA:Pr5.1.2**	**3rd** **DA:Pr5.1.3**
a. Demonstrate same-side and cross-body locomotor and non-locomotor movements, body patterning movements, and body shapes. b. Move safely in general space and start and stop on cue during activities, group formations, and creative explorations while maintaining personal space. c. Move body parts in relation to other body parts and repeat and recall movements upon request.	a. Demonstrate a range of locomotor and non-locomotor movements, body patterning, body shapes, and directionality. b. Move safely in general space through a range of activities and group formations while maintaining personal space. c. Modify movements and spatial arrangements upon request.	a. Demonstrate a range of locomotor and non-locomotor movements, body patterning, and dance sequences that require moving through space using a variety of pathways. b. Move safely in a variety of spatial relationships and formations with other dancers, sharing and maintaining personal space. c. Repeat movements, with an awareness of self and others in space. Self-adjust and modify movements or placement upon request.	a. Replicate body shapes, movement characteristics, and movement patterns in a dance sequence with awareness of body alignment and core support. b. Adjust body-use to coordinate with a partner or other dancers to safely change levels, directions, and pathway designs. c. Recall movement sequences with a partner or in group dance activities. Apply constructive feedback from teacher and self-check to improve dance skills.

Discipline: Dance		**Artistic Process**: Performing	
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Dance performance is an interaction between performer, production elements, and audience that heightens and amplifies artistic expression. **Essential Question**: How does a dancer heighten artistry in a public performance?			
Kindergarten **DA:Pr6.1.K**	**1st** **DA:Pr6.1.1**	**2nd** **DA:Pr6.1.2**	**3rd** **DA:Pr6.1.3**
a. Dance for and with others in a designated space. b. Select a prop to use as part of a dance.	a. Dance for others in a space where audience and performers occupy different areas. b. Explore the use of simple props to enhance performance.	a. Dance for and with others in a space where audience and performers occupy different areas. b. Use limited production elements (for example, hand props, simple scenery, or media projections).	a. Identify the main areas of a performance space using production terminology (for example, stage right, stage left, center stage, upstage, and downstage). b. Explore simple production elements (costumes, props, music, scenery, lighting, or media) for a dance performed for an audience in a designated specific performance space.

Discipline: Dance		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Dance is perceived and analyzed to comprehend its meaning. **Essential Question**: How is a dance understood?			
Kindergarten DA:Re.7.1.K	**1st DA:Re.7.1.1**	**2nd DA:Re.7.1.2**	**3rd DA:Re.7.1.3**
a. Find a movement that repeats in a dance. b. Demonstrate or describe observed or performed dance movements.	a. Find a movement that repeats in a dance to make a pattern. b. Demonstrate and describe observed or performed dance movements from a specific genre or culture.	a. Find movements in a dance that develop a pattern. b. Demonstrate and describe movements in dances from different genres or cultures.	a. Find a movement pattern that creates a movement phrase in a dance work. b. Demonstrate and explain how one dance genre is different from another, or how one cultural movement practice is different from another.

Discipline: Dance		**Artistic Process**: Responding	
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Dance is interpreted by considering intent, meaning, and artistic expression as communicated through the use of the body, elements of dance, dance technique, dance structure, and context. **Essential Question**: How is dance interpreted?			
Kindergarten DA:Re8.1.K	**1st DA:Re8.1.1**	**2nd DA:Re8.1.2**	**3rd DA:Re8.1.3**
Observe movement and describe it using simple dance terminology.	Select movements from a dance that suggest ideas and explain how the movement captures the idea using simple dance terminology.	Use context cues from movement to identify meaning and intent in a dance using simple dance terminology.	Select specific context cues from movement. Explain how they relate to the main idea of the dance using basic dance terminology.

Discipline: Dance		**Artistic Process**: Responding	
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Critique **Enduring Understanding**: Criteria for evaluating dance vary across genres, styles, and cultures. **Essential Question**: What criteria are used to evaluate dance?			
Kindergarten DA:Re9.1.K	**1st DA:Re9.1.1**	**2nd DA:Re9.1.2**	**3rd DA:Re9.1.3**
Find a movement that was noticed in a dance. Demonstrate the movement that was noticed and explain why it attracted attention.	Identify and demonstrate several movements in a dance that attracted attention. Describe the characteristics that make the movements interesting and talk about why they were chosen.	Observe or demonstrate dances from a genre or culture. Discuss movements and other aspects of the dances that make the dances work well, and explain why they work. Use simple dance terminology.	Select dance movements from specific genres, styles, or cultures. Identify characteristic movements from these dances and describe in basic dance terminology ways in which they are alike and different.

Discipline: Dance		**Artistic Process**: Connecting	
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: As dance is experienced, all personal experiences, knowledge, and contexts are integrated and synthesized to interpret meaning. **Essential Question**: How does dance deepen our understanding of ourselves, other knowledge, and events around us?			
Kindergarten **DA:Cn10.1.K**	**1st** **DA:Cn10.1.1**	**2nd** **DA:Cn10.1.2**	**3rd** **DA:Cn10.1.3**
a. Recognize and name an emotion that is experienced when watching, improvising, or performing dance and relate it to a personal experience. b. Observe a work of visual art. Describe and then express through movement something of interest about the artwork, and ask questions for discussion concerning the artwork.	a. Find an experience expressed or portrayed in a dance that relates to a familiar experience. Identify the movements that communicate this experience. b. Observe illustrations from a story. Discuss observations and identify ideas for dance movement and demonstrate the big ideas of the story.	a. Describe, create, and/or perform a dance that expresses personal meaning and explain how certain movements express this personal meaning. b. Respond to a dance work using an inquiry-based set of questions (for example, See, Think, Wonder). Create movement using ideas from responses and explain how certain movements express a specific idea.	a. Compare the relationships expressed in a dance to relationships with others. Explain how they are the same or different. b. Ask and research a question about a key aspect of a dance that communicates a perspective about an issue or event. Explore the key aspect through movement. Share movements and describe how the movements help to remember or discover new qualities in these key aspects. Communicate the new learning in oral, written, or movement form.

Discipline: Dance		**Artistic Process**: Connecting	
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: Dance literacy includes deep knowledge and perspectives about societal, cultural, historical, and community contexts. **Essential Question**: How does knowing about societal, cultural, historical and community experiences expand dance literacy?			
Kindergarten **DA:Cn11.1.K**	**1st** **DA:Cn11.1.1**	**2nd** **DA:Cn11.1.2**	**3rd** **DA:Cn11.1.3**
Describe or demonstrate the movements in a dance that was watched or performed.	Watch and/or perform a dance from a different culture and discuss or demonstrate the types of movement danced.	Observe a dance and relate the movement to the people or environment in which the dance was created and performed.	Find a relationship between movement in a dance from a culture, society, or community and the culture from which the dance is derived. Explain what the movements communicate about key aspects of the culture, society, or community.

Discipline: Media Arts		**Artistic Process**: Creating	
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Conceive **Enduring Understanding**: Media arts ideas, works, and processes are shaped by the imagination, creative processes, and by experiences, both within and outside of the arts. **Essential Question**: How do media artists generate ideas? How can ideas for media arts productions be formed and developed to be effective and original?			
Kindergarten (MA:Cr1.1.K)	**1st (MA:Cr1.1.1)**	**2nd (MA:Cr1.1.2)**	**3rd (MA:Cr1.1.3)**
Discover and share ideas for media artworks using play and experimentation.	Express and share ideas for media artworks through sketching and modeling.	Discover multiple ideas for media artworks through brainstorming and improvising.	Develop multiple ideas for media artworks using a variety of tools, methods and/or materials.

Discipline: Media Arts		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work **Process Component:** Develop **Enduring Understanding**: Media artists plan, organize, and develop creative ideas, plans, and models into process structures that can effectively realize the artistic idea. **Essential Question**: How do media artists organize and develop ideas and models into process structures to achieve the desired end product?			
Kindergarten (MA:Cr2.1.K)	**1st (MA:Cr2.1.1)**	**2nd (MA:Cr2.1.2)**	**3rd (MA:Cr2.1.3)**
With guidance, use ideas to form plans or models for media arts productions.	With guidance, use identified ideas to form plans and models for media arts productions.	Choose ideas to create plans and models for media arts productions.	Form, share, and test ideas, plans, and models to prepare for media arts productions.

Discipline: Media Arts		**Artistic Process**: Creating	
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Construct **Enduring Understanding**: The forming, integration, and refinement of aesthetic components, principles, and processes creates purpose, meaning, and artistic quality in media artworks. **Essential Question**: What is required to produce a media artwork that conveys purpose, meaning, and artistic quality? How do media artists improve/refine their work?			
Kindergarten (MA:Cr3.1.K)	**1st (MA:Cr3.1.1)**	**2nd (MA:Cr3.1.2)**	**3rd (MA:Cr3.1.3)**
a. Form and capture media arts content for expression and meaning in media arts productions.	a. Create, capture, and assemble media arts content for media arts productions, identifying basic principles, such as pattern and repetition.	a. Construct and assemble content for unified media arts productions, identifying and applying basic principles, such as positioning and attention.	a. Construct and order various content into unified, purposeful media arts productions, describing and applying a defined set of principles, such as movement and force.
b. Make changes to the content, form, or presentation of media artworks and share results.	b. Practice and identify the effects of making changes to the content, form, or presentation, in order to refine and finish media artworks.	b. Test and describe expressive effects in altering, refining, and completing media artworks.	b. Practice and analyze how the emphasis of elements alters effect and purpose in refining and completing media artworks.

Discipline: Media Arts		**Artistic Process**: Producing	
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Integrate **Enduring Understanding**: Media artists integrate various forms and contents to develop complex, unified artworks. **Essential Question**: How are complex media arts experiences constructed?			
Kindergarten (MA:Pr4.1.K)	**1st (MA:Pr4.1.1)**	**2nd (MA:Pr4.1.2)**	**3rd (MA:Pr4.1.3)**
With guidance, combine arts forms and media content, such as dance and video, to form media artworks.	Combine varied academic, arts, and media content in media artworks, such as an illustrated story.	Practice combining varied academic, arts, and media content into unified media artworks, such as a narrated science animation.	Practice combining varied academic, arts, and media forms and content into unified media artworks, such as animation, music, and dance.

Discipline: Media Arts	**Artistic Process**: Producing

Anchor Standard 5: Develop and refine artistic technique and work for presentation.

Process Component: Practice

Enduring Understanding: Media artists require a range of skills and abilities to creatively solve problems within and through media arts productions.

Essential Question: What skills are required for creating effective media artworks and how are they improved? How are creativity and innovation developed within and through media arts productions? How do media artists use various tools and techniques?

Kindergarten (MA:Pr5.1.K)	**1st (MA:Pr5.1.1)**	**2nd (MA:Pr5.1.2)**	**3rd (MA:Pr5.1.3)**
a. Identify and demonstrate basic skills, such as handling tools, making choices, and cooperating in creating media artworks.	a. Describe and demonstrate various artistic skills and roles, such as technical steps, planning, and collaborating in media arts productions.	a. Enact roles to demonstrate basic ability in various identified artistic, design, technical, and soft skills, such as tool use and collaboration in media arts productions.	a. Exhibit developing ability in a variety of artistic, design, technical, and organizational roles, such as making compositional decisions, manipulating tools, and group planning in media arts productions.
b. Identify and demonstrate creative skills, such as performing, within media arts productions.	b. Describe and demonstrate basic creative skills within media arts productions, such as varying techniques.	b. Demonstrate use of experimentation skills, such as playful practice, and trial and error, within and through media arts productions.	b. Exhibit basic creative skills to invent new content and solutions within and through media arts productions.
c. Practice, discover, and share how media arts creation tools work.	c. Experiment with and share different ways to use tools and techniques to construct media artworks.	c. Demonstrate and explore identified methods to use tools to capture and form media artworks.	c. Exhibit standard use of tools and techniques while constructing media artworks.

Discipline: Media Arts	**Artistic Process**: Producing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Media artists purposefully present, share, and distribute media artworks for various contexts.

Essential Question: How does time, place, audience, and context affect presenting or performing choices for media artworks? How can presenting or sharing media artworks in a public format help a media artist learn and grow?

Kindergarten (MA:Pr6.1.K)	**1st (MA:Pr6.1.1)**	**2nd (MA:Pr6.1.2)**	**3rd (MA:Pr6.1.3)**
a. With guidance, identify and share roles and the situation in presenting media artworks.	a. With guidance, discuss presentation conditions and perform a task in presenting media artworks.	a. Identify and describe presentation conditions and perform task(s) in presenting media artworks.	a. Identify and describe the presentation conditions, and take on roles and processes in presenting or distributing media artworks.
b. With guidance, identify and share reactions to the presentation of media artworks.	b. With guidance, discuss the experience of the presentation of media artworks.	b. Identify and describe the experience and share results of presenting media artworks.	b. Identify and describe the experience, and share results of and improvements for presenting media artworks.

Discipline: Media Arts		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Identifying the qualities and characteristics of media artworks improves one's artistic appreciation and production. **Essential Question**: How do we 'read' media artworks and discern their relational components? How do media artworks function to convey meaning and manage audience experience?			
Kindergarten (MA:Re7.1.K)	**1st (MA:Re7.1.1)**	**2nd (MA:Re7.1.2)**	**3rd (MA:Re7.1.3)**
a. Recognize and share components and messages in media artworks. b. Recognize and share how a variety of media artworks create different experiences.	a. Identify components and messages in media artworks. b. With guidance, identify how a variety of media artworks create different experiences.	a. Identify and describe the components and messages in media artworks. b. Identify and describe how a variety of media artworks create different experiences.	a. Identify and describe how messages are created by components in media artworks. b. Identify and describe how various forms, methods, and styles in media artworks manage audience experience.

Discipline: Media Arts		**Artistic Process**: Responding	
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Interpretation and appreciation require consideration of the intent, form, and context of the media and artwork. **Essential Question**: How do people relate to and interpret media artworks?			
Kindergarten (MA:Re8.1.K)	**1st (MA:Re8.1.1)**	**2nd (MA:Re8.1.2)**	**3rd (MA:Re8.1.3)**
With guidance, share observations regarding a variety of media artworks.	With guidance, identify the meanings of a variety of media artworks.	Determine the purposes and meanings of media artworks, considering their context.	Determine the purposes and meanings of media artworks while describing their context.

Discipline: Media Arts		**Artistic Process**: Responding	
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Skillful evaluation and critique are critical components of experiencing, appreciating, and producing media artworks. **Essential Question**: How and why do media artists value and judge media artworks? When and how should we evaluate and critique media artworks to improve them?			
Kindergarten (MA:Re9.1.K)	**1st (MA:Re9.1.1)**	**2nd (MA:Re9.1.2)**	**3rd (MA:Re9.1.3)**
Share appealing qualities and possible changes in media artworks.	Identify the effective parts of and possible changes to media artworks, considering viewers.	Discuss the effectiveness of and improvements for media artworks, considering their context.	Identify basic criteria for and evaluate media artworks, considering possible improvements and context.

Discipline: Media Arts		**Artistic Process**: Connecting	
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Media artworks synthesize meaning and form cultural experience. **Essential Question**: How do we relate knowledge and experiences to understanding and making media artworks? How do we learn about and create meaning through producing media artworks?			
Kindergarten (MA:Cn10.1.K)	**1st (MA:Cn10.1.1)**	**2nd (MA:Cn10.1.2)**	**3rd (MA:Cn10.1.3)**
a. Use personal experiences and choices in making media artworks. b. Share memorable experiences of media artworks.	a. Use personal experiences, interests, and models in creating media artworks. b. Share meaningful experiences of media artworks.	a. Use personal experiences, interests, information, and models in creating media artworks. b. Discuss experiences of media artworks, describing their meaning and	a. Use personal and external resources, such as interests, information, and models, to create media artworks. b. Identify and show how media artworks form meanings, situations, and/or culture, such as

		purpose.	popular media.

Discipline: Media Arts	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Process Component: Relate

Enduring Understanding: Media artworks and ideas are better understood and produced by relating them to their purposes, values, and various contexts.

Essential Question: How does media arts relate to its various contexts, purposes, and values? How does investigating these relationships inform and deepen the media artist's understanding and work?

Kindergarten (MA:Cn11.1.K)	**1st (MA:Cn11.1.1)**	**2nd (MA:Cn11.1.2)**	**3rd (MA:Cn11.1.3)**
a. With guidance, share ideas in relating media artworks and everyday life, such as daily activities. b. With guidance, interact safely and appropriately with media arts tools and environments.	a. Discuss and describe media artworks in everyday life, such as popular media, and connections with family and friends. b. Interact appropriately with media arts tools and environments, considering safety, rules, and fairness.	a. Discuss how media artworks and ideas relate to everyday and cultural life, such as media messages and media environments. b. Interact appropriately with media arts tools and environments, considering safety, rules, and fairness.	a. Identify how media artworks and ideas relate to everyday and cultural life and can influence values and online behavior. b. Examine and interact appropriately with media arts tools and environments, considering safety, rules, and fairness.

<table>
<tr><td colspan="2">Discipline: Music</td><td colspan="2">Artistic Process: Creating</td></tr>
<tr><td colspan="4">Anchor Standard 1: Generate and conceptualize artistic ideas and work.
Process Component: Imagine
Enduring Understanding: The creative ideas, concepts, and feelings that influence musicians’ work emerge from a variety of sources.
Essential Question: How do musicians generate creative ideas?</td></tr>
<tr><th>Kindergarten
MU:Cr1.1.K</th><th>1st
MU:Cr1.1.1</th><th>2nd
MU:Cr1.1.2</th><th>3rd
MU:Cr1.1.3</th></tr>
<tr><td>a. With guidance, explore and experience music concepts (such as beat and melodic contour).

b. With guidance, generate musical ideas (such as movements or motives).</td><td>a. With limited guidance, create musical ideas (such as answering a musical question) for a specific purpose.

b. With limited guidance, generate musical ideas in multiple tonalities (such as major and minor) and meters (such as duple and triple).</td><td>a. Improvise rhythmic and melodic patterns and musical ideas for a specific purpose.

b. Generate musical patterns and ideas within the context of a given tonality (such as major and minor) and meter (such as duple and triple).</td><td>a. Improvise rhythmic and melodic ideas, and describe connection to specific purpose and context (such as personal and social).

b. Generate musical ideas (such as rhythms and melodies) within a given tonality and/or meter.</td></tr>
</table>

Discipline: Music		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan and Make **Enduring Understanding**: Musicians' creative choices are influenced by their expertise, context, and expressive intent. **Essential Question**: How do musicians make creative decisions?			
Kindergarten **MU:Cr2.1.K**	**1st** **MU:Cr2.1.1**	**2nd** **MU:Cr2.1.2**	**3rd** **MU:Cr2.1.3**
a. With guidance, demonstrate and choose favorite musical ideas.	a. With limited guidance, demonstrate and discuss personal reasons for selecting musical ideas that represent expressive intent.	a. Demonstrate and explain personal reasons for selecting patterns and ideas for music that represent expressive intent.	a. Demonstrate selected musical ideas for a simple improvisation or composition to express intent, and describe connection to a specific purpose and context.
b. With guidance, organize personal musical ideas using iconic notation and/or recording technology.	b. With limited guidance, use iconic or standard notation and/or recording technology to document and organize personal musical ideas.	b. Use iconic or standard notation and/or recording technology to combine, sequence, and document personal musical ideas.	b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic and melodic musical ideas.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Evaluate and Refine

Enduring Understanding: Musicians evaluate, and refine their work through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their creative work?

Kindergarten MU:Cr3.1.K	**1st MU:Cr3.1.1**	**2nd MU:Cr3.1.2**	**3rd MU:Cr3.1.3**
With guidance, apply personal, peer, and teacher feedback in refining personal musical ideas.	With limited guidance, discuss and apply personal, peer, and teacher feedback to refine personal musical ideas.	Interpret and apply personal, peer, and teacher feedback to revise personal music.	Evaluate, refine, and document revisions to personal musical ideas, applying teacher-provided and collaboratively-developed criteria and feedback.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Present

Enduring Understanding: Musicians' presentation of creative work is the culmination of a process of creation and communication.

Essential Question: When is creative work ready to share?

Kindergarten MU:Cr3.2.K	**1st MU:Cr3.2.1**	**2nd MU:Cr3.2.2**	**3rd MU:Cr3.2.3**
With guidance, demonstrate a final version of personal musical ideas to peers.	With limited guidance, convey expressive intent for a specific purpose by presenting a final version of personal musical ideas to peers or informal audience.	Convey expressive intent for a specific purpose by presenting a final version of personal musical ideas to peers or informal audience.	Present the final version of personal created music to others, and describe connection to expressive intent.

Discipline: Music		**Artistic Process**: Performing	
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Performers' interest in and knowledge of musical works, understanding of their own technical skill, and the context for a performance influence the selection of repertoire. **Essential Question**: How do performers select repertoire?			
Kindergarten MU:Pr4.1.K	**1st MU:Pr4.1.1**	**2nd MU:Pr4.1.2**	**3rd MU:Pr4.1.3**
With guidance, demonstrate and state personal interest in varied musical selections.	With limited guidance, demonstrate and discuss personal interest in, knowledge about, and purpose of varied musical selections.	Demonstrate and explain personal interest in, knowledge about, and purpose of varied musical selections.	Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, purpose, and context.

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

Kindergarten **MU:Pr4.2.K**	**1st** **MU:Pr4.2.1**	**2nd** **MU:Pr4.2.2**	**3rd** **MU:Pr4.2.3**
With guidance, explore and demonstrate awareness of music contrasts (such as high/low, loud/soft, same/different) in a variety of music selected for performance.	a. With limited guidance, demonstrate knowledge of music concepts (such as beat and melodic contour) in music from a variety of cultures selected for performance. b. When analyzing selected music, read and perform rhythmic patterns using iconic or standard notation.	a. Demonstrate knowledge of music concepts (such as tonality and meter) in music from a variety of cultures selected for performance. b. When analyzing selected music, read and perform rhythmic and melodic patterns using iconic or standard notation.	a. Demonstrate understanding of the structure in music selected for performance. b. When analyzing selected music, read and perform rhythmic patterns and melodic phrases using iconic and standard notation. c. Describe how context (such as personal and social) can inform a performance.

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Interpret

Enduring Understanding: Performers make interpretive decisions based on their understanding of context and expressive intent.

Essential Question: How do performers interpret musical works?

Kindergarten **MU:Pr4.3.K**	**1st** **MU:Pr4.3.1**	**2nd** **MU:Pr4.3.2**	**3rd** **MU:Pr4.3.3**
With guidance, demonstrate awareness of expressive qualities (such as voice quality, dynamics, and tempo) that support the creators' expressive intent.	Demonstrate and describe music's expressive qualities (such as dynamics and tempo).	Demonstrate understanding of expressive qualities (such as dynamics and tempo) and how creators use them to convey expressive intent.	Demonstrate and describe how intent is conveyed through expressive qualities (such as dynamics and tempo).

Discipline: Music		**Artistic Process**: Performing	
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Rehearse, Evaluate, Refine **Enduring Understanding**: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria. **Essential Question**: How do musicians improve the quality of their performance?			
Kindergarten MU:Pr5.1.K	**1st MU:Pr5.1.1**	**2nd MU:Pr5.1.2**	**3rd MU:Pr5.1.3**
a. With guidance, apply personal, teacher, and peer feedback to refine performances.	a. With limited guidance, apply personal, teacher, and peer feedback to refine performances.	a. Apply established criteria to judge the accuracy, expressiveness, and effectiveness of performances.	a. Apply teacher-provided and collaboratively-developed criteria and feedback to evaluate accuracy of ensemble performances.
b. With guidance, use suggested strategies in rehearsal to improve the expressive qualities of music.	b. With limited guidance, use suggested strategies in rehearsal to address interpretive challenges of music.	b. Rehearse, identify and apply strategies to address interpretive, performance, and technical challenges of music.	b. Rehearse to refine technical accuracy, expressive qualities, and identified performance challenges.

Discipline: Music		**Artistic Process**: Performing	
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Musicians judge performance based on criteria that vary across time, place, and culture. The context and how a work is presented influence the audience response. **Essential Question**: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?			
Kindergarten **MU:Pr6.1.K**	**1st** **MU:Pr6.1.1**	**2nd** **MU:Pr6.1.2**	**3rd** **MU:Pr6.1.3**
a. With guidance, perform music with expression. b. Perform appropriately for the audience.	a. With limited guidance, perform music for a specific purpose with expression. b. Perform appropriately for the audience and purpose.	a. Perform music for a specific purpose with expression and technical accuracy. b. Perform appropriately for the audience and purpose.	a. Perform music with expression and technical accuracy. b. Demonstrate performance decorum and audience etiquette appropriate for the context and venue.

Discipline: Music		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Select **Enduring Understanding**: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes. **Essential Question**: How do individuals choose music to experience?			
Kindergarten **MU:Re7.1.K**	**1st** **MU:Re7.1.1**	**2nd** **MU:Re7.1.2**	**3rd** **MU:Re7.1.3**
With guidance, list personal interests and experiences and demonstrate why they prefer some music selections over others.	With limited guidance, identify and demonstrate how personal interests and experiences influence musical selection for specific purposes.	Explain and demonstrate how personal interests and experiences influence musical selection for specific purposes.	Demonstrate and describe how selected music connects to and is influenced by specific interests, experiences, or purposes.

Discipline: Music		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music. **Essential Question**: How does understanding the structure and context of music inform a response?			
Kindergarten **MU:Re7.2.K**	**1st** **MU:Re7.2.1**	**2nd** **MU:Re7.2.2**	**3rd** **MU:Re7.2.3**
With guidance, demonstrate how a specific music concept (such as beat or melodic direction) is used in music.	With limited guidance, demonstrate and identify how specific music concepts (such as beat or pitch) are used in various styles of music for a purpose.	Describe how specific music concepts are used to support a specific purpose in music.	Demonstrate and describe how a response to music can be informed by the structure, the use of the elements of music, and context (such as personal and social).

Discipline: Music		**Artistic Process**: Responding	
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent. **Essential Question**: How do we discern the musical creators' and performers' expressive intent?			
Kindergarten **MU:Re8.1.K**	**1st** **MU:Re8.1.1**	**2nd** **MU:Re8.1.2**	**3rd** **MU:Re8.1.3**
With guidance, demonstrate awareness of expressive qualities (such as dynamics and tempo) that reflect creators'/performers' expressive intent.	With limited guidance, demonstrate and identify expressive qualities (such as dynamics and tempo) that reflect creators'/performers' expressive intent.	Demonstrate knowledge of music concepts and how they support creators'/performers' expressive intent.	Demonstrate and describe how the expressive qualities (such as dynamics and tempo) are used in performers' interpretations to reflect expressive intent.

Discipline: Music		**Artistic Process**: Responding	
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: The personal evaluation of musical work(s) and performance(s) is informed by analysis, interpretation, and established criteria. **Essential Question**: How do we judge the quality of musical work(s) and performance(s)?			
Kindergarten MU:Re9.1.K	**1st MU:Re9.1.1**	**2nd MU:Re9.1.2**	**3rd MU:Re9.1.3**
With guidance, apply personal and expressive preferences in the evaluation of music.	With limited guidance, apply personal and expressive preferences in the evaluation of music for specific purposes.	Apply personal and expressive preferences in the evaluation of music for specific purposes.	Evaluate musical works and performances, applying established criteria, and describe appropriateness to the context.

Discipline: Music		**Artistic Process**: Connecting	
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Enduring Understanding**: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing, and responding. **Essential Question**: How do musicians make meaningful connections to creating, performing, and responding?			
Kindergarten MU:Cn10.1.K	**1st MU:Cn10.1.1**	**2nd MU:Cn10.1.2**	**3rd MU:Cn10.1.3**
Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music		**Artistic Process**: Connecting	
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians’ creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts, and daily life inform creating, performing, and responding to music?			
Kindergarten MU:Cn11.1.K	**1st MU:Cn11.1.1**	**2nd MU:Cn11.1.2**	**3rd MU:Cn11.1.3**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

Discipline: Theatre	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Envision/Conceptualize

Enduring Understanding: Theatre artists rely on intuition, curiosity, and critical inquiry.

Essential Question: What happens when theatre artists use their imaginations and/or learned theatre skills while engaging in creative exploration and inquiry?

Kindergarten **TH:Cr1.1.K.**	**1st** **TH:Cr1.1.1.**	**2nd** **TH:Cr1.1.2.**	**3rd** **TH:Cr1.1.3.**
a. With prompting and support, invent and inhabit an imaginary elsewhere in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama). b. With prompting and support, use non-representational materials to create props, puppets, and costume pieces for dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. Propose potential choices characters could make in a guided drama experience (e.g., process drama, story drama, creative drama). b. Collaborate with peers to conceptualize costumes and props in a guided drama experience (e.g., process drama, story drama, creative drama). c. Identify ways in which gestures and movement may be used to create or retell a story in guided drama experiences (e.g., process drama, story drama, creative drama).	a. Propose potential new details to plot and story in a guided drama experience (e.g., process drama, story drama, creative drama). b. Collaborate with peers to conceptualize scenery in a guided drama experience (e.g., process drama, story drama, creative drama). c. Identify ways in which voice and sounds may be used to create or retell a story in guided drama experiences (e.g., process drama, story drama, creative drama).	a. Create roles, imagined worlds, and improvised stories in a drama/theatre work. b. Imagine and articulate ideas for costumes, props and sets for the environment and characters in a drama/theatre work. c. Collaborate to determine how characters might move and speak to support the story and given circumstances in drama/theatre work.

Discipline: Theatre		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Develop **Enduring Understanding**: Theatre artists work to discover different ways of communicating meaning. **Essential Question**: How, when, and why do theatre artists' choices change?			
Kindergarten **TH:Cr2.1.K.**	**1st** **TH:Cr21.1.**	**2nd** **TH:Cr2.1.2.**	**3rd** **TH:Cr2.1.3.**
a. With prompting and support, interact with peers and contribute to dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama). b. With prompting and support, express original ideas in dramatic play or a guided drama experience (e.g., creative drama, process drama, story drama).	a. Contribute to the development of a sequential plot in a guided drama experience (e.g., process drama, story drama, creative drama). b. With prompting and support, participate in group decision making in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Collaborate with peers to devise meaningful dialogue in a guided drama experience (e.g., process drama, story drama, creative drama). b. Contribute ideas and make decisions as a group to advance a story in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Participate in methods of investigation to devise original ideas for a drama/theatre work. b. Compare ideas with peers and make selections that will enhance and deepen group drama/theatre work.

Discipline: Theatre	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Rehearse

Enduring Understanding: Theatre artists refine their work and practice their craft through rehearsal.

Essential Question: How do theatre artists transform and edit their initial ideas?

Kindergarten **TH:Cr3.1.K.**	**1st** **TH:Cr3.1.1.**	**2nd** **TH:Cr3.1.2.**	**3rd** **TH:Cr3.1.3.**
a. With prompting and support, ask and answer questions in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. Contribute to the adaptation of the plot in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Contribute to the adaptation of dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work.
	b. Identify similarities and differences in sounds and movements in a guided drama experience (e.g., process drama, story drama, creative drama).	b. Use and adapt sounds and movements in a guided drama experience (e.g., process drama, story drama, creative drama).	b. Participate and contribute to physical and vocal exploration in an improvised or scripted drama/theatre work.
	c. Collaborate to imagine multiple representations of a single object in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Generate independently multiple representations of a single object in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Practice and refine design and technical choices to support a devised or scripted drama/theatre work.

Discipline: Theatre		**Artistic Process**: Performing	
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Theatre artists make strong choices to effectively convey meaning. **Essential Question**: Why are strong choices essential to interpreting a drama or theatre piece?			
Kindergarten TH:Pr4.1.K.	**1st TH:Pr4.1.1.**	**2nd TH:Pr4.1.2.**	**3rd TH:Pr4.1.3.**
a. With prompting and support, identify characters and setting in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. Describe a story's character actions and dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Interpret story elements in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Apply the elements of dramatic structure to a story and create a drama/theatre work.
	b. Use body, face, gestures, and voice to communicate character traits and emotions in a guided drama experience (e.g., process drama, story drama, creative drama).	b. Alter voice and body to expand and articulate nuances of a character in a guided drama experience (e.g., process drama, story drama, creative drama).	b. Investigate how movement and voice are incorporated into drama/theatre work.

Discipline: Theatre		**Artistic Process**: Performing	
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Prepare **Enduring Understanding**: Theatre artists develop personal processes and skills for a performance or design. **Essential Question**: What can I do to fully prepare a performance or technical design?			
Kindergarten TH:Pr5.1.K.	**1st TH:Pr5.1.1.**	**2nd TH:Pr5.1.2.**	**3rd TH:Pr5.1.3.**
a. With prompting and support, understand that voice and sound are fundamental to dramatic play and guided drama experiences (e.g., process drama, story drama, creative drama). b. With prompting and support, explore and experiment with various technical elements in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. With prompting and support, identify and understand that physical movement is fundamental to guided drama experiences (e.g., process drama, story drama, creative drama). b. With prompting and support, identify technical elements that can be used in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Demonstrate the relationship between and among body, voice, and mind in a guided drama experience (e.g., process drama, story drama, creative drama). b. Explore technical elements in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Participate in a variety of physical, vocal, and cognitive exercises that can be used in a group setting for drama/theatre work. b. Identify the basic technical elements that can be used in drama/theatre work.

<table>
<tr><td colspan="2">Discipline: Theatre</td><td colspan="2">Artistic Process: Performing</td></tr>
<tr><td colspan="4">Anchor Standard 6: Convey meaning through the presentation of artistic work.
Process Component: Share, Present
Enduring Understanding: Theatre artists share and present stories, ideas, and envisioned worlds to explore the human experience.
Essential Question: What happens when theatre artists and audiences share a creative experience?</td></tr>
<tr><th>Kindergarten
TH:Pr6.1.K.</th><th>1st
TH:Pr6.1.1.</th><th>2nd
TH:Pr6.1.2.</th><th>3rd
TH:Pr6.1.3.</th></tr>
<tr><td>With prompting and support, use voice and sound in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>With prompting and support, use movement and gestures to communicate emotions in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Contribute to group guided drama experiences (e.g., process drama, story drama, creative drama) and informally share with peers.</td><td>Practice drama/theatre work and share reflections individually and in small groups.</td></tr>
</table>

<table>
<tr><td colspan="2">Discipline: Theatre</td><td colspan="2">Artistic Process: Responding</td></tr>
<tr><td colspan="4">Anchor Standard 7: Perceive and analyze artistic work.
Process Component: Reflect
Enduring Understanding: Theatre artists reflect to understand the impact of drama processes and theatre experiences.
Essential Question: How do theatre artists comprehend the essence of drama processes and theatre experiences?</td></tr>
<tr><th>Kindergarten
TH:Re7.1.K.</th><th>1st
TH:Re7.1.1.</th><th>2nd
TH:Re7.1.2.</th><th>3rd
TH:Re7.1.3.</th></tr>
<tr><td>With prompting and support, express an emotional response to characters in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Recall choices made in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Recognize when artistic choices are made in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Understand why artistic choices are made in a drama/theatre work.</td></tr>
</table>

Discipline: Theatre	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Theatre artists' interpretations of drama/theatre work are influenced by personal experiences and aesthetics.

Essential Question: How can the same work of art communicate different messages to different people?

Kindergarten **TH:Re8.1.K.**	**1st** **TH:Re8.1.1.**	**2nd** **TH:Re8.1.2.**	**3rd** **TH:Re8.1.3.**
a. With prompting and support, identify preferences in dramatic play, a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.	a. Explain preferences and emotions in a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.	a. Explain how personal preferences and emotions affect an observer's response in a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.	a. Consider multiple personal experiences when participating in or observing a drama/theatre work.
b. With prompting and support, name and describe settings in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	b. Identify causes of character actions in a guided drama experience (e.g., process drama, story drama, or creative drama).	b. Identify causes and consequences of character actions in a guided drama experience (e.g., process drama, story drama, or creative drama).	b. Consider multiple ways to develop a character using physical characteristics and prop or costume design choices that reflect cultural perspectives in drama/theatre work.
	c. Explain or use text and pictures to describe how personal emotions and choices compare to the emotions and choices of characters in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Explain or use text and pictures to describe how others' emotions and choices may compare to the emotions and choices of characters in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Examine how connections are made between oneself and a character's emotions in drama/theatre work.

Discipline: Theatre		**Artistic Process**: Responding	
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Theatre artists apply criteria to investigate, explore, and assess drama and theatre work. **Essential Question**: How are the theatre artist's processes and the audience's perspectives impacted by analysis and synthesis?			
Kindergarten TH:Re9.1.K.	**1st TH:Re9.1.1.**	**2nd TH:Re9.1.2.**	**3rd TH:Re9.1.3.**
a. With prompting and support, actively engage with others in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. Build on others' ideas in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Collaborate on a scene in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Understand how and why groups evaluate drama/theatre work.
	b. Identify props and costumes that might be used in a guided drama experience (e.g., process drama, story drama, creative drama).	b. Use a prop or costume in a guided drama experience (e.g., process drama, story drama, creative drama) to describe characters, settings, or events.	b. Consider and analyze technical elements from multiple drama/theatre works.
	c. Compare and contrast the experiences of characters in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Describe how characters respond to challenges in a guided drama experience (e.g., process drama, story drama, creative drama).	c. Evaluate and analyze problems and situations in a drama/theatre work from an audience perspective.

<table>
<tr><td colspan="2">Discipline: Theatre</td><td colspan="2">Artistic Process: Connecting</td></tr>
<tr><td colspan="4">Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Process Component: Empathize

Enduring Understanding: Theatre artists allow awareness of interrelationships between self and others to influence and inform their work.

Essential Question: What happens when theatre artists foster understanding between self and others through critical awareness, social responsibility, and the exploration of empathy?</td></tr>
<tr><th>Kindergarten
TH:Cn10.1.K.</th><th>1st
TH:Cn10.1.1.</th><th>2nd
TH:Cn10.1.2.</th><th>3rd
TH:Cn10.1.3.</th></tr>
<tr><td>With prompting and support, identify similarities between characters and oneself in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Identify character emotions in a guided drama experience (e.g., process drama, story drama, creative drama) and relate it to personal experience.</td><td>Relate character experiences to personal experiences in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>Use personal experiences and knowledge to make connections to community and culture in a drama/theatre work.</td></tr>
</table>

Discipline: Theatre		**Artistic Process**: Connecting	
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Interrelate **Enduring Understanding**: Theatre artists understand and can communicate their creative process as they analyze the way the world may be understood. **Essential Question**: What happens when theatre artists allow an understanding of themselves and the world to inform perceptions about theatre and the purpose of their work?			
Kindergarten **TH:Cn11.1.K.**	**1st** **TH:Cn11.1.1.**	**2nd** **TH:Cn11.1.2.**	**3rd** **TH:Cn11.1.3.**
With prompting and support, identify skills and knowledge from other areas in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	Apply skills and knowledge from different art forms and content areas in a guided drama experience (e.g., process drama, story drama, creative drama).	Determine appropriate skills and knowledge from different art forms and content areas to apply in a guided drama experience (e.g., process drama, story drama, creative drama).	Identify connections to community, social issues and other content areas in drama/theatre work.

Discipline: Theatre		**Artistic Process**: Connecting	
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Research **Enduring Understanding**: Theatre artists critically inquire into the ways others have thought about and created drama processes and productions to inform their own work. **Essential Question**: In what ways can research into theatre histories, theories, literature, and performances alter the way a drama process or production is understood?			
Kindergarten TH:Cn11.2.K.	**1st TH:Cn11.2.-1.**	**2nd TH:Cn11.2.2.**	**3rd TH:Cn11.2.3.**
a. With prompting and support, identify stories that are different from one another in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama). b. With prompting and support, tell a short story in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	a. Identify similarities and differences in stories from one's own community in a guided drama experience (e.g., process drama, story drama, creative drama). b. Collaborate on the creation of a short scene based on a fictional literary source in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Identify similarities and differences in stories from multiple cultures in a guided drama experience (e.g., process drama, story drama, creative drama). b. Collaborate on the creation of a short scene based on a non-fiction literary source in a guided drama experience (e.g., process drama, story drama, creative drama).	a. Explore how stories are adapted from literature to drama/theatre work. b. Examine how artists have historically presented the same stories using different art forms, genres, or drama/theatre conventions.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Creativity and innovative thinking are essential life skills that can be developed.

Essential Question: What conditions, attitudes, and behaviors support creativity and innovative thinking?

What factors prevent or encourage people to take creative risks? How does collaboration expand the creative process?

Kindergarten **VA:Cr1.1.K**	**1st** **VA:Cr1.1.1**	**2nd** **VA:Cr1.1.2**	**3rd** **VA:Cr1.1.3**
Engage in exploration and imaginative play with materials.	Engage collaboratively in exploration and imaginative play with materials.	Brainstorm collaboratively multiple approaches to an art or design problem.	Elaborate on an imaginative idea.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Artists and designers shape artistic investigations, following or breaking with traditions in pursuit of creative art-making goals.

Essential Question: How does knowing the contexts histories, and traditions of art forms help us create works of art and design? Why do artists follow or break from established traditions? How do artists determine what resources and criteria are needed to formulate artistic investigations?

Kindergarten **VA:Cr1.2.K**	**1st** **VA:Cr1.2.1**	**2nd** **VA:Cr1.2.2**	**3rd** **VA:Cr1.2.3**
Engage collaboratively in creative art-making in response to an artistic problem.	Use observation and investigation in preparation for making a work of art.	Make art or design with various materials and tools to explore personal interests, questions, and curiosity.	Apply knowledge of available resources, tools, and technologies to investigate personal ideas through the art-making process.

Discipline: Visual Arts		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers experiment with forms, structures, materials, concepts, media, and art-making approaches. **Essential Question**: How do artists work? How do artists and designers determine whether a particular direction in their work is effective? How do artists and designers learn from trial and error?			
Kindergarten VA:Cr2.1.K	**1st VA:Cr2.1.1**	**2nd VA:Cr2.1.2**	**3rd VA:Cr2.1.3**
Through experimentation, build skills in various media and approaches to art-making.	Explore uses of materials and tools to create works of art or design.	Experiment with various materials and tools to explore personal interests in a work of art or design.	Create personally satisfying artwork using a variety of artistic processes and materials.

Discipline: Visual Arts		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers balance experimentation and safety, freedom and responsibility while developing and creating artworks. **Essential Question**: How do artists and designers care for and maintain materials, tools, and equipment? Why is it important for safety and health to understand and follow correct procedures in handling materials, tools, and equipment? What responsibilities come with the freedom to create?			
Kindergarten VA:Cr2.2.K	**1st VA:Cr2.2.1**	**2nd VA:Cr2.2.2**	**3rd VA:Cr2.2.3**
Identify safe and non-toxic art materials, tools, and equipment.	Demonstrate safe and proper procedures for using materials, tools, and equipment while making art.	Demonstrate safe procedures for using and cleaning art tools, equipment, and studio spaces.	Demonstrate an understanding of the safe and proficient use of materials, tools, and equipment for a variety of artistic processes.

Discipline: Visual Arts		**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: People create and interact with objects, places, and design that define, shape, enhance, and empower their lives. **Essential Question**: How do objects, places, and design shape lives and communities? How do artists and designers determine goals for designing or redesigning objects, places, or systems? How do artists and designers create works of art or design that effectively communicate?			
Kindergarten **VA:Cr2.3.K**	**1st** **VA:Cr2.3.1**	**2nd** **VA:Cr2.3.2**	**3rd** **VA:Cr2.3.3**
Create art that represents natural and constructed environments.	Identify and classify uses of everyday objects through drawings, diagrams, sculptures, or other visual means.	Repurpose objects to make something new.	Individually or collaboratively construct representations, diagrams, or maps of places that are part of everyday life.

Discipline: Visual Arts		**Artistic Process**: Creating	
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Reflect- Refine- Complete **Enduring Understanding**: Artist and designers develop excellence through practice and constructive critique, reflecting on, revising, and refining work over time. **Essential Question**: What role does persistence play in revising, refining, and developing work? How do artists grow and become accomplished in art forms? How does collaboratively reflecting on a work help us experience it more completely?			
Kindergarten **VA:Cr3.1.K**	**1st** **VA:Cr3.1.1**	**2nd** **VA:Cr3.1.2**	**3rd** **VA:Cr3.1.3**
Explain the process of making art while creating.	Use art vocabulary to describe choices while creating art.	Discuss and reflect with peers about choices made in creating artwork.	Elaborate visual information by adding details in an artwork to enhance emerging meaning.

Discipline: Visual Arts		**Artistic Process**: Presenting	
Anchor Standard 4: Select, analyze and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Artists and other presenters consider various techniques, methods, venues, and criteria when analyzing, selecting, and curating objects artifacts, and artworks for preservation and presentation. **Essential Question**: How are artworks cared for and by whom? What criteria, methods, and processes are used to select work for preservation or presentation? Why do people value objects, artifacts, and artworks, and select them for presentation?			
Kindergarten **VA:Pr4.1.K**	**1st** **VA:Pr4.1.1**	**2nd** **VA:Pr4.1.2**	**3rd** **VA:Pr4.1.3**
Select art objects for personal portfolio and display, explaining why they were chosen.	Explain why some objects, artifacts, and artwork are valued over others.	Categorize artwork based on a theme or concept for an exhibit.	Investigate and discuss possibilities and limitations of spaces, including electronic, for exhibiting artwork.

Discipline: Visual Arts		**Artistic Process**: Presenting	
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Analyze **Enduring Understanding**: Artists, curators and others consider a variety of factors and methods including evolving technologies when preparing and refining artwork for display and or when deciding if and how to preserve and protect it. **Essential Question**: What methods and processes are considered when preparing artwork for presentation or preservation? How does refining artwork affect its meaning to the viewer? What criteria are considered when selecting work for presentation, a portfolio, or a collection?			
Kindergarten **VA:Pr5.1.K**	**1st** **VA:Pr5.1.1**	**2nd** **VA:Pr5.1.2**	**3rd** **VA:Pr5.1.3**
Explain the purpose of a portfolio or collection.	Ask and answer questions such as where, when, why, and how artwork should be prepared for presentation or preservation.	Distinguish between different materials or artistic techniques for preparing artwork for presentation.	Identify exhibit space and prepare works of art including artists' statements, for presentation.

Discipline: Visual Arts		**Artistic Process**: Presenting	
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Share **Enduring Understanding**: Objects, artifacts, and artworks collected, preserved, or presented either by artists, museums, or other venues communicate meaning and a record of social, cultural, and political experiences resulting in the cultivating of appreciation and understanding. **Essential Question**: What is an art museum? How does the presenting and sharing of objects, artifacts, and artworks influence and shape ideas, beliefs, and experiences? How do objects, artifacts, and artworks collected, preserved, or presented, cultivate appreciation and understanding?			
Kindergarten **VA:Pr6.1.K**	**1st** **VA:Pr6.1.1**	**2nd** **VA:Pr6.1.2**	**3rd** **VA:Pr6.1.3**
Explain what an art museum is and distinguish how an art museum is different from other buildings.	Identify the roles and responsibilities of people who work in and visit museums and other art venues.	Analyze how art exhibited inside and outside of schools (such as in museums, galleries, virtual spaces, and other venues) contributes to communities.	Identify and explain how and where different cultures record and illustrate stories and history of life through art.

Discipline: Visual Arts		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Individual aesthetic and empathetic awareness developed through engagement with art can lead to understanding and appreciation of self, others, the natural world, and constructed environments. **Essential Question**: How do life experiences influence the way you relate to art? How does learning about art impact how we perceive the world? What can we learn from our responses to art?			
Kindergarten **VA:Pr7.1.K**	**1st** **VA:Pr7.1.1**	**2nd** **VA:Pr7.1.2**	**3rd** **VA:Pr7.1.3**
Identify uses of art within one's personal environment.	Select and describe works of art that illustrate daily life experiences of one's self and others.	Perceive and describe aesthetic characteristics of one's natural world and constructed	Speculate about processes an artist uses to create a work of art.

		environments.	

Discipline: Visual Arts		**Artistic Process**: Responding	
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Visual imagery influences understanding of and responses to the world. **Essential Question**: What is an image? Where and how do we encounter images in our world? How do images influence our views of the world?			
Kindergarten VA:Re7.2.K	**1st VA:Re7.2.1**	**2nd VA:Re7.2.2**	**3rd VA:Re7.2.3**
Describe what an image represents.	Compare images that represent the same subject.	Categorize images based on expressive properties.	Determine messages communicated by an image.

Discipline: Visual Arts		**Artistic Process**: Responding	
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Analyze **Enduring Understanding**: People gain insights into meanings of artworks by engaging in the process of art criticism. **Essential Question**: What is the value of engaging in the process of art criticism? How can the viewer "read" a work of art as text? How does knowing and using visual art vocabularies help us understand and interpret works of art?			
Kindergarten VA:Re8.1.K	**1st VA:Re8.1.1**	**2nd VA:Re8.1.2**	**3rd VA:Re8.1.3**
Interpret art by identifying subject matter and describing relevant details.	Interpret art by categorizing subject matter and identifying the characteristics of form.	Interpret art by identifying the mood suggested by a work of art and describing relevant subject matter and characteristics of form.	Interpret art by analyzing use of media to create subject matter, characteristics of form, and mood.

Discipline: Visual Arts		**Artistic Process**: Responding	
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Interpret **Enduring Understanding**: People evaluate art based on various criteria. **Essential Question**: How does one determine criteria to evaluate a work of art? How and why might criteria vary? How is a personal preference different from an evaluation?			
Kindergarten VA:Re9.1.K	**1st VA:Re9.1.1**	**2nd VA:Re9.1.2**	**3rd VA:Re9.1.3**
Explain reasons for selecting a preferred artwork.	Classify artwork based on different reasons for preferences.	Use learned art vocabulary to express preferences about artwork.	Evaluate an artwork based on given criteria.

Discipline: Visual Arts		**Artistic Process**: Connecting	
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Through art-making, people make meaning by investigating and developing awareness of perceptions, knowledge, and experiences. **Essential Question**: How does engaging in creating art enrich people's lives? How does making art attune people to their surroundings? How do people contribute to awareness and understanding of their lives and the lives of their communities through art-making?			
Kindergarten VA:Cn10.1.K	**1st VA:Cn10.1.1**	**2nd VA:Cn10.1.2**	**3rd VA:Cn10.1.3**
Create art that tells a story about a life experience.	Identify times, places, and reasons by which students make art outside of school.	Create works of art about events in home, school, or community life.	Develop a work of art based on observations of surroundings.

Discipline: Visual Arts		**Artistic Process**: Connecting	
Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: People develop ideas and understandings of society, culture, and history through their interactions with and analysis of art. **Essential Question**: How does art help us understand the lives of people of different times, places, and cultures? How is art used to impact the views of a society? How does art preserve aspects of life?			
Kindergarten **VA:Cn11.1.K**	**1st** **VA:Cn11.1.1**	**2nd** **VA:Cn11.1.2**	**3rd** **VA:Cn11.1.3**
Identify a purpose of an artwork.	Understand that people from different places and times have made art for a variety of reasons.	Compare and contrast cultural uses of artwork from different times and places.	Recognize that responses to art change depending on knowledge of the time and place in which it was made.

~~PRIMARY AND INTERMEDIATE ENGLISH LANGUAGE ARTS~~

~~Kentucky Academic Standards~~

~~In English language arts, the Academic Standards contain single-grade standards in my areas of kindergarten and grades 1, 2, and 3. Text complexity expectations in Reading, beginning at grade 2. The standards are organized around the follow features:~~

- ~~Reading and Literature: Text complexity and the growth of comprehension~~
- ~~Writing and Research: Text types, grade-level focuses, and research~~
- ~~Speaking and Listening: Flexible communication~~
- ~~Language Development: Conventions and vocabulary~~

~~English language arts at the intermediate level, the Academic Standards contain combined standards for grades 4 and 5. The standards are organized around the follow features:~~

- ~~Reading and Literature: Text complexity and the growth of comprehension~~
- ~~Writing and Research: Text types, grade-level focuses, and research~~
- ~~Speaking and Listening: Flexible communication~~
- ~~Language Development: Conventions and vocabulary~~

~~Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, and Language~~

~~The descriptions that follow are not standards themselves but instead offer a portrait of students who meet the standards set out in this document. As students advance through the grades and master the standards in reading, writing, speaking, listening, and language, they are able to exhibit with increasing fullness and regularity these capacities of the literate individual.~~

~~They demonstrate independence.~~

~~Students can, without significant scaffolding, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and convey intricate or multifaceted information. Likewise, students are able independently to discern a speaker's key points, request clarification, and ask relevant questions. They build on others' ideas, articulate their own ideas, and confirm they have been understood. Without prompting, they demonstrate command of standard English and acquire and use a wide-ranging vocabulary. More broadly, they become self-directed learners, effectively seeking out and using resources to assist them, including teachers, peers, and print and digital reference materials.~~

~~They build strong content knowledge.~~

~~Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.~~

~~They respond to the varying demands of audience, task, purpose, and discipline.~~

~~Students adapt their communication in relation to audience, task, purpose, and discipline. They set and adjust purpose for reading, writing, speaking, listening, and language use as warranted by the task. They appreciate nuances, such as how the composition of an audience should affect tone when speaking and how the connotations of words affect meaning. They also know that different disciplines call for different types of evidence (e.g., documentary evidence in history, experimental evidence in science).~~

~~They comprehend as well as critique.~~

~~Students are engaged and open-minded—but discerning—readers and listeners. They work diligently to understand precisely what an author or speaker is saying, but they also question an author's or speaker's assumptions and premises and assess the veracity of claims and the soundness of reasoning.~~

~~They value evidence.~~

~~Students cite specific evidence when offering an oral or written interpretation of a text. They use relevant evidence when supporting their own points in writing and speaking, making their reasoning clear to the reader or listener, and they constructively evaluate others' use of evidence.~~

~~They use technology and digital media strategically and capably.~~

~~Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.~~

~~They come to understand other perspectives and cultures.~~

~~Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.~~

~~COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE AND TECHNICAL SUBJECTS~~

~~How to read this document~~

~~Overall Document Organization~~

~~The Standards comprise three main sections: a comprehensive K–5 section and two content area–specific sections for grades 6–12, one for ELA and one for history/social studies, science, and technical subjects. Three appendices accompany the main document.~~

~~Each section is divided into strands. K–5 and 6–12 ELA have Reading, Writing, Speaking and Listening, and Language strands; the 6–12 history/ social studies, science, and technical subjects section focuses on Reading and Writing. Each strand is headed by a strand-specific set of College and Career Readiness Anchor Standards that is identical across all grades and content areas.~~

~~Standards for each grade within K–8 and for grades 9–10 and 11–12 follow the CCR anchor standards in each strand. Each grade-specific standard (as these standards are collectively referred to) corresponds to the same-numbered CCR anchor standard. Put another way, each CCR anchor standard has an accompanying grade-specific standard translating the broader CCR statement into grade-appropriate end-of-year expectations.~~

~~Individual CCR anchor standards can be identified by their strand, CCR status, and number (R.CCR.6, for example). Individual grade-specific standards can be identified by their strand, grade, and number (or number and letter, where applicable), so that RI.4.3, for example, stands for Reading, Informational Text, grade 4, standard 3 and W.5.1a stands for Writing, grade 5, standard 1a. Strand designations can be found in brackets alongside the full strand title.~~

~~Who is responsible for which portion of the Standards~~

~~A single K–5 section lists standards for reading, writing, speaking, listening, and language across the curriculum, reflecting the fact that most or all of the instruction students in these grades receive comes from one teacher. Grades 6–12 are covered in two content area–specific sections, the first for the English language arts teacher and the second for teachers of history/social studies, science, and technical subjects. Each section uses the same CCR anchor standards but also includes grade-specific standards tuned to the literacy requirements of the particular discipline(s).~~

~~Key features of the Standards~~

~~Reading: Text complexity and the growth of comprehension~~

~~The Reading standards place equal emphasis on the sophistication of what students read and the skill with which they read. Standard 10 defines a grade by grade "staircase" of increasing text complexity that rises from beginning reading to the college and career readiness level. Whatever they are reading, students must also show a steadily growing ability to discern more from and make fuller use of text, including making an increasing number of connections among ideas and between texts, considering a wider range of textual evidence, and becoming more sensitive to inconsistencies, ambiguities, and poor reasoning in texts.~~

~~Writing: text types, responding to reading, and research~~

~~The Standards acknowledge the fact that whereas some writing skills, such as the ability to plan, revise, edit, and publish, are applicable to many types of writing, other skills are more properly defined in terms of specific writing types: arguments, informative/explanatory texts, and narratives. Standard 9 stresses the importance of the writing-reading connection by requiring students to draw and write about evidence from literary and informational texts. Because of the centrality of writing to most forms of inquiry, research standards are prominently included in this strand, though skills important to research are infused throughout the document.~~

~~Speaking and Listening: flexible communication and collaboration~~

~~Including but not limited to skills necessary for formal presentations, the Speaking and Listening standards require students to develop a range of broadly useful oral communication and interpersonal skills. Students must learn to work together, express and listen carefully to ideas, integrate information from oral, visual, quantitative, and media sources, evaluate what they hear, use media and visual displays strategically to help achieve communicative purposes, and adapt speech to context and task.~~

~~Language: Conventions, effective use, and vocabulary~~

~~The Language standards include the essential "rules" of standard written and spoken English, but they also approach language as a matter of craft and informed choice among alternatives. The vocabulary standards focus on understanding words and phrases, their relationships, and their nuances and on acquiring new vocabulary, particularly general academic and domain-specific words and phrases.~~

~~Appendices A, B, and C~~

~~Appendix A contains supplementary material on reading, writing, speaking and listening, and language as well as a glossary of key terms. Appendix B consists of text exemplars illustrating the complexity, quality, and range of reading appropriate for various grade levels with accompanying sample performance tasks. Appendix C includes annotated samples demonstrating at least adequate performance in student writing at various grade levels.~~

~~College and Career Readiness Anchor Standards for Reading~~

~~The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Key Ideas and details~~

1. ~~Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.~~
2. ~~Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.~~
3. ~~Analyze how and why individuals, events, and ideas develop and interact over the course of a text.~~

~~Craft and Structure~~

4. ~~Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.~~
5. ~~Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.~~
6. ~~Assess how point of view or purpose shapes the content and style of a text.~~

~~Integration of Knowledge and Ideas~~

7. ~~Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.*~~
8. ~~Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.~~
9. ~~Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.~~

~~Range of Reading and Level of text Complexity~~

10. ~~Read and comprehend complex literary and informational texts independently and proficiently.~~

~~* Please see “Research to Build and Present Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.~~

~~Note on range and content of student reading~~

~~To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.~~

Reading Standards for Literature K–5

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Kindergartners:	Grade 1 students:	Grade 2 students:
Key Ideas and Details		
1. With prompting and support, ask and answer questions about key details in a text.	1. Ask and answer questions about key details in a text.	1. Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
2. With prompting and support, retell familiar stories, including key details.	2. Retell stories, including key details, and demonstrate understanding of their central message or lesson.	2. Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.
3. With prompting and support, identify characters, settings, and major events in a story.	3. Describe characters, settings, and major events in a story, using key details.	3. Describe how characters in a story respond to major events and challenges.
Craft and Structure		
4. Ask and answer questions about unknown words in a text.	4. Identify words and phrases in stories or poems that suggest feelings or appeal to the senses.	4. Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song.
5. Recognize common types of texts (e.g., storybooks, poems).	5. Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types.	5. Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action.
6. With prompting and support, name the author and illustrator of a story and define the role of each in telling the story.	6. Identify who is telling the story at various points in a text.	6. Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud.
Integration of Knowledge and Ideas		
7. With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).	7. Use illustrations and details in a story to describe its characters, setting, or events.	7. Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)
9. With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories.	9. Compare and contrast the adventures and experiences of characters in stories.	9. Compare and contrast two or more versions of the same story (e.g., Cinderella stories) by different authors or from different cultures.
Range of Reading and Level of Text Complexity		
10. Actively engage in group reading activities with purpose and understanding.	10. With prompting and support, read prose and poetry of appropriate complexity for grade 1.	10. By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Reading Standards for Literature K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Key Ideas and Details		
1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
2. Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.	2. Determine a theme of a story, drama, or poem from details in the text; summarize the text.	2. Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.
3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.	3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).	3. Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.	4. Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean).	4. Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes.
5. Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections.	5. Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., casts of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text.	5. Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem.
6. Distinguish their own point of view from that of the narrator or those of the characters.	6. Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations.	6. Describe how a narrator's or speaker's point of view influences how events are described.
Integration of Knowledge and Ideas		
7. Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).	7. Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text.	7. Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)
9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series).	9. Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures.	9. Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics.
Range of Reading and Level of Text Complexity		
10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 2–3 text complexity band independently and proficiently.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently.

Reading Standards for Informational Text K–5

RI

Kindergartners:	Grade 1 students:	Grade 2 students:
Key Ideas and Details		
1. With prompting and support, ask and answer questions about key details in a text.	1. Ask and answer questions about key details in a text.	1. Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
2. With prompting and support, identify the main topic and retell key details of a text.	2. Identify the main topic and retell key details of a text.	2. Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.	3. Describe the connection between two individuals, events, ideas, or pieces of information in a text.	3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
Craft and Structure		
4. With prompting and support, ask and answer questions about unknown words in a text.	4. Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.	4. Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
5. Identify the front cover, back cover, and title page of a book.	5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.	5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
6. Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.	6. Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.	6. Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
Integration of Knowledge and Ideas		
7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).	7. Use the illustrations and details in a text to describe its key ideas.	7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
8. With prompting and support, identify the reasons an author gives to support points in a text.	8. Identify the reasons an author gives to support points in a text.	8. Describe how reasons support specific points the author makes in a text.
9. With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	9. Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).	9. Compare and contrast the most important points presented by two texts on the same topic.
Range of Reading and Level of Text Complexity		
10. Actively engage in group reading activities with purpose and understanding.	10. With prompting and support, read informational texts appropriately complex for grade 1.	10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Reading Standards for Informational Text K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Key Ideas and Details		
1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
2. Determine the main idea of a text; recount the key details and explain how they support the main idea.	2. Determine the main idea of a text and explain how it is supported by key details; summarize the text.	2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.	3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
Craft and Structure		
4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.	4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.	4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.	5. Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.
6. Distinguish their own point of view from that of the author of a text.	6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.	6. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.
Integration of Knowledge and Ideas		
7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	7. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
8. Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence).	8. Explain how an author uses reasons and evidence to support particular points in a text.	8. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
9. Compare and contrast the most important points and key details presented in two texts on the same topic.	9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.	9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
Range of Reading and Level of Text Complexity		
10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.	10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.

Reading Standards: Foundational Skills (K–5)

These standards are directed toward fostering students' understanding and working knowledge of concepts of print, the alphabetic principle, and other basic conventions of the English writing system. These foundational skills are not an end in and of themselves; rather, they are necessary and important components of an effective, comprehensive reading program designed to develop proficient readers with the capacity to comprehend texts across a range of types and disciplines. Instruction should be differentiated: good readers will need much less practice with these concepts than struggling readers will. The point is to teach students what they need to learn and not what they already know—to discern when particular children or activities warrant more or less attention.

Note: In kindergarten, children are expected to demonstrate increasing awareness and competence in the areas that follow.

Kindergartners:	Grade 1 students:
Print Concepts	
1. Demonstrate understanding of the organization and basic features of print. a. Follow words from left to right, top to bottom, and page by page. b. Recognize that spoken words are represented in written language by specific sequences of letters. c. Understand that words are separated by spaces in print. d. Recognize and name all upper- and lowercase letters of the alphabet.	1. Demonstrate understanding of the organization and basic features of print. a. Recognize the distinguishing features of a sentence (e.g., first word, capitalization, ending punctuation).
Phonological Awareness	
2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes). a. Recognize and produce rhyming words. b. Count, pronounce, blend, and segment syllables in spoken words. c. Blend and segment onsets and rimes of single-syllable spoken words. d. Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonent-vowel-consonent, or CVC) words.* (This does not include CVCs ending with /l/, /r/, or /x/.) e. Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.	2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes). a. Distinguish long from short vowel sounds in spoken single-syllable words. b. Orally produce single-syllable words by blending sounds (phonemes), including consonant blends. c. Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words. d. Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes).

*Words, syllables, or phonemes written in /slashes/refer to their pronunciation or phonology. Thus, /CVC/ is a word with three phonemes regardless of the number of letters in the spelling of the word.

Reading Standards: Foundational Skills (K–5)

***Note:** In kindergarten children are expected to demonstrate increasing awareness and competence in the areas that follow.*

Kindergartners:	Grade 1 students:	Grade 2 students:
Phonics and Word Recognition		
3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing the primary or many of the most frequent sound for each consonant. b. Associate the long and short sounds with common spellings (graphemes) for the five major vowels. c. Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does). d. Distinguish between similarly spelled words by identifying the sounds of the letters that differ.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Know the spelling-sound correspondences for common consonant digraphs. b. Decode regularly spelled one-syllable words. c. Know final -e and common vowel team conventions for representing long vowel sounds. d. Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word. e. Decode two-syllable words following basic patterns by breaking the words into syllables. f. Read words with inflectional endings. g. Recognize and read grade-appropriate irregularly spelled words.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Distinguish long and short vowels when reading regularly spelled one-syllable words. b. Know spelling-sound correspondences for additional common vowel teams. c. Decode regularly spelled two-syllable words with long vowels. d. Decode words with common prefixes and suffixes. e. Identify words with inconsistent but common spelling-sound correspondences. f. Recognize and read grade-appropriate irregularly spelled words.
Fluency		
4. Read emergent-reader texts with purpose and understanding.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read on-level text with purpose and understanding. b. Read on-level text orally with accuracy, appropriate rate, and expression on successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read on-level text with purpose and understanding. b. Read on-level text orally with accuracy, appropriate rate, and expression on successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

Reading Standards: Foundational Skills (K–5)

Grade 3 students:	Grade 4 students:	Grade 5 students:
Phonics and Word Recognition		
3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Identify and know the meaning of the most common prefixes and derivational suffixes. b. Decode words with common Latin suffixes. c. Decode multisyllable words. d. Read grade-appropriate irregularly spelled words.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.	3. Know and apply grade-level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
Fluency		
4. Read with sufficient accuracy and fluency to support comprehension. a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	4. Read with sufficient accuracy and fluency to support comprehension. a. Read on-level text with purpose and understanding. b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings. c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

~~College and Career Readiness Anchor Standards for Writing~~

~~The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Text Types and Purposes*~~

1. ~~Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.~~
2. ~~Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.~~
3. ~~Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.~~

~~Production and distribution of Writing~~

4. ~~Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.~~
5. ~~Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.~~
6. ~~Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.~~

~~Research to Build and Present Knowledge~~

7. ~~Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.~~
8. ~~Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.~~
9. ~~Draw evidence from literary or informational texts to support analysis, reflection, and research.~~

~~Range of Writing~~

10. ~~Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.~~

~~*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.~~

~~Note on range and content of student reading~~

~~To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.~~

Writing Standards K–5

The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

Kindergartners:	Grade 1 students:	Grade 2 students:
Text Types and Purposes		
1. Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., My favorite book is . . .).	1. Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure.	1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.
2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.	2. Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.	2. Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.
3. Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.	3. Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.	3. Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.
Production and Distribution of Writing		
4. (Begins in grade 3)	4. (Begins in grade 3)	4. (Begins in grade 3)
5. With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed.	5. With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed.	5. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.
6. With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.	6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.	6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
Research to Build and Present Knowledge		
7. Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).	7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).	7. Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	8. Recall information from experiences or gather information from provided sources to answer a question.
9. (Begins in grade 4)	9. (Begins in grade 4)	9. (Begins in grade 4)
Range of Writing		
10. (Begins in grade 3)	10. (Begins in grade 3)	10. (Begins in grade 3)

Writing Standards K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Text Types and Purposes		
1. Write opinion pieces on topics or texts, supporting a point of view with reasons. a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons. d. Provide a concluding statement or section.	1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose. b. Provide reasons that are supported by facts and details. c. Link opinion and reasons using words and phrases (e.g., for instance, in order to, in addition). d. Provide a concluding statement or section related to the opinion presented.	1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically). d. Provide a concluding statement or section related to the opinion presented.
2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information. d. Provide a concluding statement or section.	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within categories of information using words and phrases (e.g., another, for example, also, because). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented.	2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented.
3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations. c. Use temporal words and phrases to signal event order. d. Provide a sense of closure.	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situationand introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and description to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words and phrases to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the	3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely.

Writing Standards K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Production and Distribution of Writing		
4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 3 on pages 28 and 29.)	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on pages 28 and 29.)	5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 5 on pages 28 and 29.)
6. With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.	6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.	6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.
Research to Build and Present Knowledge		
7. Conduct short research projects that build knowledge about a topic.	7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.	7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.	8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
9. (Begins in grade 4)	9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 4 Reading standards to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions]."). b. Apply grade 4 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").	9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 5 Reading standards to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]"). b. Apply grade 5 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]").
Range of Writing		
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

~~College and Career Readiness Anchor Standards for Speaking and Listening~~

~~The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Comprehension and Collaboration~~

1. ~~Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.~~
2. ~~Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.~~
3. ~~Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.~~

~~Presentation of Knowledge and Ideas~~

4. ~~Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.~~
5. ~~Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.~~
6. ~~Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.~~

~~Note on range and content of student speaking and listening~~

~~To build a foundation for college and career readiness, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner. Being productive members of these conversations requires that students contribute accurate, relevant information; respond to and develop what others have said; make comparisons and contrasts; and analyze and synthesize a multitude of ideas in various domains.~~

~~New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio.~~

Speaking and Listening Standards K–5

The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Kindergartners:	Grade 1 students:	Grade 2 students:
Comprehension and Collaboration		
1. Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion). b. Continue a conversation through multiple exchanges.	1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. c. Ask questions to clear up any confusion about the topics and texts under discussion.	1. Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by linking their comments to the remarks of others. c. Ask for clarification and further explanation as needed about the topics and texts under discussion.
2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.	2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media.	2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	3. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.	3. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
Presentation of Knowledge and Ideas		
4. Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.	4. Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.	4. Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.
5. Add drawings or other visual displays to descriptions as desired to provide additional detail.	5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.	5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.
6. Speak audibly and express thoughts, feelings, and ideas clearly.	6. Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 on page 26 for specific expectations.)	6. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on pages 26 and 27 for specific expectations.)

Speaking and Listening Standards K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Comprehension and Collaboration		
1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others. d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	2. Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	3. Identify the reasons and evidence a speaker provides to support particular points.	3. Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
Presentation of Knowledge and Ideas		
4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.	4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
5. Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.	5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.	5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 on pages 28 and 29 for specific expectations.)	6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 on pages 28 and 29 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 on pages 28 and 29 for specific expectations.)

~~College and Career Readiness Anchor Standards for Language~~

~~The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Conventions of Standard English~~ ~~1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.~~ ~~2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.~~ **~~Knowledge of Language~~** ~~3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.~~ **~~Vocabulary acquisition and Use~~** ~~4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.~~ ~~5. Demonstrate understanding of word relationships and nuances in word meanings.~~ ~~6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.~~	**~~Note on range and content of student language use~~** *~~To build a foundation for college and career readiness in language, students must gain control over many conventions of standard English grammar, usage, and mechanics as well as learn other ways to use language to convey meaning effectively. They must also be able to determine or clarify the meaning of grade-appropriate words encountered through listening, reading, and media use; come to appreciate that words have nonliteral meanings, shadings of meaning, and relationships to other words; and expand their vocabulary in the course of studying content. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.~~*

Language Standards K–5

The following standards for grades K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 30 for a complete list and Appendix A for an example of how these skills develop in sophistication.

Kindergartners:	Grade 1 students:	Grade 2 students:
Conventions of Standard English		
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Print many upper- and lowercase letters. b. Use frequently occurring nouns and verbs. c. Form regular plural nouns orally by adding /s/ or /es/ (e.g., *dog, dogs; wish, wishes*). d. Understand and use question words (interrogatives) (e.g., *who, what, where, when, why, how*). e. Use the most frequently occurring prepositions (e.g., *to, from, in, out, on, off, for, of, by, with*). f. Produce and expand complete sentences in shared language activities.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Print all upper- and lowercase letters. b. Use common, proper, and possessive nouns. c. Use singular and plural nouns with matching verbs in basic sentences (e.g., *He hops; We hop*). d. Use personal, possessive, and indefinite pronouns (e.g., *I, me, my; they, them, their, anyone, everything*). e. Use verbs to convey a sense of past, present, and future (e.g., *Yesterday I walked home; Today I walk home; Tomorrow I will walk home*). f. Use frequently occurring adjectives. g. Use frequently occurring conjunctions (e.g., *and, but, or, so, because*). h. Use determiners (e.g., articles, demonstratives). i. Use frequently occurring prepositions (e.g., *during, beyond, toward*). j. Produce and expand complete simple and compound declarative, interrogative, imperative, and exclamatory sentences in response to prompts.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Use collective nouns (e.g., *group*). b. Form and use frequently occurring irregular plural nouns (e.g., *feet, children, teeth, mice, fish*). c. Use reflexive pronouns (e.g., *myself, ourselves*). d. Form and use the past tense of frequently occurring irregular verbs (e.g., *sat, hid, told*). e. Use adjectives and adverbs, and choose between them depending on what is to be modified. f. Produce, expand, and rearrange complete simple and compound sentences (e.g., *The boy watched the movie; The little boy watched the movie; The action movie was watched by the little boy*).
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize the first word in a sentence and the pronoun I. b. Recognize and name end punctuation. c. Write a letter or letters for most consonant and short-vowel sounds (phonemes). d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize dates and names of people. b. Use end punctuation for sentences. c. Use commas in dates and to separate single words in a series. d. Use conventional spelling for words with common spelling patterns and for frequently occurring irregular words. e. Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize holidays, product names, and geographic names. b. Use commas in greetings and closings of letters. c. Use an apostrophe to form contractions and frequently occurring possessives. d. Generalize learned spelling patterns when writing words (e.g., cage → badge; boy → boil). e. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings.

Language Standards K-5

Kindergartners:	Grade 1 students:	Grade 2 students:
Knowledge of Language		
3. (Begins in grade 2)	3. (Begins in grade 2)	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Compare formal and informal uses of English.
Vocabulary Acquisition and Use		
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *kindergarten reading and content.* a. Identify new meanings for familiar words and apply them accurately (e.g., knowing *duck* is a bird and learning the verb *to duck*). b. Use the most frequently occurring inflections and affixes (e.g., *-ed, -s, re-, un-, pre-, -ful, -less*) as a clue to the meaning of an unknown word.	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 1 reading and content*, choosing flexibly from an array of strategies. a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Use frequently occurring affixes as a clue to the meaning of a word. c. Identify frequently occurring root words (e.g., *look*) and their inflectional forms (e.g., *looks, looked, looking*).	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 2 reading and content*, choosing flexibly from an array of strategies. a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., *happy/unhappy, tell/retell*). c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., *addition, additional*). d. Use knowledge of the meaning of individual words to predict the meaning of compound words (e.g., *birdhouse, lighthouse, housefly; bookshelf, notebook, bookmark*). e. Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases.
5. With guidance and support from adults, explore word relationships and nuances in word meanings. a. Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent. b. Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms). c. Identify real-life connections between words and their use (e.g., note places at school that are *colorful*). d. Distinguish shades of meaning among verbs describing the same general action (e.g., *walk, march, strut, prance*) by acting out the meanings.	5. With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings. a. Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent. b. Define words by category and by one or more key attributes (e.g., a *duck* is a bird that swims; a *tiger* is a large cat with stripes). c. Identify real-life connections between words and their use (e.g., note places at home that are *cozy*). d. Distinguish shades of meaning among verbs differing in manner (e.g., *look, peek, glance, stare, glare, scowl*) and adjectives differing in intensity (e.g., *large, gigantic*) by defining or choosing them or by acting out the meanings.	5. Demonstrate understanding of word relationships and nuances in word meanings. a. Identify real-life connections between words and their use (e.g., describe foods that are *spicy* or *juicy*). b. Distinguish shades of meaning among closely related verbs (e.g., *toss, throw, hurl*) and closely related adjectives (e.g., *thin, slender, skinny, scrawny*).
6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts.	6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., *I named my hamster Nibblet because she nibbles too much because she likes that*).	6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., *When other kids are happy that makes me happy*).

Language Standards K–5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Conventions of Standard English		
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences. b. Form and use regular and irregular plural nouns. c. Use abstract nouns (e.g., *childhood*). d. Form and use regular and irregular verbs. e. Form and use the simple (e.g., *I walked; I walk; I will walk*) verb tenses. f. Ensure subject-verb and pronoun-antecedent agreement.* g. Form and use comparative and superlative adjectives and adverbs, and choose between them depending on what is to be modified. h. Use coordinating and subordinating conjunctions. i. Produce simple, compound, and complex sentences.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Use relative pronouns (*who, whose, whom, which, that*) and relative adverbs (*where, when, why*). b. Form and use the progressive (e.g., *I was walking; I am walking; I will be walking*) verb tenses. c. Use modal auxiliaries (e.g., *can, may, must*) to convey various conditions. d. Order adjectives within sentences according to conventional patterns (e.g., *a small red bag* rather than *a red small bag*). e. Form and use prepositional phrases. f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.* g. Correctly use frequently confused words (e.g., *to, too, two; there, their*).*	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of conjunctions, prepositions, and interjections in general and their function in particular sentences. b. Form and use the perfect (e.g., *I had walked; I have walked; I will have walked*) verb tenses. c. Use verb tense to convey various times, sequences, states, and conditions. d. Recognize and correct inappropriate shifts in verb tense.* e. Use correlative conjunctions (e.g., *either/or, neither/nor*).
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Capitalize appropriate words in titles. b. Use commas in addresses. c. Use commas and quotation marks in dialogue. d. Form and use possessives. e. Use conventional spelling for high-frequency and other studied words and for adding suffixes to base words (e.g., *sitting, smiled, cries, happiness*). f. Use spelling patterns and generalizations (e.g., word families, position-based spellings, syllable patterns, ending rules, meaningful word parts) in writing words. g. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use correct capitalization. b. Use commas and quotation marks to mark direct speech and quotations from a text. c. Use a comma before a coordinating conjunction in a compound sentence. d. Spell grade-appropriate words correctly, consulting references as needed.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use punctuation to separate items in a series.* b. Use a comma to separate an introductory element from the rest of the sentence. c. Use a comma to set off the words yes and no (e.g., *Yes, thank you*), to set off a tag question from the rest of the sentence (e.g., *It's true, isn't it?*), and to indicate direct address (e.g., *Is that you, Steve?*). d. Use underlining, quotation marks, or italics to indicate titles of works. e. Spell grade-appropriate words correctly, consulting references as needed.

Language Standards K-5

Grade 3 students:	Grade 4 students:	Grade 5 students:
Knowledge of Language		
3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Choose words and phrases for effect.* b. Recognize and observe differences between the conventions of spoken and written standard English.	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Choose words and phrases to convey ideas precisely.* b. Choose punctuation for effect.* c. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion).	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style. b. Compare and contrast the varieties of English (e.g., dialects, registers) used in stories, dramas, or poems.
Vocabulary Acquisition and Use		
4. Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on *grade 3 reading and content*, choosing flexibly from a range of strategies. a. Use sentence-level context as a clue to the meaning of a word or phrase. b. Determine the meaning of the new word formed when a known affix is added to a known word (e.g., *agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat*). c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., *company, companion*). d. Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases.	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 4 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *telegraph, photograph, autograph*). c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 5 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *photograph, photosynthesis*). c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
5. Demonstrate understanding of word relationships and nuances in word meanings. a. Distinguish the literal and nonliteral meanings of words and phrases in context (e.g., *take steps*). b. Identify real-life connections between words and their use (e.g., describe people who are *friendly* or *helpful*). c. Distinguish shades of meaning among related words that describe states of mind or degrees of certainty (e.g., *knew, believed, suspected, heard, wondered*).	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Explain the meaning of simple similes and metaphors (e.g., *as pretty as a picture*) in context. b. Recognize and explain the meaning of common idioms, adages, and proverbs. c. Demonstrate understanding of words by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms).	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figurative language, including similes and metaphors, in context. b. Recognize and explain the meaning of common idioms, adages, and proverbs. c. Use the relationship between particular words (e.g., synonyms, antonyms, homographs) to better understand each of the words.
6. Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., *After dinner that night we went looking for them*).	6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., *quizzed, whined, stammered*) and that are basic to a particular topic (e.g., *wildlife, conservation,* and *endangered* when discussing animal preservation).	6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., *however, although, nevertheless, similarly, moreover, in addition*).

~~Language Progressive Skills, by Grade~~

~~The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.~~

Standard	Grade(s)							
	3	4	5	6	7	8	9–10	11–12
L.3.1f. Ensure subject-verb and pronoun-antecedent agreement.								
L.3.3a. Choose words and phrases for effect.								
L.4.1f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.								
L.4.1g. Correctly use frequently confused words (e.g., *to/too/two; there/their*).								
L.4.3a. Choose words and phrases to convey ideas precisely.*								
L.4.3b. Choose punctuation for effect.								
L.5.1d. Recognize and correct inappropriate shifts in verb tense.								
L.5.2a. Use punctuation to separate items in a series.†								
L.6.1c. Recognize and correct inappropriate shifts in pronoun number and person.								
L.6.1d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
L.6.1e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
L.6.2a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
L.6.3a. Vary sentence patterns for meaning, reader/listener interest, and style.‡								
L.6.3b. Maintain consistency in style and tone.								
L.7.1c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.								
L.8.1d. Recognize and correct inappropriate shifts in verb voice and mood.								
L.9–10.1a. Use parallel structure.								

~~*Subsumed by L.7.3a~~
~~†Subsumed by L.9-10.1a~~
~~‡Subsumed by L.11-12.3a~~

~~Standard 10: Range, Quality, and Complexity of Student Reading K–5~~

~~Measuring Text Complexity: Three Factors~~

~~Qualitative evaluation of the text:~~	~~Levels of meaning, structure, language conventionality and clarity, and knowledge demands~~
~~Quantitative evaluation of the text:~~	~~Readability measures and other scores of text complexity~~
~~Matching reader to text and task~~~~:~~	~~Reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed)~~

~~Note:~~ ~~More detailed information on text complexity and how it is measured is contained in Appendix A.~~

~~Range of Text Types for K–5~~

~~Students in K–5 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.~~

	~~Literature~~		~~Informational Text~~
~~Stories~~	~~dramas~~	~~Poetry~~	~~Literary nonfiction and Historical, Scientific, and technical texts~~
~~Includes children's adventure stories, folktales, legends, fables, fantasy, realistic fiction, and myth~~	~~Includes staged dialogue and brief familiar scenes~~	~~Includes nursery rhymes and the subgenres of the narrative poem, limerick, and free verse poem~~	~~Includes biographies and autobiographies; books about history, social studies, science, and the arts; technical texts, including directions, forms, and information displayed in graphs, charts, or maps; and digital sources on a range of topics~~

~~* Read-aloud ** Read-along~~

~~Texts Illustrating the Complexity, Quality, and Range of Student Reading K–5~~

	~~Literature: Stories, drama, Poetry~~	~~Informational texts: Literary nonfiction and Historical, Scientific, and technical texts~~
~~K*~~	• ~~*Over in the Meadow* by John Langstaff (traditional) (c1800)*~~ • ~~*A Boy, a Dog, and a Frog* by Mercer Mayer (1967)~~ • ~~*Pancakes for Breakfast* by Tomie DePaola (1978)~~ • ~~*A Story A Story* by Gail E. Haley (1970)*~~ • ~~*Kitten's First Full Moon* by Kevin Henkes (2004)*~~	• ~~*My Five Senses* by Aliki (1962)**~~ • ~~*Truck* by Donald Crews (1980)~~ • ~~*Read Signs* by Tana Hoban (1987)~~ • ~~*What Do You Do With a Tail Like This?* by Steve Jenkins and Robin Page (2003)*~~ • ~~*Amazing Whales!* by Sarah L. Thomson (2005)*~~
~~1*~~	• ~~"Mix a Pancake" by Christina G. Rossetti (1893)**~~ • ~~*Mr. Popper's Penguins* by Richard Atwater (1938)*~~ • ~~*Little Bear* by Else Holmelund Minarik, illustrated by Maurice Sendak (1957)**~~ • ~~*Frog and Toad Together* by Arnold Lobel (1971)**~~ • ~~*Hi! Fly Guy* by Tedd Arnold (2006)~~	• ~~*A Tree Is a Plant* by Clyde Robert Bulla, illustrated by Stacey Schuett (1960)**~~ • ~~*Starfish* by Edith Thacher Hurd (1962)~~ • ~~*Follow the Water from Brook to Ocean* by Arthur Dorros (1991~~ • ~~*From Seed to Pumpkin* by Wendy Pfeffer, illustrated by James Graham Hale (2004)*~~ • ~~*How People Learned to Fly* by Fran Hodgkins and True Kelley (2007)*~~
~~2–3~~	• ~~"Who Has Seen the Wind?" by Christina G. Rossetti (1893)~~ • ~~*Charlotte's Web* by E. B. White (1952)*~~ • ~~*Sarah, Plain and Tall* by Patricia MacLachlan (1985~~ • ~~*Tops and Bottoms* by Janet Stevens (1995)~~ • ~~*Poppleton in Winter* by Cynthia Rylant, illustrated by Mark Teague (2001)~~	• ~~*A Medieval Feast* by Aliki (1983)~~ • ~~*From Seed to Plant* by Gail Gibbons (1991)~~ • ~~*The Story of Ruby Bridges* by Robert Coles (1995)*~~ • ~~*A Drop of Water: A Book of Science and Wonder* by Walter Wick (1997)~~ • ~~*Moonshot: The Flight of Apollo 11* by Brian Floca (2009)~~
~~4–5~~	• ~~*Alice's Adventures in Wonderland* by Lewis Carroll (1865~~ • ~~"Casey at the Bat" by Ernest Lawrence Thayer (1888)~~ • ~~*The Black Stallion* by Walter Farley (1941)~~ • ~~"Zlateh the Goat" by Isaac Bashevis Singer (1984)~~ • ~~*Where the Mountain Meets the Moon* by Grace Lin (2009)~~	• ~~*Discovering Mars: The Amazing Story of the Red Planet* by Melvin Berger (1992)~~ • ~~*Hurricanes: Earth's Mightiest Storms* by Patricia Lauber (1996)~~ • ~~*A History of US* by Joy Hakim (2005)~~ • ~~*Horses* by Seymour Simon (2006)~~ • ~~*Quest for the Tree Kangaroo: An Expedition to the Cloud Forest of New Guinea* by Sy Montgomery (2006)~~

~~**Note**: Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a wide range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of K–5 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth. On the next page is an example of progressions of texts building knowledge across grade levels.~~

~~*Children at the kindergarten and grade 1 levels should be expected to read texts independently that have been specifically written to correlate to their reading level and their word knowledge. Many of the titles listed above are meant to supplement carefully structured independent reading with books to read along with a teacher or that are read aloud to students to build knowledge and cultivate a joy in reading.~~

~~Staying on Topic Within a Grade and Across Grades: How to Build Knowledge Systematically in English Language Arts K–5~~

~~Building knowledge systematically in English language arts is like giving children various pieces of a puzzle in each grade that, over time, will form one big picture. At a curricular or instructional level, texts—within and across grade levels—need to be selected around topics or themes that systematically develop the knowledge base of students. Within a grade level, there should be an adequate number of titles on a single topic that would allow children to study that topic for a sustained period. The knowledge children have learned about particular topics in early grade levels should then be expanded and developed in subsequent grade levels to ensure an increasingly deeper understanding of these topics. Children in the upper elementary grades will generally be expected to read these texts independently and reflect on them in writing. However, children in the early grades (particularly K–2) should participate in rich, structured conversations with an adult in response to the written texts that are read aloud, orally comparing and contrasting as well as analyzing and synthesizing, in the manner called for by the Standards.~~

~~Preparation for reading complex informational texts should begin at the very earliest elementary school grades. What follows is one example that uses domain-specific nonfiction titles across grade levels to illustrate how curriculum designers and classroom teachers can infuse the English language arts block with rich, age-appropriate content knowledge and vocabulary in history/social studies, science, and the arts. Having students listen to informational read-alouds in the early grades helps lay the necessary foundation for students' reading and understanding of increasingly complex texts on their own in subsequent grades.~~

Exemplar Texts on a Topic Across Grades	K	1	2–3	4–5
~~The Human Body~~ ~~Students can begin learning about the human body starting in kindergarten and then review and extend their learning during each subsequent grade.~~	~~**The five senses and associated body parts**~~ ~~• *My Five Senses* by Aliki (1989)~~ ~~• *Hearing* by Maria Rius (1985)~~ ~~• *Sight* by Maria Rius (1985)~~ ~~• *Smell* by Maria Rius (1985)~~ ~~• *Taste* by Maria Rius (1985)~~ ~~• *Touch* by Maria Rius (1985)~~ ~~**Taking care of your body: overview (hygiene, diet, exercise, rest)**~~ ~~• *My Amazing Body: A First Look at Health & Fitness* by Pat Thomas (2001)~~ ~~• *Get Up and Go!* by Nancy Carlson (2008)~~ ~~• *Go Wash Up* by Doering Tourville (2008)~~ ~~• *Sleep* by Paul Showers (1997)~~ ~~• *Fuel the Body* by Doering Tourville (2008)~~	~~**Introduction to the systems of the human body and associated body parts**~~ ~~• *Under Your Skin: Your Amazing Body* by Mick Manning (2007)~~ ~~• *Me and My Amazing Body* by Joan Sweeney (1999)~~ ~~• *The Human Body* by Gallimard Jeunesse (2007)~~ ~~• *The Busy Body Book* by Lizzy Rockwell (2008)~~ ~~• *First Encyclopedia of the Human Body* by Fiona Chandler (2004)~~ ~~**Taking care of your body: Germs, diseases, and preventing illness**~~ ~~• *Germs Make Me Sick* by Marilyn Berger (1995)~~ ~~• *Tiny Life on Your Body* by Christine Taylor-Butler (2005)~~ ~~• *Germ Stories* by Arthur Kornberg (2007)~~ ~~• *All About Scabs* by GenichiroYagu (1998)~~	~~**Digestive and excretory systems**~~ ~~• *What Happens to a Hamburger* by Paul Showers (1985)~~ ~~• *The Digestive System* by Christine Taylor-Butler (2008)~~ ~~• *The Digestive System* by Rebecca L. Johnson (2006)~~ ~~• *The Digestive System* by Kristin Petrie (2007)~~ ~~**Taking care of your body: healthy eating and nutrition**~~ ~~• *Good Enough to Eat* by Lizzy Rockwell (1999)~~ ~~• *Showdown at the Food Pyramid* by Rex Barron (2004)~~ ~~**Muscular, skeletal, and nervous systems**~~ ~~• *The Mighty Muscular and Skeletal Systems* Crabtree Publishing (2009)~~ ~~• *Muscles* by Seymour Simon (1998)~~ ~~• *Bones* by Seymour Simon (1998) *The Astounding Nervous System* Crabtree Publishing (2009)~~ ~~• *The Nervous System* by Joelle Riley (2004)~~	~~**Circulatory system**~~ ~~• *The Heart by Seymour Simon (2006)*~~ ~~• *The Heart and Circulation by Carol Ballard (2005)*~~ ~~• *The Circulatory System by Kristin Petrie (2007)*~~ ~~• *The Amazing Circulatory System by John Burstein (2009)*~~ ~~**Respiratory system**~~ ~~• *The Lungs* by Seymour Simon (2007)~~ ~~• *The Respiratory System* by Susan Glass (2004)~~ ~~• *The Respiratory System* by Kristin Petrie (2007)~~ ~~• *The Remarkable Respiratory System* by John Burstein (2009)~~ ~~**Endocrine system**~~ ~~• *The Endocrine System* by Rebecca Olien (2006)~~ ~~• *The Exciting Endocrine System* by John Burstein (2009)~~

~~ELEMENTARY MATHEMATICS~~

~~Kentucky Academic Standards~~

~~Mathematics Academic Standards for primary, grades K, 1, 2, and 3 contain several headings, each one the title of a single progression having significant presence in that particular grade level. Under each of these progression headings, there appear standards, divided into standards describing concepts student should understand and standards describing skills students should acquire. A typical progression spans a number of grades, but does not span all of primary.~~

~~Introduction~~

~~Toward greater focus and coherence~~

~~For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is “a mile wide and an inch deep.” These Standards are a substantial answer to that challenge.~~

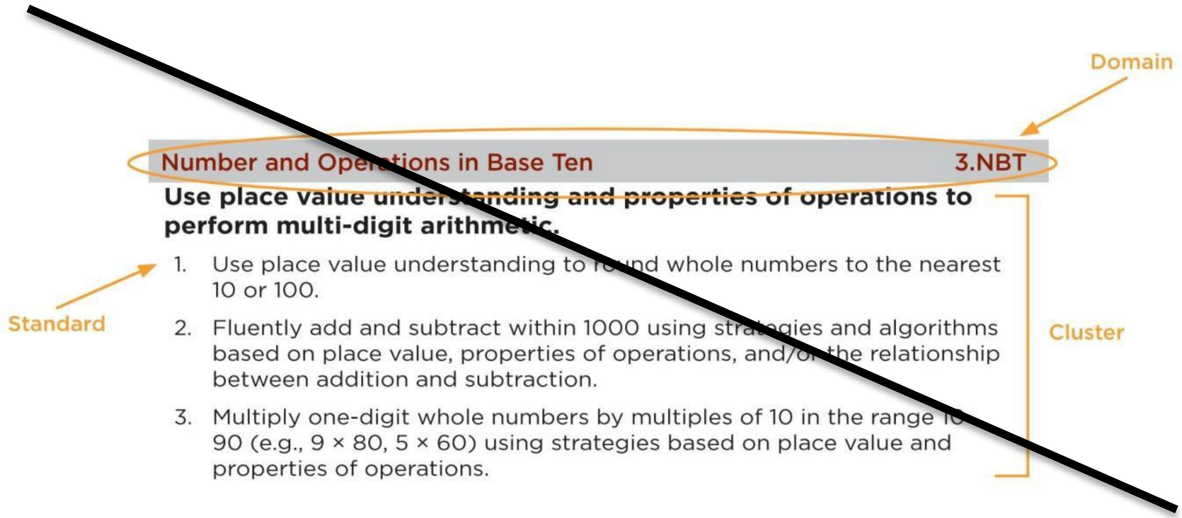
~~Understanding mathematics~~

~~These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student’s mathematical maturity, *why* a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.~~

~~The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. For example, for students with disabilities reading should allow for use of Braille, screen reader technology, or other assistive devices, while writing should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and listening should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.~~

~~How to read the grade level standards~~

~~Standards define what students should understand and be able to do.~~
~~Clusters are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.~~
~~Domains are larger groups of related standards. Standards from different domains may sometimes be closely related.~~



~~These Standards do not dictate curriculum or teaching methods. For example, just because topic A appears before topic B in the standards for a given grade, it does not necessarily mean that topic A must be taught before topic B. A teacher might prefer to teach topic B before topic A, or might choose to highlight connections by teaching topic A and topic B at the same time. Or, a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B.~~

~~What students can learn at any particular grade level depends upon what they have learned before. Ideally then, each standard in this document might have been phrased in the form, “Students who already know ... should next come to learn ....” But at present this approach is unrealistic—not least because existing education research cannot specify all such learning pathways. Of necessity therefore, grade placements for specific topics have been made on the basis of state and international comparisons and the collective experience and collective professional judgment of educators, researchers and mathematicians. One promise of common state standards is that over time they will allow research on learning progressions to inform and improve the design of standards to a much greater extent than is possible today. Learning opportunities will continue to vary across schools and school systems, and educators should make every effort to meet the needs of individual students based on their current understanding.~~

~~These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.~~

~~Mathematics | Standards for Mathematical Practice~~

~~The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).~~

~~1. Make sense of problems and persevere in solving them.~~

~~Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.~~

~~2. Reason abstractly and quantitatively.~~

~~Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.~~

~~3. Construct viable arguments and critique the reasoning of others.~~

~~Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.~~

~~4. Model with mathematics.~~

~~Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.~~

~~5. Use appropriate tools strategically.~~

~~Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.~~

~~6. Attend to precision.~~

~~Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.~~

~~7. Look for and make use of structure.~~

~~Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.~~

~~8. Look for and express regularity in repeated reasoning.~~

~~Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.~~

~~Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content~~

~~The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.~~

~~The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word “understand” are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.~~

~~In this respect, those content standards which set an expectation of understanding are potential “points of intersection” between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.~~

~~Mathematics | Kindergarten~~

~~In Kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.~~

~~(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.~~

~~(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.~~

~~Grade K Overview~~

~~Counting and Cardinality~~

- ~~Know number names and the count sequence.~~
- ~~Count to tell the number of objects.~~
- ~~Compare numbers.~~

~~Operations and Algebraic Thinking~~

- ~~Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.~~

~~Number and Operations in Base Ten~~

- ~~Work with numbers 11–19 to gain foundations for place value.~~

~~Measurement and Data~~

- ~~Describe and compare measurable attributes.~~
- ~~Classify objects and count the number of objects in categories.~~

~~Geometry~~

- ~~Identify and describe shapes.~~
- ~~Analyze, compare, create, and compose shapes.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~Counting and Cardinality~~ ~~K.CC~~

~~Know number names and the count sequence.~~

1. ~~Count to 100 by ones and by tens.~~
2. ~~Count forward beginning from a given number within the known sequence (instead of having to begin at 1).~~
3. ~~Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).~~

~~Count to tell the number of objects.~~

4. ~~Understand the relationship between numbers and quantities; connect counting to cardinality.~~
   a. ~~When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.~~
   b. ~~Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.~~
   c. ~~Understand that each successive number name refers to a quantity that is one larger.~~

5. ~~Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.~~

~~Compare numbers.~~

6. ~~Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.~~[1]
7. ~~Compare two numbers between 1 and 10 presented as written numerals.~~

~~Operations and Algebraic Thinking~~ ~~K.OA~~

~~Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.~~

1. ~~Represent addition and subtraction with objects, fingers, mental images, drawings2, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.~~
2. ~~Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.~~
3. ~~Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).~~
4. ~~For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.~~
5. ~~Fluently add and subtract within 5.~~

[1] ~~Include groups with up to ten objects.~~
[2] ~~Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)~~

~~Number and Operations in Base Ten~~ ~~K.NBT~~

~~Work with numbers 11–19 to gain foundations for place value.~~

1. ~~Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.~~

~~Measurement and Data~~ ~~K.MD~~

~~Describe and compare measurable attributes.~~

1. ~~Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.~~
2. ~~Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*~~

~~Classify objects and count the number of objects in each category.~~

3. ~~Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.[1]~~

~~Geometry~~ ~~K.G~~

~~Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).~~

1. ~~Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.~~
2. ~~Correctly name shapes regardless of their orientations or overall size.~~
3. ~~Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").~~

~~Analyze, compare, create, and compose shapes.~~

4. ~~Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).~~
5. ~~Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.~~
6. ~~Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*~~

~~[1] Limit category counts to be less than or equal to 10.~~

~~Mathematics | Grade 1~~

~~In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.~~

~~(1) Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., "making tens") to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.~~

~~(2) Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.~~

~~(3) Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.1~~

~~(4) Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.~~

~~[1] Students should apply the principle of transitivity of measurement to make indirect comparisons, but they need not use this technical term.~~

~~Grade 1 Overview~~

~~Operations and Algebraic Thinking~~

- ~~Represent and solve problems involving addition and subtraction.~~
- ~~Understand and apply properties of operations and the relationship between addition and subtraction.~~
- ~~Add and subtract within 20.~~
- ~~Work with addition and subtraction equations.~~

~~Number and Operations In Base Ten~~

- ~~Extend the counting sequence.~~
- ~~Understand place value.~~
- ~~Use place value understanding and properties of operations to add and subtract.~~

~~Measurement and Data~~

- ~~Measure lengths indirectly and by iterating length units.~~
- ~~Tell and write time.~~
- ~~Represent and interpret data.~~

~~Geometry~~

- ~~Reason with shapes and their attributes.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~Operations and Algebraic Thinking~~ ~~1.OA~~

~~Represent and solve problems involving addition and subtraction.~~

1 ~~Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.~~[1]

2 ~~Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.~~

~~Understand and apply properties of operations and the relationship between addition and subtraction.~~

3. ~~Apply properties of operations as strategies to add and subtract.~~[2] ~~Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)~~
4. ~~Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.~~

~~Add and subtract within 20.~~

5. ~~Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).~~
6. ~~Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).~~

~~Work with addition and subtraction equations.~~

7. ~~Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.~~
8. ~~Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □.~~

~~Number and Operations in Base Ten~~ ~~1NBT~~

~~Extend the counting sequence.~~

1. ~~Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.~~

~~Understand place value.~~

2. ~~Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:~~
   a. ~~10 can be thought of as a bundle of ten ones — called a "ten."~~
   b. ~~The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.~~
   c. ~~The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).~~

[1] ~~See Glossary, Table 1.~~
[2] ~~Students need not use formal terms for these properties.~~

3. ~~Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.~~

~~Use place value understanding and properties of operations to add and subtract.~~

4. ~~Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.~~
5. ~~Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.~~
6. ~~Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.~~

~~Measurement and Data~~ ~~1.MD~~

~~Measure lengths indirectly and by iterating length units.~~

1. ~~Order three objects by length; compare the lengths of two objects indirectly by using a third object.~~
2. ~~Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.~~

~~Tell and write time.~~

3. ~~Tell and write time in hours and half-hours using analog and digital clocks.~~

~~Represent and interpret data.~~

4. ~~Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.~~

~~Geometry~~ ~~1.G~~

~~Reason with shapes and their attributes.~~

1. ~~Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.~~
2. ~~Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.~~[1]
3. ~~Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.~~

[1] ~~Students do not need to learn formal names such as “right rectangular prism.”~~

~~Mathematics | Grade 2~~

~~In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.~~

~~(1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).~~

~~(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.~~

~~(3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.~~

~~(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.~~

~~Grade 2 Overview~~

~~Operations and Algebraic Thinking~~

- ~~Represent and solve problems involving addition and subtraction.~~
- ~~Add and subtract within 20.~~
- ~~Work with equal groups of objects to gain foundations for multiplication.~~

~~Number and Operations In Base Ten~~

- ~~Understand place value.~~
- ~~Use place value understanding and properties of operations to add and subtract.~~

~~Measurement and Data~~

- ~~Measure and estimate lengths in standard units.~~
- ~~Relate addition and subtraction to length.~~
- ~~Work with time and money.~~
- ~~Represent and interpret data.~~

~~Geometry~~

- ~~Reason with shapes and their attributes.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning~~

~~Operations and Algebraic Thinking 2.OA~~

~~Represent and solve problems involving addition and subtraction.~~

~~1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]~~

~~Add and subtract within 20.~~

~~2 Fluently add and subtract within 20 using mental strategies.[2] By end of Grade 2, know from memory all sums of two one-digit numbers.~~

~~Work with equal groups of objects to gain foundations for multiplication.~~

~~3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.~~

~~4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.~~

~~Number and Operations in Base Ten 2.NBT~~

~~Understand place value.~~

~~1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:~~
   - ~~a. 100 can be thought of as a bundle of ten tens — called a "hundred."~~
   - ~~b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).~~

~~2 Count within 1000; skip-count by 5s, 10s, and 100s.~~

~~3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.~~

~~4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.~~

~~Use place value understanding and properties of operations to add and subtract.~~

~~5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.~~

~~6. Add up to four two-digit numbers using strategies based on place value and properties of operations.~~

~~7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.~~

~~8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.~~

~~9. Explain why addition and subtraction strategies work, using place value and the properties of operations.[1]~~

~~[1] See Glossary, Table 1.~~
~~[2] See standard 1.OA.6 for a list of mental strategies.~~

~~Measurement and Data~~ ~~2.MD~~

~~Measure and estimate lengths in standard units.~~

1. ~~Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.~~
2. ~~Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.~~
3. ~~Estimate lengths using units of inches, feet, centimeters, and meters.~~
4. ~~Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.~~

~~Relate addition and subtraction to length.~~

5. ~~Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.~~
6. ~~Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.~~

~~Work with time and money.~~

7. ~~Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.~~
8. ~~Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.~~ ~~*Example: If you have 2 dimes and 3 pennies, how many cents do you have?*~~

~~Represent and interpret data.~~

9. ~~Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.~~
10. ~~Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems[2] using information presented in a bar graph.~~

~~Geometry~~ ~~2.G~~

~~Reason with shapes and their attributes.~~

1. ~~Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[3] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.~~
2. ~~Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.~~
3. ~~Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.~~

[1] ~~Explanations may be supported by drawings or objects.~~
[2] ~~See Glossary, Table 1.~~
[3] ~~Sizes are compared directly or visually, not compared by measuring.~~

~~Mathematics | Grade 3~~

~~In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.~~

~~(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.~~

~~(2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.~~

~~(3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area.~~
~~Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.~~

~~(4) Students describe, analyze, and compare properties of two dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.~~

~~Grade 3 Overview~~

~~Operations and Algebraic Thinking~~

- ~~Represent and solve problems involving multiplication and division.~~
- ~~Understand properties of multiplication and the relationship between multiplication and division.~~
- ~~Multiply and divide within 100.~~
- ~~Solve problems involving the four operations, and identify and explain patterns in arithmetic.~~

~~Number and Operations In Base Ten~~

- ~~Use place value understanding and properties of operations to perform multi-digit arithmetic.~~

~~Number and Operations—Fractions~~

- ~~Develop understanding of fractions as numbers.~~

~~Measurement and Data~~

- ~~Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.~~
- ~~Represent and interpret data.~~
- ~~Geometric measurement: understand concepts of area and relate area to multiplication and to addition.~~
- ~~Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.~~

~~Geometry~~

- ~~Reason with shapes and their attributes.~~

~~Mathematical Practices~~

~~1 Make sense of problems and persevere in solving them.~~

~~2 Reason abstractly and quantitatively.~~

~~3 Construct viable arguments and critique the reasoning of others.~~

~~4 Model with mathematics.~~

~~5 Use appropriate tools strategically.~~

~~6 Attend to precision.~~

~~7 Look for and make use of structure.~~

8 ~~Look for and express regularity in repeated reasoning~~.

~~Operations and Algebraic Thinking 3.OA~~

~~Represent and solve problems involving multiplication and division.~~

1 ~~Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7.~~

2 ~~Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.~~

3 ~~Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]~~

4 ~~Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \square \div 3$, $6 \times 6 = ?$.~~

~~Understand properties of multiplication and the relationship between multiplication and division.~~

5 ~~Apply properties of operations as strategies to multiply and divide.[2] Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)~~

6 ~~Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.~~

~~Multiply and divide within 100.~~

7 ~~Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.~~

~~Solve problems involving the four operations, and identify and explain patterns in arithmetic.~~

8 ~~Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.[3]~~

9 ~~Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*~~

~~Number and Operations in Base Ten 3.NBT~~

~~Use place value understanding and properties of operations to perform multi-digit arithmetic.~~[4]

1 ~~Use place value understanding to round whole numbers to the nearest 10 or 100.~~

2 ~~Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.~~

~~[1] See Glossary, Table 2.~~
~~[2] Students need not use formal terms for these properties.~~
~~[3] This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).~~
~~[4] A range of algorithms may be used.~~

3 ~~Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.~~

~~Number and Operations—Fractions[1]~~ ~~3.NF~~

~~Develop understanding of fractions as numbers.~~

1 ~~Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.~~

2 ~~Understand a fraction as a number on the number line; represent fractions on a number line diagram.~~

   a. ~~Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.~~

   b. ~~Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.~~

3 ~~Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.~~

   a. ~~Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.~~

   b. ~~Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.~~

   c. ~~Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.~~

   d. ~~Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.~~

~~Measurement and Data~~ ~~3.MD~~

~~Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.~~

1. ~~Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.~~

2. ~~Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[2] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.[3]~~

~~Represent and interpret data.~~

3. ~~Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.~~ ~~*For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*~~

[1] ~~Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.~~
[2] ~~Excludes compound units such as cm^3 and finding the geometric volume of a container.~~
[3] ~~Excludes multiplicative comparison problems (problems involving notions of "times as much"; see Glossary, Table 2).~~

4. ~~Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.~~

~~Geometric measurement: understand concepts of area and relate area to multiplication and to addition.~~

5. ~~Recognize area as an attribute of plane figures and understand concepts of area measurement.~~
    a. ~~A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.~~
    b. ~~A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.~~
6. ~~Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).~~
7. ~~Relate area to the operations of multiplication and addition.~~
    a. ~~Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.~~
    b. ~~Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.~~
    c. ~~Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* × *b* and *a* × *c*. Use area models to represent the distributive property in mathematical reasoning.~~
    d. ~~Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.~~

~~Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.~~

8. ~~Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.~~

~~Geometry~~ ~~3.G~~

~~Reason with shapes and their attributes.~~

1. ~~Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.~~
2. ~~Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.~~

~~Mathematics | Grade 4~~

~~In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.~~

~~(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.~~

~~(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.~~

~~(3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.~~

~~Grade 4 Overview~~

~~Operations and Algebraic Thinking~~

- ~~Use the four operations with whole numbers to solve problems.~~
- ~~Gain familiarity with factors and multiples.~~
- ~~Generate and analyze patterns.~~

~~Number and Operations in Base Ten~~

- ~~Generalize place value understanding for multi-digit whole numbers.~~
- ~~Use place value understanding and properties of operations to perform multi-digit arithmetic.~~

~~Number and Operations—Fractions~~

- ~~Extend understanding of fraction equivalence and ordering.~~
- ~~Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.~~
- ~~Understand decimal notation for fractions, and compare decimal fractions.~~

~~Measurement and Data~~

- ~~Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.~~
- ~~Represent and interpret data.~~
- ~~Geometric measurement: understand concepts of angle and measure angles.~~

~~Geometry~~

- ~~Draw and identify lines and angles, and classify shapes by properties of their lines and angles.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~Operations and Algebraic Thinking~~ ~~4.OA~~

~~Use the four operations with whole numbers to solve problems.~~

1 ~~Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.~~

2 ~~Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.1~~

3 ~~Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.~~

~~Gain familiarity with factors and multiples.~~

4 ~~Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.~~

~~Generate and analyze patterns.~~

5 ~~Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.~~ ~~*For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*~~

~~Number and Operations in Base Ten[2]~~ ~~4.NBT~~

~~Generalize place value understanding for multi-digit whole numbers.~~

1 ~~Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.~~ ~~*For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*~~

2 ~~Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.~~

3 ~~Use place value understanding to round multi-digit whole numbers to any place.~~

~~Use place value understanding and properties of operations to perform multi-digit arithmetic.~~

4 ~~Fluently add and subtract multi-digit whole numbers using the standard algorithm.~~

5 ~~Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.~~

6 ~~Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.~~

[1] ~~See Glossary, Table 2.~~
[2] ~~Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000~~

~~Number and Operations—Fractions[1]~~ ~~4.NF~~

~~Extend understanding of fraction equivalence and ordering.~~

1. ~~Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.~~
2. ~~Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2.~~

   ~~Recognize that comparisons are valid only when the two fractions refer to the same whole.~~

   ~~Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.~~

~~Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.~~

3. ~~Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.~~
   - a. ~~Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.~~
   - *b.* ~~Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*~~
   - c. ~~Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.~~
   - d. ~~Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.~~
4. ~~Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.~~
   - a. ~~Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = × (1/4).~~
   - b. ~~Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)~~
   - *c.* ~~Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*~~

~~Understand decimal notation for fractions, and compare decimal fractions.~~

5. ~~Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[2] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*~~

~~[1] Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.~~
~~[2] Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.~~

6. ~~Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.~~
7. ~~Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.~~

~~Measurement and Data 4.MD~~

~~Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.~~

1. ~~Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.~~ *~~For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...~~*
2. ~~Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.~~
3. ~~Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.~~

~~Represent and interpret data.~~

4. ~~Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.~~ *~~For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.~~*

~~Geometric measurement: understand concepts of angle and measure angles.~~

5. ~~Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:~~
    a. ~~An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.~~
    b. ~~An angle that turns through~~ *~~n~~* ~~one-degree angles is said to have an angle measure of~~ *~~n~~* ~~degrees.~~
6. ~~Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.~~
7. ~~Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.~~

~~**Geometry**~~	~~**4.G**~~

~~**Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**~~

1. ~~Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.~~
2. ~~Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.~~
3. ~~Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.~~

~~Mathematics | Grade 5~~

~~In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.~~

~~(1) Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)~~

~~(2) Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.~~

~~(3) Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.~~

~~Grade 5 Overview~~

~~Operations and Algebraic Thinking~~

- ~~Write and interpret numerical expressions.~~
- ~~Analyze patterns and relationships.~~

~~Number and Operations in Base Ten~~

- ~~Understand the place value system.~~
- ~~Perform operations with multi-digit whole numbers and with decimals to hundredths.~~

~~Number and Operations—Fractions~~

- ~~Use equivalent fractions as a strategy to add and subtract fractions.~~
- ~~Apply and extend previous understandings of multiplication and division to multiply and divide fractions.~~

~~Measurement and Data~~

- ~~Convert like measurement units within a given measurement system.~~
- ~~Represent and interpret data.~~
- ~~Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.~~

~~Geometry~~

- ~~Graph points on the coordinate plane to solve real-world and mathematical problems.~~
- ~~Classify two-dimensional figures into categories based on their properties.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~Operations and Algebraic Thinking 5.OA~~

~~Write and interpret numerical expressions.~~

1. ~~Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.~~
2. ~~Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.~~

~~Analyze patterns and relationships.~~

3. ~~Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.~~ *~~For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.~~*

~~Number and Operations in Base Ten 5.NBT~~

~~Understand the place value system.~~

1. ~~Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.~~
2. ~~Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.~~
3. ~~Read, write, and compare decimals to thousandths.~~
   a. ~~Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).~~
   b. ~~Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.~~
4. ~~Use place value understanding to round decimals to any place.~~

~~Perform operations with multi-digit whole numbers and with decimals to hundredths.~~

5. ~~Fluently multiply multi-digit whole numbers using the standard algorithm.~~
6. ~~Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.~~
7. ~~Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.~~

~~Number and Operations—Fractions 5.NF~~

~~Use equivalent fractions as a strategy to add and subtract fractions.~~

1. ~~Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.~~ *~~For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)~~*

2. ~~Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.*~~

~~**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**~~

3. ~~Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?~~
4. ~~Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.~~
    - *a.* ~~Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)*~~
    - b. ~~Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.~~
5. ~~Interpret multiplication as scaling (resizing), by:~~
    - a. ~~Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.~~
    - b. ~~Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n\times a)/(n\times b)$ to the effect of multiplying a/b by 1.~~

7 ~~Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.~~

8 ~~Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1]~~
- a. ~~Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.~~
- b. ~~Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.~~

~~[1] Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.~~

~~*c.* Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*~~

~~Measurement and Data 5.MD~~

~~Convert like measurement units within a given measurement system.~~

~~1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.~~

~~Represent and interpret data.~~

~~*2* Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*~~

~~Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.~~

~~3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.~~

- ~~a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.~~
- ~~b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.~~

~~4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.~~

~~5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.~~

- ~~a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.~~
- ~~b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.~~
- ~~c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.~~

~~Geometry 5.G~~

~~Graph points on the coordinate plane to solve real-world and mathematical problems.~~

~~1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).~~

~~2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.~~

~~Classify two-dimensional figures into categories based on their properties.~~

~~3 Understand that attributes belonging to a category of two dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.~~

~~4 Classify two-dimensional figures in a hierarchy based on properties.~~

~~PRIMARY~~
~~PRACTICAL LIVING~~
~~(HEALTH AND PHYSICAL EDUCATION)~~

~~Kentucky Academic Standards– Practical Living – Primary~~

~~Students in the primary health education program develop an understanding of the body functions as well as behaviors and decisions that will foster life-long health. Health literacy is assuming responsibility for personal health throughout the life cycle as related to good nutrition and personal health habits, sound safety practices, violence avoidance, and the use of refusal skills. Health education at this level enables students to acquire the knowledge, skills, and practices that should be a part of their daily routine throughout life.~~

~~Physical education addresses both health-related and skill-related components that promote enhanced health behaviors and increase responsible decision-making. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge, and attitudes that contribute to their optimal development and well-being.~~

~~Primary level physical education assists in the development of children's motor and fitness skills. Developing fundamental movement patterns is the focus of the physical education curriculum at the primary level. While developing fundamental skill patterns, the students will begin to learn key movement concepts that help them perform in a variety of educational games and dances. Students in the primary grades learn to move through space with objects and other individuals. They will learn how their bodies react to vigorous physical activity. Students will learn to use safe practices, cooperate with and respect others and follow classroom rules. Experiences in physical education will help develop a positive attitude for leading a healthy, active lifestyle.~~

~~The Health and Physical Education content standards at the primary level are directly aligned with Kentucky's~~ ~~**Academic Expectations.**~~ ~~The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and Concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being, or total health. Personal Wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases, and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~2.29~~ ~~Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.32~~ ~~Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~Primary Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~individuals have a responsibility to maintain a healthy lifestyle.~~
- ~~changes are normal and each individual is unique in the growth and development process.~~
- ~~responsibility to others enhances social interactions skills.~~
- ~~media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal health.~~
- ~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
- ~~positive health habits can help prevent injuries and the spreading of diseases to self and others.~~

~~Primary Skills and Concepts – Personal and Physical Health~~

~~Students will~~

- ~~demonstrate awareness of the concept of responsibility to oneself and others~~
- ~~identify relationships between personal health behaviors and individual well-being~~
- ~~describe how the family, physical and social environments influence personal health~~
- ~~recognize indicators of mental/emotional, social, and physical health during childhood~~
- ~~explain why growth and development are unique to each individual~~
- ~~describe how diet, exercise, and rest affect the body~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Primary Skills and Concepts – Social, Metal and Emotional Health~~
~~Students will~~

- ~~demonstrate social interaction skills by:~~
  - ~~using etiquette, politeness, sharing and other positive social interaction skills~~
  - ~~working and playing collaboratively in large and small groups~~
  - ~~using appropriate means to express needs, wants and feelings~~
  - ~~describing characteristics needed to be a responsible friend and family member~~
  - ~~practicing attentive listening skills that build and maintain healthy relationships~~
  - ~~identifying the differences between verbal and nonverbal communication~~
  - ~~identifying social interaction skills that enhance individual health~~
- ~~explain how an individual's attitude can affect one's personal health~~
  - ~~social health: getting along with others, serving as team members~~
  - ~~emotional health: expressing feelings, self-concept~~

- ~~define and identify ways to manage stress (e.g., exercise, drawing/writing/talking about feelings)~~

~~Primary Skills and Concepts – Family and Community Health~~
~~Students will~~

- ~~describe ways technology and media influence:~~
  - ~~family~~
  - ~~feelings and thoughts~~
  - ~~physical, social, and emotional health~~

~~Primary Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~
~~Students will~~

- ~~identify and practice personal health habits (e.g., hand washing, care of teeth and eyes, covering~~
  ~~coughs and sneezes, sun protection) which affect self and others in the prevention and spread of~~
  ~~disease~~
- ~~describe the reasons for regular visits to health care providers~~

~~Primary Skills and Concepts – Alcohol, Tobacco and Other Drugs~~
~~Students will~~

- ~~identify the differences between the use/misuse of alcohol, tobacco and other drugs and the effects they have on the body~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~**2.30** Students evaluate consumer products and services and make effective consumer decisions.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**3.5** Students will demonstrate self-control and self-discipline.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use decision-making process to make informed decisions among options.~~

~~Primary Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~proper nutrition is essential to growth and development.~~
- ~~nutrients provide energy for daily living.~~
- ~~resources are available to assist in making nutritional choices.~~

~~Primary Skills and Concepts~~

~~Students will~~

- ~~explain why foods are needed by the body (growth, energy)~~
- ~~identify the six nutrients~~
- ~~investigate the role of the digestive system in nutrition~~
- ~~describe the reasons why an individual needs to eat breakfast~~
- ~~identify the food groups and the recommended number of daily servings to be eaten from each group~~
- ~~apply the decision-making process in making healthful food choices~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving motor vehicles, falls, drowning, fires, firearms, and poisons can occur at home, school and work.~~
~~Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~**2.3** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.33** Students demonstrate the skills to evaluate and use services and resources available in their community.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.3** Students individually demonstrate consistent, responsive, and caring behavior.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Primary Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~safety practices and procedures help prevent injuries and provide a safe environment.~~
- ~~community resources are available to assist in hazardous situations.~~

~~Primary Skills and Concepts~~
~~Students will~~

- ~~explain and practice safety rules/procedures for crossing streets, riding in cars/buses, loading/unloading buses, and using playground equipment~~
- ~~identify and explain how to help prevent injuries at home and at school (e.g., seat belts, helmets, knee pads)~~
- ~~explain and demonstrate school and home safety procedures (e.g., tornado, fire, earthquake drills)~~
- ~~demonstrate awareness of how to avoid danger (e.g., fires, strangers)~~
- ~~identify procedures and practices for obtaining emergency assistance and information (e.g., fire department, police department, poison control, ambulance service, when to call 911)~~
- ~~identify the available health and safety agencies in a community and the services they provide (e.g., health department, fire department, police, ambulance services)~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~

~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~

~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~

~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Primary Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~spatial awareness, motor skills and movement patterns are needed to perform a variety of physical activities.~~
- ~~movement concepts, principles and strategies apply to the learning and performance of physical activities.~~

~~Primary Skills and Concepts~~

~~Students will~~

- ~~demonstrate fundamental motor skills (e.g., locomotor, non-locomotor, object manipulation) and movement concepts (e.g., body control, space awareness)~~
- ~~demonstrate fundamental motor skill aspects of performance~~
- ~~utilize fundamental motor skills and movement concepts to create movement sequences~~
- ~~demonstrate the contrast between slow and fast movements while traveling~~
- ~~demonstrate relationships (e.g., over, under, front and back, side-by-side, leading and following) with other people and objects~~
- ~~define the role personal and general space has in movement~~
- ~~work in group settings without physically interfering with others~~
- ~~develop basic manipulative skills (e.g., throwing, catching, kicking, striking)~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime Wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional, and social health is strengthened by regular involvement in physical activities.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~3.1~~ ~~Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~3.7~~ ~~Students demonstrate the ability to learn on one's own.~~
~~4.2~~ ~~Students use productive team membership skills.~~

~~Primary Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~physical activity provides opportunities for social interaction, challenges, and fun.~~
- ~~participation in regular physical activity has physical, mental, and social benefits.~~
- ~~practice is a basic component for improving sport skills.~~
- ~~rules impact effective participation in physical activities.~~
- ~~personal and social behavior that shows respect to self and others impacts enjoyment and safety in physical activity settings.~~
- ~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~

~~Primary Skills and Concepts~~
~~Students will~~

- ~~identify likes and dislikes connected with participating in sports and physical activities (e.g., enjoyment, challenge, maintaining fitness, teamwork)~~
- ~~identify benefits gained from regular participation in physical activities and describe activities that will promote a physically active lifestyle~~
- ~~identify the physiological and psychological changes in the body during physical activity~~
- ~~participate in daily physical activity during and after school~~
- ~~explain the importance of practice for improving performance in games and sports for individuals when participating in a variety of physical activities and games:~~
  - ~~explain why rules are used (e.g., safety, fairness)~~
  - ~~differentiate between positive and negative behaviors (e.g., waiting your turn vs. pushing in line, honesty vs. lying)~~
  - ~~practice cooperation strategies with partners and small groups~~
- ~~demonstrate and describe the concept of sportsmanship (e.g., rules, fair play) in regard to games and activities~~
- ~~identify and explain how spectator behaviors influence the safety and enjoyment of sports and games~~
- ~~explore and identify a variety of physical activities that enhance the health related fitness components~~

PRIMARY SCIENCE

The Kentucky Academic Standards for Science are written as a set of performance expectations that are assessable statements of what students should know and be able to do. An underlying assumption of these standards is that all students should be held accountable for demonstrating their achievement of all performance expectations. A coherent and complete view of what students should be able to do comes when the performance expectations are viewed in tandem with the contents of the foundation boxes that lie just below the performance expectations. These three boxes include the practices, core disciplinary ideas, and crosscutting concepts, derived from the National Research Council's *Framework for K12 Science Education* that were used to construct this set of performance expectations.

Science and Engineering Practices. The blue box on the left includes just the science and engineering practices used to construct the performance expectations in the box above. These statements are derived from and grouped by the eight categories detailed in the *Framework* to further explain the science and engineering practices important to emphasize in each grade band. Most sets of performance expectations emphasize only a few of the practice categories; however, all practices are emphasized within a grade band.

Disciplinary Core Ideas (DCIs). The orange box in the middle includes statements that are taken from the *Framework* about the most essential ideas in the major science disciplines that all students should understand during 13 years of school. Including these detailed statements was very helpful to the writing team as they analyzed and "unpacked" the disciplinary core ideas and sub-ideas to reach a level that is helpful in describing what each student should understand about each sub-idea at the end of grades 2, 5, 8, and 12. Although they appear in paragraph form in the *Framework*, here they are bulleted to be certain that each statement is distinct.

Crosscutting Concepts. The green box on the right includes statements derived from the *Framework's* list of crosscutting concepts, which apply to one or more of the performance expectations in the box above. Most sets of performance expectations limit the number of crosscutting concepts so as focus on those that are readily apparent when considering the DCIs; however, all are emphasized within a grade band. Aspects of the Nature of Science relevant to the standard are also listed in this box, as are the interdependence of science and engineering, and the influence of engineering, technology, and science on society and the natural world.

Connection Boxes

Three Connection Boxes, below the Foundation Boxes, are designed to support a coherent vision of the standards by showing how the performance expectations in each standard connect to other performance expectations in science, [~~as well as to the KAS standards in Mathematics and English/Language Arts~~]. The **two** [~~three~~] boxes include:

- Connections to other DCIs in this grade level or band. This box contains the names of science topics in other disciplines that have related disciplinary core ideas at the same grade level. For example, both Physical Science and Life Science performance expectations contain core ideas related to Photosynthesis, and could be taught in relation to one another.

- Articulation of DCIs across grade levels. This box contains the names of other science topics that either 1) provide a foundation for student understanding of the core ideas in this set of performance expectations (usually at prior grade levels) or 2) build on the foundation provided by the core ideas in this set of performance expectations (usually at subsequent grade levels).

- ~~[Connections to the Kentucky Academic Standards in mathematics and English/Language Arts. This box contains the coding and names of pre-requisite or co-requisite Kentucky Academic Standards in English Language Arts & and Literacy and Mathematics that align to the performance expectations. An effort has been made to ensure that the mathematical skills that students need for science were taught in a previous year where possible.]~~

K. Forces and Interactions: Pushes and Pulls

K. Forces and Interactions: Pushes and Pulls

Students who demonstrate understanding can:

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. • With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) **Analyzing and Interpreting Data** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) --- **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** • Scientists use different ways to study the world. (K-PS2-1)	**PS2.A: Forces and Motion** • Pushes and pulls can have different strengths and directions. (KPS2-1),(K-PS2-2) • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1),(K-PS2-2) **PS2.B: Types of Interactions** • When objects touch or collide, they push on one another and can change motion. (K-PS2-1) **PS3.C: Relationship Between Energy and Forces** • A bigger push or pull makes things speed up or slow down more quickly. *(secondary to K-PS2-1)* **ETS1.A: Defining Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. *(secondary to KPS2-2)*	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1),(K-PS2-2)

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-PS2-2); **K.ETS1.B** (K-PS2-2)

Articulation of DCIs across grade-levels: **2.ETS1.B** (K-PS2-2); **3.PS2.A** (K-PS2-1),(K-PS2-2); **3.PS2.B** (K-PS2-1); **4.PS3.A** (K-PS2-1); **4.ETS1.A** (K-PS2-2)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.K.1** With prompting and support, ask and answer questions about key details in a text. *(K-PS2-2)*~~
~~**W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)~~
~~**SL.K.3** Ask and answer questions in order to seek help, get information, or clarify something that is not understood. *(K-PS2-2)*~~
~~Mathematics –~~
~~**MP.2** Reason abstractly and quantitatively. *(K-PS2-1)*~~
~~**K.MD.A.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. *(K-PS2-1)*~~
~~**K.MD.A.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS2-1)]~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

Students who demonstrate understanding can:

K-LS1-1. **Use observations to describe patterns of what plants and animals (including humans) need to survive.** [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and that all living things need water.]

K-ESS2-2. **Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.** [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

K-ESS3-1. **Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.** [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas, and grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

K-ESS3-3. **Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*** [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
- Use a model to represent relationships in the natural world. (K-ESS3-1)

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Use observations (firsthand or from media) to describe
- patterns in the natural world in order to answer scientific questions. (K-LS1-1)

Engaging in Argument from Evidence
Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
- Construct an argument with evidence to support a claim. (K-ESS2-2)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Scientists look for patterns and order when making observations about the world. (K-LS1-1)

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms
- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)

ESS2.E: Biogeology
- Plants and animals can change their environment. (K-ESS2-2)

ESS3.A: Natural Resources
- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)

ESS3.C: Human Impacts on Earth Systems
- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.
  (secondary to K-ESS2-2),(K-ESS3-3)

ETS1.B: Developing Possible Solutions
- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.*(secondary to K-ESS3-3)*

Crosscutting Concepts

Patterns
- Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)

Cause and Effect
- Events have causes that generate observable patterns. (K-ESS3-3)

Systems and System Models
- Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-ESS3-3)

Articulation of DCIs across grade-levels: **1.LS1.A** (K-LS1-1),(K-ESS3-1); **2.LS2.A** (K-LS1-1); **2.ETS1.B** (K-ESS3-3); **3.LS2.C** (K-LS1-1); **3.LS4.B** (K-LS1-1); **4.ESS2.E** (K-ESS2-2); **4.ESS3.A** (K-ESS3-3); **5.LS1.C** (K-LS1-1); **5.LS2.A** (K-LS1-1),(K-ESS3-1); **5.ESS2.A** (K-ESS2-2),(K-ESS3-1); **5.ESS3.C** (K-ESS3-3)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)~~
~~**W.K.1** Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)~~
~~***W.K.2*** Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. *(K-ESS2-2),(K-ESS3-3)*~~
~~**W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)~~
~~**SL.K.5** Add drawings or other visual displays to descriptions as desired to provide additional detail. *(K-ESS3-1)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(K-ESS3-1)*~~
~~**MP.4** Model with mathematics. *(K-ESS3-1)*~~
~~**K.CC** Counting and Cardinality *(K-ESS3-1)*~~
~~**K.MD.A.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *(K-LS1-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

K. Weather and Climate

K. Weather and Climate

Students who demonstrate understanding can:

K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.* [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* [Clarification Statement: Emphasis is on local forms of severe weather.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.
- Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods
- Scientists use different ways to study the world. (K-PS3-1)

Science Knowledge is Based on Empirical Evidence
- Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer
- Sunlight warms Earth's surface. (K-PS31), (K-PS3-2)

ESS2.D: Weather and Climate
- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

ESS3.B: Natural Hazards
- Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2)

ETS1.A: Defining and Delimiting an Engineering Problem
- Asking questions, making observations, and gathering information are helpful in thinking about problems. *(secondary to K-ESS3-2)*

Crosscutting Concepts

Patterns
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Cause and Effect
- Events have causes that generate observable patterns. (K-PS3-1),(K-PS3-2),(K-ESS3-2)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- People encounter questions about the natural world every day. (K-ESS3-2)

Influence of Engineering, Technology, and Science on Society and the Natural World
- People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)

Connections to other DCIs in kindergarten: **K.ETS1.A** (K-PS3-2),(K-ESS3-2); **K.ETS1.B** (K-PS3-2)

Articulation of DCIs across grade-levels: **1.PS4.B** (K-PS3-1),(K-PS3-2); **2.ESS1.C** (K-ESS3-2); **2.ESS2.A** (K-ESS2-1); **2.ETS1.B** (K-PS3-2); **3.ESS2.D** (K-PS3-1),(K-ESS2-1); **3.ESS3.B** (K-ESS3-2); **4.ESS2.A** (K-ESS2-1); **4.ESS3.B** (K-ESS3-2); **4.ETS1.A** (K-PS3-2)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RI.K.1** With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)~~
~~**W.K.7** Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1),*(K-PS3-2)*,(K-ESS2-1)~~
~~**SL.K.3** Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (K-ESS2-1)~~
~~**MP.4** Model with mathematics. (K-ESS2-1),*(K-ESS3-2)*~~
~~**K.CC** Counting and Cardinality (K-ESS3-2)~~
~~**K.CC.A** Know number names and the count sequence. (K-ESS2-1)~~
~~**K.MD.A.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)~~
~~**K.MD.A.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS3-1), (KPS3-2)~~
~~**K.MD.B.3** Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)]~~

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The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

1. Waves: Light and Sound

1. Waves: Light and Sound

Students who demonstrate understanding can:

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1),(1-PS4-3)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

Disciplinary Core Ideas

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science, on Society and the Natural World

- People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: **K.ETS1.A** (1-PS4-4); **2.PS1.A** (1-PS4-3); **2.ETS1.B** (1-PS4-4); **4.PS4.C** (1-PS4-4); **4.PS4.B** (1-PS4-2); **4.ETS1.A** (1-PS4-4)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**W.1.2** Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. *(1-PS4-2)*~~

~~**W.1.7** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1),(1-PS4-2),(1-PS4-3),(1-PS4-4)~~

~~**W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1),(1-PS4-2),(1-PS4-3)~~

~~**SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. *(1-PS4-1),(1-PS4-2),(1-PS4-3)*~~

~~*Mathematics –*~~

~~**MP.5** Use appropriate tools strategically. *(1-PS4-4)*~~

~~**1.MD.A.1** Order three objects by length; compare the lengths of two objects indirectly by using a third object. *(1-PS4-4)*~~

~~**1.MD.A.2** Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *(1-PS4-4)]*~~

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1. Structure, Function, and Information Processing

1. Structure, Function, and Information Processing

Students who demonstrate understanding can:

1-LS1-1. **Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*** [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

1-LS1-2. **Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.** [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

1-LS3-1. **Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.** [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)
- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

LS3.A: Inheritance of Traits

- Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2),(1-LS3-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (1-LS1-1)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: **K.ETS1.A** (1-LS1-1); **3.LS2.D** (1-LS1-2) **3.LS3.A** (1-LS3-1); **3.LS3.B** (1-LS3-1); **4.LS1.A** (1-LS1-1); **4.LS1.D** (1-LS1-1); **4.ETS1.A** (1-LS1-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RI.1.1** Ask and answer questions about key details in a text. (1-LS1-2),(1-LS3-1)~~
~~**RI.1.2** Identify the main topic and retell key details of a text. (1-LS1-2)~~
~~**RI.1.10** With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)~~
~~**W.1.7** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1),(1-LS3-1)~~
~~**W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. *(1-LS3-1)*~~
~~**MP.5** Use appropriate tools strategically. *(1-LS3-1)*~~
~~**1.NBT.B.3** Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. *(1-LS1-2)*~~
~~**1.NBT.C.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. *(1-LS1-2)*~~
~~**1.NBT.C.5** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. *(1-LS1-2)*~~
~~**1.NBT.C.6** Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. *(1-LS1-2)*~~
~~**1.MD.A.1** Order three objects by length; compare the lengths of two objects indirectly by using a third object. *(1-LS3-1)]*~~

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1. Space Systems: Patterns and Cycles

1. Space Systems: Patterns and Cycles

Students who demonstrate understanding can:

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Analyzing and Interpreting Data** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)	**ESS1.A: The Universe and its Stars** • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) **ESS1.B: Earth and the Solar System** • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	**Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2) -- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes natural events happen today as they happened in the past. (1-ESS1-1) • Many events are repeated. (1-ESS1-1)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: **3.PS2.A** (1-ESS1-1); **5.PS2.B** (1-ESS1-1),(1-ESS1-2) **5-ESS1.B** (1-ESS1-1),(1-ESS1-2)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**W.1.7** Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2)~~
~~**W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(1-ESS1-2)*~~
~~**MP.4** Model with mathematics. *(1-ESS1-2)*~~
~~**MP.5** Use appropriate tools strategically. *(1-ESS1-2)*~~
~~**1.OA.A.1** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. *(1-ESS1-2)*~~
~~**1.MD.C.4** Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. *(1-ESS1-2)]*~~

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2. Structure and Properties of Matter

2. Structure and Properties of Matter

Students who demonstrate understanding can:

2-PS1-1. **Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.** [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

2-PS1-2. **Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.*** [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture,
and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

2-PS1-3. **Make observations to construct an evidence-based account of how an object made of a small set of pieces can
be disassembled and made into a new object.** [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

2-PS1-4. **Construct an argument with evidence that some changes caused by heating or cooling can be reversed and
some cannot.** [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

Engaging in Argument from Evidence
Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
- Construct an argument with evidence to support a claim. (2-PS1-4)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- Scientists search for cause and effect relationships to explain natural events. (2-PS1-4)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reactions
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

Crosscutting Concepts

Patterns
- Patterns in the natural and human designed world can be observed. (2-PS1-1)

Cause and Effect
- Events have causes that generate observable patterns. (2-PS1-4)
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

Energy and Matter
- Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (2-PS1-2)

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: **4.ESS2.A** (2-PS1-3); **5.PS1.A** (2-PS1-1),(2-PS1-2),(2-PS1-3); **5.PS1.B** (2-PS1-4); **5.LS2.A** (2-PS1-3)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~

~~**RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. *(2-PS1-4)*~~
~~**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4)~~
~~**RI.2.8** Describe how reasons support specific points the author makes in a text. *(2-PS1-2)*,(2-PS1-4)~~
~~**W.2.1** Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4)~~
~~**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1), (2-PS1-2),(2-PS1-3)~~
~~**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1),(2-PS1-2),(2-PS1-3)~~

~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(2-PS1-2)*~~
~~**MP.4** Model with mathematics. *(2-PS1-1),(2-PS1-2)*~~
~~**MP.5** Use appropriate tools strategically. *(2-PS1-2)*~~
~~**2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(2-PS1-1),(2-PS1-2]*)~~

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2. Interdependent Relationships in Ecosystems

2. Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. • Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1) • Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** • Scientists look for patterns and order when making observations about the world. (2-LS4-1)	**LS2.A: Interdependent Relationships in Ecosystems** • Plants depend on water and light to grow. (2-LS2-1) • Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) **LS4.D: Biodiversity and Humans** • There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) **ETS1.B: Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. *(secondary to 2-LS2-2)*	**Cause and Effect** • Events have causes that generate observable patterns. (2-LS2-1) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: **K.LS1.C** (2-LS2-1); **K-ESS3.A** (2-LS2-1); **K.ETS1.A** (2-LS2-2); **3.LS4.C** (2-LS4-1); **3.LS4.D** (2-LS4-1); **5.LS1.C** (2-LS2-1); **5.LS2.A** (2-LS2-2),(2-LS4-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1),(2-LS4-1)~~

~~***W.2.8*** Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1),(2-LS4-1)~~

~~**SL.2.5** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(2-LS2-2)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. *(2-LS2-1),(2-LS4-1)*~~

~~**MP.4** Model with mathematics. *(2-LS2-1),(2-LS2-2),(2-LS4-1)*~~

~~**MP.5** Use appropriate tools strategically. *(2-LS2-1)*~~

~~**2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems. *(2-LS2-2),(2-LS4-1)]*~~

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2. Earth's Systems: Processes that Shape the Earth

2. Earth's Systems: Processes that Shape the Earth

Students who demonstrate understanding can:

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
[Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of
rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*
[Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs
for using shrubs, grass, and trees to hold back the land.]

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]

2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
- Develop a model to represent patterns in the natural world. (2-ESS2-2)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.
- Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)
- Compare multiple solutions to a problem. (2-ESS2-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth
- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

ESS2.A: Earth Materials and Systems
- Wind and water can change the shape of the land. (2-ESS2-1)

ESS2.B: Plate Tectonics and Large-Scale System Interactions
- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

ESS2.C: The Roles of Water in Earth's Surface Processes
- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

ETS1.C: Optimizing the Design Solution
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. *(secondary to 2-ESS2-1)*

Crosscutting Concepts

Patterns
- Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3)

Stability and Change
- Things may change slowly or rapidly. (2-ESS1-1),(2-ESS2-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Developing and using technology has impacts on the natural world. (2-ESS2-1)

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World
- Scientists study the natural and material world. (2-ESS2-1)

Connections to other DCIs in second grade: **2.PS1.A** (2-ESS2-3)

Articulation of DCIs across grade-levels: **K.ETS1.A** (2-ESS2-1); **3.LS2.C** (2-ESS1-1); **4.ESS1.C** (2-ESS1-1); **4.ESS2.A** (2-ESS1-1),(2-ESS2-1); **4.ESS2.B** (2-ESS2-2); **4.ETS1.A** (2-ESS2-1); **4.ETS1.B** (2-ESS2-1); **4.ETS1.C** (2-ESS2-1); **5.ESS2.A** (2-ESS2-1); **5.ESS2.C** (2-ESS2-2),(2-ESS2-3)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~

~~**RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. *(2-ESS1-1)*~~
~~**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1),*(2-ESS2-1)*~~
~~**RI.2.9** Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)~~
~~***W.2.6*** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(2-ESS1-1), (2-ESS2-3)*~~
~~**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)~~
~~**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1),(2-ESS2-3)~~
~~**SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)~~
~~**SL.2.5** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(2-ESS2-2)*~~

~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(2-ESS2-1),(2-ESS2-1),(2-ESS2-2)*~~
~~**MP.4** Model with mathematics. *(2-ESS1-1),(2-ESS2-1),(2-ESS2-2)*~~
~~**MP.5** Use appropriate tools strategically. *(2-ESS2-1)*~~
~~**2.NBT.A** Understand place value. (2-ESS1-1)~~
~~**2.NBT.A.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. *(2-ESS2-2)*~~
~~**2.MD.B.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. *(2-ESS2-1)]*~~

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3. Forces and Interactions

3. Forces and Interactions

Students who demonstrate understanding can:

3-PS2-1. **Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.** [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

3-PS2-2. **Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.** [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl,
and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-PS2-3. **Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.** [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships
could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

3-PS2-4. **Define a simple design problem that can be solved by applying scientific ideas about magnets.*** [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.
- Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence
- Science findings are based on recognizing patterns. (3-PS2-2)

Scientific Investigations Use a Variety of Methods
- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

Disciplinary Core Ideas

PS2.A: Forces and Motion
- Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1)
- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)

PS2.B: Types of Interactions
- Objects in contact exert forces on each other. (3-PS2-1)
- Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3),(3-PS2-4)

Crosscutting Concepts

Patterns
- Patterns of change can be used to make predictions. (3-PS2-2)

Cause and Effect
- Cause and effect relationships are routinely identified. (3-PS2-1)
- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: **K.PS2.A** (3-PS2-1); **K.PS2.B** (3-PS2-1); **K.PS3.C** (3-PS2-1); **K.ETS1.A** (3-PS2-4); **1.ESS1.A** (3-PS2-2); **4.PS4.A** (3-PS2-2); **4.ETS1.A** (3-PS2-4); **5.PS2.B** (3-PS2-1); **MS.PS2.A** (3-PS2-1),(3-PS2-2); **MS.PS2.B** (3-PS2-3),(3-PS2-4); **MS.ESS1.B** (3-PS2-1),(3-PS2-2); **MS.ESS2.C** (3-PS2-1)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. *(3-PS2-1)*,(3-PS2-3)~~
~~**RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3)~~
~~**RI.3.8** Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). *(3-PS2-3)*~~
~~**W.3.7** Conduct short research projects that build knowledge about a topic. (3-PS2-1),(3-PS2-2)~~
~~***W.3.8*** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1),*(3-PS2-2)*~~
~~**SL.3.3** Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(3-PS2-1)*~~
~~**MP.5** Use appropriate tools strategically. *(3-PS2-1)*~~
~~**3.MD.A.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. *(3-PS2-1)]*~~

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3. Interdependent Relationships in Ecosystems

3. Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

3-LS2-1. **Construct an argument that some animals form groups that help members survive.**

3-LS4-1. **Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.** [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-3. **Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.** [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

3-LS4-4. **Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*** [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed worlds.

- Construct an argument with evidence, data, and/or a model. (3-LS2-1)
- Construct an argument with evidence. (3-LS4-3)
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. *(secondary to 3-LS4-4)*

LS2.D: Social Interactions and Group Behavior

- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. *(Note: Moved from K–2) (3-LS2-1)*

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. *(Note: Moved from K–2) (3-LS4-1)*
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

LS4.D: Biodiversity and Humans

- Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1),(3-LS4-3)

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

Systems and System Models

- A system can be described in terms of its components and their interactions. (3-LS4-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3-LS4-1)

Connections to other DCIs in third grade: **3.ESS2.D** (3-LS4-3); **3.ESS3.B** (3-LS4-4)

Articulation of DCIs across grade-levels: **K.ESS3.A** (3-LS4-3)(3-LS4-4); **K.ETS1.A** (3-LS4-4); **1.LS1.B** (3-LS2-1); **2.LS2.A** (3-LS4-3),(3-LS4-4); **2.LS4.D** (3-LS4-3),(3-LS4-4); **4.ESS1.C** (3-LS4-1); **4.ESS3.B** (3-LS4-4); **4.ETS1.A** (3-LS4-4); **MS.LS2.A** (3-LS2-1),(3-LS4-1)(3-LS4-3),(3-LS4-4); **MS.LS2.C** (3-LS4-4); **MS.LS2.D** (3-LS2-1); **MS.LS4.A** (3-LS4-1); **MS.LS4.B** (3-LS4-3); **MS.LS4.C** (3-LS4-3),(3-LS4-4); **MS.ESS1.C** (3-LS4-1),(3-LS4-3),(3-LS4-4); **MS.ESS2.B** (3-LS4-1); **MS.ESS3.C** (3-LS4-4)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. *(3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4)*~~
~~**RI.3.2** Determine the main idea of a text; recount the key details and explain how they support the main idea. *(3-LS4-1),(3-LS4-3),(3LS4-4)*~~
~~**RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. *(3-LS2-1),(3-LS4-1),(3-LS4-3),(3-LS4-4)*~~
~~***W.3.1*** Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1),*(3-LS4-1)*,(3-LS4-3),*(3-LS4-4)*~~
~~***W.3.2*** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. *(3-LS4-1),(3-LS4-3),(3-LS4-4)*~~
~~**W.3.9** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1)~~
~~**SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. *(3-LS4-3),(3-LS4-4)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(3-LS4-1),(3-LS4-4)*~~
~~**MP.4** Model with mathematics. (3-LS2-1),*(3-LS4-1),(3-LS4-4)*~~
~~**MP.5** Use appropriate tools strategically. *(3-LS4-1)*~~
~~**3.NBT** Number and Operations in Base Ten (3-LS2-1)~~
~~**3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *(3-LS4-3)*~~
~~**3.MD.B.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters. *(3-LS4-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

3. Inheritance and Variation of Traits: Life Cycles and Traits

3. Inheritance and Variation of Traits: Life Cycles and Traits

Students who demonstrate understanding can:

3-LS1-1. **Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

3-LS3-1. **Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.** [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS3-2. **Use evidence to support the explanation that traits can be influenced by the environment.** [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

3-LS4-2. **Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.** [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Develop models to describe phenomena. (3-LS1-1)

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
- Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)
- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Science findings are based on recognizing patterns. (3-LS1-1)

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms
- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

LS3.A: Inheritance of Traits
- Many characteristics of organisms are inherited from their parents. (3-LS3-1)
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

LS3.B: Variation of Traits
- Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)
- The environment also affects the traits that an organism develops. (3-LS3-2)

LS4.B: Natural Selection
- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

Crosscutting Concepts

Patterns
- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1)
- Patterns of change can be used to make predictions. (3-LS1-1)

Cause and Effect
- Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2),(3-LS4-2)

Connections to other DCIs in third grade: **3.LS4.C** (3-LS4-2)

Articulation of DCIs across grade-levels: **1.LS3.A** (3-LS3-1),(3-LS4-2); **1.LS3.B** (3-LS3-1); **MS.LS1.B** (3-LS1-1), (3-LS3-2); **MS.LS2.A** (3-LS4-2); **MS.LS3.A** (3-LS3-1); **MS.LS3.B** (3-LS3-1),(3-LS4-2); **MS.LS4.B** (3-LS4-2)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1),(3-LS3-2),*(3-LS4-2)*~~
~~**RI.3.2** Determine the main idea of a text; recount the key details and explain how they support the main idea. *(3-LS3-1),(3-LS3-2),(3-LS4-2)*~~
~~**RI.3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1),*(3-LS3-2),(3-LS4-2)*~~
~~**RI.3.7** Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). *(3-LS1-1)*~~
~~**W.3.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1),(3-LS3-2),(3-LS4-2)~~
~~**SL.3.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. *(3-LS3-1),(3-LS3-2),(3-LS4-2)*~~
~~**SL.3.5** Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. *(3-LS1-1)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(3-LS3-1),(3-LS3-2),(3-LS4-2)*~~
~~**MP.4** Model with mathematics. *(3-LS1-1),(3-LS3-1),(3-LS3-2),(3-LS4-2)*~~
~~**3.NBT** Number and Operations in Base Ten *(3-LS1-1)*~~
~~**3.NF** Number and Operations—Fractions *(3-LS1-1)*~~
~~**3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *(3-LS4-2)*~~
~~**3.MD.B.4** Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. *(3-LS3-1),(3-LS3-2)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

3. Weather and Climate

3. Weather and Climate

Students who demonstrate understanding can:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*
[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lighting rods.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in tables and various graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (3-ESS2-1)

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) *(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)*

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.
- (3-ESS3-1)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: **K.ESS2.D** (3-ESS2-1); **K.ESS3.B** (3-ESS3-1); **K.ETS1.A** (3-ESS3-1); **4.ESS2.A** (3-ESS2-1); **4.ESS3.B** (3-ESS3-1); **4.ETS1.A** (3-ESS3-1); **5.ESS2.A** (3-ESS2-1); **MS.ESS2.C** (3-ESS2-1),(3-ESS2-2); **MS.ESS2.D** (3-ESS2-1),(3-ESS2-2); **MS.ESS3.B** (3-ESS3-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)~~
~~**RI.3.9** Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)~~
~~**W.3.1** Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)~~
~~**W.3.7** Conduct short research projects that build knowledge about a topic. (3-ESS3-1)~~
~~**W.3.9** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)~~
~~**MP.4** Model with mathematics. (3-ESS2-1),(3-ESS2-2),(3-ESS3-1)~~
~~**MP.5** Use appropriate tools strategically. (3-ESS2-1)~~
~~**3.MD.A.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1)~~
~~**3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in bar graphs. (3-ESS2-1)]~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

K-2. Engineering Design

K-2. Engineering Design

Students who demonstrate understanding can:

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

<table>
<tr><th>Science and Engineering Practices</th><th>Disciplinary Core Ideas</th><th>Crosscutting Concepts</th></tr>
<tr>
<td>Asking Questions and Defining Problems
Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.
• Ask questions based on observations to find more information about the natural and/or designed world. (K-2-ETS1-1)
• Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.
• Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
• Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)</td>
<td>ETS1.A: Defining and Delimiting Engineering Problems
• A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
• Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
• Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

ETS1.B: Developing Possible Solutions
• Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

ETS1.C: Optimizing the Design Solution
• Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)</td>
<td>Structure and Function
• The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)</td>
</tr>
</table>

Connections to K-2-ETS1.A: Defining and Delimiting Engineering Problems include:
Kindergarten: K-PS2-2, K-ESS3-2
Connections to K-2-ETS1.B: Developing Possible Solutions Problems include:
Kindergarten: K-ESS3-3, **First Grade:** 1-PS4-4, **Second Grade:** 2-LS2-2
Connections to K-2-ETS1.C: Optimizing the Design Solution include:
Second Grade: 2-ESS2-1

Articulation of DCIs across grade-bands: **3-5.ETS1.A** (K-2-ETS1-1),(K-2-ETS1-2),(K-2 -ETS1-3); **3-5.ETS1.B** (K-2-ETS1-2),(K-2-ETS1-3); **3-5.ETS1.C** (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)~~
~~**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(K-2-ETS1-1),(K-2-ETS1-3)*~~
~~**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),*(K-2-ETS1-3)*~~
~~**SL.2.5** Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(K-2-ETS1-2)*~~
~~*Mathematics –*~~
~~**2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(K-2-ETS1-1),(K-2-ETS1-3)]*~~

3-5. Engineering Design

3-5. Engineering Design

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)	**ETS1.A: Defining and Delimiting Engineering Problems** • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1) **ETS1.B: Developing Possible Solutions** • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)	**Influence of Science, Engineering, and Technology on Society and the Natural World** • People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1) • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

Connections to 3-5-ETS1.A: Defining and Delimiting Engineering Problems include:
Fourth Grade: 4-PS3-4
Connections to 3-5-ETS1.B: Designing Solutions to Engineering Problems include:
Fourth Grade: 4-ESS3-2
Connections to 3-5-ETS1.C: Optimizing the Design Solution include:
Fourth Grade: 4-PS4-3

Articulation of DCIs across grade-bands: **K-2.ETS1.A** (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); **K-2.ETS1.B** (3-5-ETS1-2); **K-2.ETS1.C** (3-5-ETS1-2),(3-5-ETS1-3); **MS.ETS1.A** (3-5-ETS1-1); **MS.ETS1.B** (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); **MS.ETS1.C** (3-5-ETS1-2),(3-5-ETS1-3)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(3-5-ETS-2)*~~
~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(3-5-ETS-2)*~~
~~**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS-2)~~
~~**W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1),(3-5-ETS1-3)~~
~~***W.5.8*** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. *(3-5-ETS1-1),(3-5-ETS1-3)*~~
~~**W.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-1),(3-5-ETS1-3)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**MP.4** Model with mathematics. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**MP.5** Use appropriate tools strategically. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**3-5.OA** Operations and Algebraic Thinking *(3-5-ETS1-1),(3-5-ETS1-2)]*~~

PRIMARY
SOCIAL STUDIES

Kentucky Academic Standards– Social Studies – Primary

The social studies program in primary includes connections to literature, active, hands-on work with concrete materials and appropriate technologies. Although the social studies program for primary is divided into five areas, each area is designed to interact with the others in an integrated fashion. Because of this integration, students are able to develop broad conceptual understandings in social studies. This style of learning reflects the developmental nature of children.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the primary level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five “Big Ideas” that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure and the role of citizens. Understanding the historical development of structures of power, authority and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Primary Enduring Knowledge – Understandings

Students will understand that

- local governments are formed to establish order, provide security and accomplish common goals.
- citizens of local communities have certain rights and responsibilities in a democratic society.
- local communities promote the basic principles (e.g., liberty, justice, equality, rights, responsibilities) of a democratic form of government.

Primary Skills and Concepts

Students will

- demonstrate (e.g., speak, draw, write) an understanding of the nature of government:
  - explain basic functions (to establish order, to provide security and accomplish common goals)
    of local government
  - explore and give examples of the services (e.g., police and fire protection, maintenance of roads, snow removal, garbage pick-up)
  - investigate how the local government pays for services (by collecting taxes from people who live there)
  - explain the reasons for rules in the home and at school; and compare rules (e.g., home, school) and laws in the local community
  - investigate the importance of rules and laws and give examples of what life would be like without rules and laws (home, school, community)
- explore personal rights and responsibilities:
  - explain, demonstrate, give examples of ways to show good citizenship at school and in the community (e.g., recycling, picking up trash)
  - describe the importance of civic participation and locate examples (e.g., donating canned food to a class food drive) in current events/news
- use a variety of print and non-print sources (e.g., stories, books, interviews, observations) to identify and describe basic democratic ideas (e.g., liberty, justice, equality, rights, responsibility)

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals connecting all cultures. Culture influences viewpoints, rules and institutions in a global society.
Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.

Primary Enduring Knowledge – Understandings

Students will understand that

- culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people.
- cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior, and respond to human needs.
- interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition).
- a variety of factors promote cultural diversity in a community.
- an understanding and appreciation of the diverse complexity of cultures is essential to interact effectively and work cooperatively with the many diverse ethnic and cultural groups of today.

Primary Skills and Concepts

Students will

- develop an understanding of the nature of culture:
  - explore and describe cultural elements (e.g., beliefs, traditions, languages, skills, literature, the arts)
  - investigate diverse cultures using print and non-print sources (e.g., stories, books, interviews, observations)
- investigate social institutions (e.g., schools) in the community
- describe interactions (e.g., compromise, cooperation, conflict, competition) that occur between individuals/groups
- describe and give examples of conflicts and conflict resolution strategies

Big Idea: Economics

Economics includes the study of production, distribution, and consumption of goods and services. Students need to understand how their economic decisions affect them, others and the nation as a whole.

The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Primary Enduring Knowledge – Understandings

Students will understand that

- the basic economic problem confronting individuals and groups in our community today is scarcity; as a result of scarcity economic choices and decisions must be made.
- a variety of fundamental economic concepts (e.g., supply and demand, opportunity cost) impact individuals, groups and businesses in the community today.
- economic institutions are created to help individuals, groups and businesses in the community accomplish common goals.
- markets enable buyers and sellers to exchange goods and services.
- production, distribution and consumption of goods and services in the community have changed over time.
- individuals, groups and businesses in the community demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.

Primary Skills and Concepts

Students will

- develop an understanding of the nature of limited resources and scarcity:
  - investigate and give examples of resources
  - explain why people cannot have all the goods and services they want
  - solve economic problems related to prioritizing resources, saving, loaning and spending money
  - explore differences between limited natural resources and limited human resources
- investigate banks in the community and explain how they help people (e.g., loan money, save money)
- compare ways people in the past/present acquired what they needed, using basic economic terms related to markets (e.g., goods, services, profit, consumer, producer, supply, demand, buyers, sellers, barter)
- describe and give examples of production, distribution and consumption of goods and services in the community

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

Primary Enduring Knowledge – Understandings

Students will understand that

- the use of geographic tools (e.g., maps, globes, charts, graphs) and mental maps help to locate places, recognize patterns and identify geographic features.
- patterns emerge as humans move, settle and interact on Earth's surface and can be identified by examining the location of physical and human characteristics, how they are arranged and why they are in particular locations.
- people depend on, adapt to, and/or modify the environment to meet basic needs. Human actions modify the physical environment and in turn, the physical environment limits and/or promotes human activities.

Primary Skills and Concepts

Students will

- develop an understanding of patterns on the Earth's surface using a variety of geographic tools (e.g., maps, globes, charts, graphs):
  - locate and describe familiar places at school and the community
  - create maps that identify the relative location of familiar places and objects (e.g., school, neighborhood)
  - identify major landforms (e.g., continents, mountain ranges) and major bodies of water (e.g., oceans, rivers)
- investigate the Earth's surface using print and non-print sources (e.g., books, magazines, films, Internet, geographic tools):
  - locate and describe places (e.g., local environments, different habitats) using their physical characteristics (e.g., landforms, bodies of water)
  - identify and explain patterns of human settlement in different places
- compare ways people and animals modify the physical environment to meet their basic needs (e.g., clearing land to build homes versus building nests and burrows as shelters)
- recognize how technology helps people move, settle, and interact in the world

Big Idea: Historical Perspective

History is an account of events, people, ideas and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments, and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Primary Enduring Knowledge – Understandings

Students will understand that

- history is an account of human activities that is interpretive in nature. A variety of tools (e.g., primary and secondary sources) are needed to understand historical events.
- history is a series of connected events shaped by multiple cause-effect relationships, tying past to present.
- history has been impacted by significant individuals and groups.

Primary Skills and Concepts

Students will

- develop an understanding of the nature of history using a variety of tools (e.g., primary and secondary sources, family mementoes, artifacts, Internet, diaries, timelines, maps):
  - examine the past (of selves and the community)
  - distinguish among past, present and future people, places, events
  - explain why people move and settle in different places; explore the contributions of diverse groups
- use print and non-print sources (e.g., stories, folktales, legends, films, magazines, Internet, oral history):
  - investigate and give examples of factual and fictional accounts of historical events
  - explore and give examples of change over time (e.g., transportation, clothing, communication, technology, occupations)
- investigate the significance of patriotic symbols, patriotic songs, patriotic holidays and landmarks
  (e.g., the flag of the United States, the song “My Country, ‘Tis of Thee,” the Fourth of July, Veterans’ Day, the Statue of Liberty)

PRIMARY TECHNOLOGY

Kentucky Academic Standards – Technology – Primary

Technology use in the 21st century has become a vital component of all aspects of life. For students in Kentucky to be contributing citizens, they must receive an education that incorporates technology literacy at all levels. Technology literacy is the ability of students to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century. The Technology Kentucky Academic Standards provides a framework for integrating technology into all content areas. It reflects the basic skills required for each student to be competitive in the global economy.

For students to gain the technology competencies, it is essential that they have access to technology during the school day in all grade levels. Instruction should provide opportunities for students to gain and demonstrate technology skills that build primary through grade 12.

The technology content standards should be integrated into each curricular discipline. The purpose of integrating technology is to help students make useful connections between what they learn in each content area and the real world. Technology knowledge, concepts and skills should be interwoven into lessons or units and taught in partnership with other content areas. Technology lends itself to curriculum integration and team teaching. Technology can enhance learning for all students, and for some it is essential for access to learning.

The technology content standards are organized by grade spans: primary, intermediate, middle, and high. The technology Kentucky Academic Standards at the primary level includes beginning competencies related to technology literacy. Students are involved in the use of technology for communicating and collaborating with others and in developing ideas and opinions. Students interact with developmentally appropriate applications (e.g., interactive books, graphic organizers, reading and writing assistants, mathematical and scientific tools).
Through this experience, students gain a positive view of technology as tools for learning.

The technology content standards at the primary grade span are directly aligned with Kentucky's **Academic Expectations**. Technology standards are organized around three Big Ideas that are important to the discipline of technology. The three Big Ideas in technology are: **1) Information, Communication and Productivity; 2) Safety and Ethical/Social Issues;** and **3) Research, Inquiry/Problem-Solving and Innovation**. The Big Ideas are conceptual organizers for technology. Each grade level span ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of *Enduring Knowledge/Understandings* that represent overarching generalizations linked to the Big Ideas of Technology. The understandings represent the desired results--what learning will focus upon and what knowledge students will be able to explain or apply. *Understandings* can be used to frame development of units of study and lesson plans.

Skills and Concepts describe ways that students demonstrate their learning and are specific to each grade level span. The skills and concepts for technology are fundamental to technology literacy, safe use and inquiry.

Big Idea: Information, Communication and Productivity

Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, to increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Academic Expectations

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.

6.1 Students connect knowledge and experiences from different subject areas.

6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills and experiences.

Primary Enduring Knowledge – Understandings

Students will understand that

- technology is used in all content areas to support directed and independent learning.
- appropriate terminology, computer operations and applications assist in gaining confidence in the use of technology.
- technology requires proper care and maintenance to be used effectively.
- technology is used to communicate in a variety of ways.

Primary Skills and Concepts – Information

Students will

- investigate different technology devices and systems (e.g., computer processor unit, monitor, keyboard, disk drive, printer, mouse, digital cameras, interactive white boards)
- use and care for technology (e.g., computers, cell phones, digital cameras, scanners, multimedia)
  at home, school and community
- use appropriate technology terms (e.g., hardware, software, CD, hard drive)
- demonstrate proper keyboarding techniques, optimal posture and correct hand placement (e.g., left hand for left side keys and right hand for right side keys, special keys such as space bar, enter/return, backspace, shift, delete)

Primary Skills and Concepts – Communication

Students will

- use technology to communicate in a variety of modes (e.g., recordings, speech to text, print, media)
- participate in group projects and learning activities using technology communications

Primary Skills and Concepts – Productivity

Students will

- explain how information can be published and presented in different formats
- create a variety of tasks using technology devices and systems to support authentic learning

Big Idea: Safety and Ethical/Social Issues

Students understand safe and ethical/social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

Academic Expectations

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.
3.6 Students demonstrate the ability to make decisions based on ethical values.
4.3 Students individually demonstrate consistent, responsive and caring behavior.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multi-cultural and world view.

Primary Enduring Knowledge – Understandings
Students will understand that

- responsible and ethical use of technology is necessary to ensure safety.
- technology enhances collaboration to contribute to a learning community.
- acceptable technology etiquette is essential to respectful social interactions and good citizenship.
- technology is used in jobs and careers to support the needs of the community.
- assistive technology supports learning to ensure equitable access to a productive life.

Primary Skills and Concepts – Safety
Students will

- explain the importance of safe Internet use (e.g., iSafe skills)
- use safe behavior when using technology

Primary Skills and Concepts – Ethical Issues
Students will

- use responsible and ethical behavior in using technology
- adhere to the Acceptable Use Policy (AUP) as well as other state and federal laws

Primary Skills and Concepts – Social Issues
Students will

- work cooperatively with peers, family members and others when using technology
- collaborate with peers, family members and others when using technology
- explain how technology is used in jobs and careers

Big Idea: Research, Inquiry/Problem-Solving and Innovation

Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Academic Expectations

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.

5.2 Students use creative thinking skills to develop or invent novel, constructive ideas or products.

5.4 Students use a decision-making process to make informed decisions among options.

5.5 Students use problem-solving processes to develop solutions to relatively complex problems.

6.1 Students connect knowledge and experiences from different subject areas.

Primary Enduring Knowledge – Understandings

Students will understand that

- technology assists in gathering, organizing and evaluating information from a variety of sources to answer an essential question.
- technology is used to analyze real world data and support critical thinking skills through inquiry/problem-solving in order to produce results and make informed decisions.

Primary Skills and Concepts – Research

Students will

- use teacher-directed Internet sources as a resource for information
- use electronic resources to access and retrieve information

Primary Skills and Concepts – Inquiry/Problem-solving

Students will

- gather technology information/data and use for problem solving in all content areas
- describe at least one strategy for problem solving while using technology (e.g., inquiry/problem-solving software, troubleshooting technology issues)

Primary Skills and Concepts – Innovation

Students will

- use technology for original creations/innovation in classroom
- express creativity both individually and collaboratively using technology

PRIMARY VOCATIONAL STUDIES

Kentucky Academic Standards – Vocational Studies – Primary

The vocational studies program in the primary level develops an awareness of careers. This awareness includes the purpose of having a job, concepts of consumer decision-making, saving money, and connections between work and learning. The challenge is to empower students to make a connection between school and the world of work and to be productive citizens.

The primary level provides appropriate opportunities for students to be involved in activities designed to develop an appreciation of work and an awareness of self and jobs/careers. They should examine the relationship between school studies and work; this will enable them to make vital connections that will give meaning to their learning. Elementary students should begin to develop work habits, study skills, team skills and set short-term goals.

The vocational studies program at the primary level includes active, hands-on work with concrete materials and appropriate technologies. Although the vocational studies program for primary level is divided into five areas, each area is designed to interact with the others in an integrated fashion. Because of this integration, students are able to develop broad conceptual understandings in vocational studies. All content teachers are responsible for providing instruction in the Vocational Studies area.

The vocational studies content standards at the primary level are directly aligned with Kentucky's **Academic Expectations.** The vocational studies standards are organized around five "Big Ideas" that are important to the discipline of vocational studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school career to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for vocational studies are fundamental to career awareness and builds on prior learning.

Academic Expectations 2.36 and 2.37 bring forward the career awareness in Vocational Studies. Vocational Studies provide a connection to Kentucky Learning Goal 3 (become self-sufficient individual) and Learning Goal 4 (become a responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Primary Enduring Knowledge – Understandings

Students will understand that

- basic economic concepts are important for consumer decision-making.
- consumer decisions are influenced by economic and social factors.
- consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.

Primary Skills and Concepts

Students will

- develop an understanding of how consumer decisions are influenced by economic and social factors by:
    - recognizing that consumers are people whose wants are satisfied by using goods and services
    - recognizing that producers are people who make goods and provide services
    - describing the steps in making consumer decisions
    - identifying the difference between wants and needs (e.g., food, clothing, and shelter) and the relationship to consumer decisions
    - describing major factors (e.g., price, quality, features) to consider when making consumer decisions
    - defining barter, giving examples of bartering (e.g., trading baseball cards with each other), and explaining how money makes it easier for people to get things they want
    - recognizing the relationship between supply and demand and the dependence one has on others to provide for wants and needs
      identifying the ways friends may influence your decisions when making purchases
      recognizing how media and advertising affect consumer decisions
- investigate media advertisements and newspaper stories that influence consumer decisions
- explore and use technology to access information as a consumer
- describe how consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment by:
    - describing some community activities that promote healthy environments

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.

2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.

5.4 Students use a decision-making process to make informed decisions among options.

Primary Enduring Knowledge – Understandings

Students will understand that

- financial decisions impact the achievement of short and long-term goals.
- saving money is a component of financial decision-making.

Primary Skills and Concepts

Students will

- identify goals pertaining to money that might affect individuals and families
- investigate different ways to save money (e.g., piggy bank, local bank, savings bonds)

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers.

The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
5.4 Students use a decision-making process to make informed decision among options.

Primary Enduring Knowledge – Understandings

Students will understand that

- people need to work to meet basic needs.
- the connection between work and learning can influence one's future job/career.

Primary Skills and Concepts

Students will

- communicate the concepts of work and career
- examine and group careers found in the community
- identify that people need to work (e.g., chores, jobs, employment) to meet basic needs (e.g., food, clothing, shelter)
- describe the different job opportunities are available in the community
- explain different jobs/careers that use what they learn in school (e.g., mathematics, reading/writing, science, social studies) impacts future jobs/careers

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
3.6 Students demonstrate the ability to make decisions based on ethical values.
4.1 Students effectively use interpersonal skills.
4.2 Students use productive team membership skills.

Primary Enduring Knowledge – Understandings
Students will understand that

- interpersonal skills are needed to be a responsible friend, family and team member.
- attitudes and work habits contribute to success at home, school and work.

Primary Skills and Concepts
Students will

- identify how interpersonal skills are needed to be a responsible friend, family and team member by:
  - identifying ways to cooperate at both home and school
  - learning the importance of working with others in groups
  - demonstrating how to work cooperatively by contributing ideas, suggestions and efforts
- describe how attitudes and work habits contribute to success at home, school and work by:
  - describing study skills needed in the school
  - describing how attitude can impact an individual's performance at school
  - learning how to follow routines (e.g., rules, schedules, directions) with minimal supervision
- describe the importance of working hard and efficiently (e.g., taking pride in one's work, being on task)
- examine potential job/careers in the community

Big Idea: Communication/Technology

Special communication/technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

Primary Enduring Knowledge – Understandings

Students will understand that

- technology in school and the workplace can enhance learning and provide access to information and resources.
- communication skills are essential for jobs/careers.

Primary Skills and Concepts

Students will

- explore how technology is used in different jobs/careers
- investigate how technology in school and at work enhances learning and provide access to information and resources by:
    - identifying technology tools (e.g., electronic games, phones, computers) that are used in homes and schools
- identify ways written communication skills are used at school and in the workplace

INTERMEDIATE EDUCATION

Intermediate Education

The intermediate grades, most often viewed as grades four and five, build upon the integrated approach to curriculum that begins in a student's primary years. The intermediate program sets high expectations for all students through a rigorous curriculum that focuses on *Kentucky's Learning Goals*, *Academic Expectations* and the developmental characteristics of pre-adolescent children.

The fourth-grade program continues to address the intellectual, social, emotional, aesthetic and physical needs of fourth-grade students, thereby supporting their successful transition from the primary program. The fifth-grade program provides a continuation and extension of learning from the primary and fourth-grade programs and prepares students for transition to the middle level program.

Content included in this document for the intermediate level is arranged sequentially by grade. However, it is the prerogative of school councils to reorganize the content into a format that best meets the needs of the school's students. This allows schools the opportunity to create integrated, interdisciplinary or multidisciplinary programs.

INTERMEDIATE ~~ARTS AND HUMANITIES~~ VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – ~~Arts and Humanities~~ Visual and Performing Arts– Intermediate Level

Grades 4 and 5

The ~~arts and humanities~~ visual and performing arts instructional program in the intermediate level continues with the exploration of the art forms of dance, media arts, music, theatre, and visual arts. Instructional emphasis at the intermediate level should continue to be on exposing students to a variety of arts through active experiences. This exploration includes the continuation of arts literacy development, simple analysis and critique of the arts, and active sharing of their work with others. Students should be making connections between the arts and their own personal experiences, along with connections to how the arts convey meaning and reflect human experience. Students demonstrate more confidence in applying the arts to communicate meaning, and through their choices in the use of arts elements and principles.

The Standards

The standards are directly related to the *National Core Arts Standards*. These are process standards, which are designed to engage students in artistic processes and creative expression as put forward in Senate Bill 1 (2009), KRS 158:6451, Section 1, Schools shall develop their students' ability to: "Express their creative talents and interests in visual arts, music, dance, and dramatic arts".

Standards Organization

The standards are organized around four arts processes:

1. **Creating:** Conceiving and developing new artistic ideas and work

   Creating involves planning and creating new dance, media arts, music, theatre, or visual arts. Creating may involve improvising in music, dance or theatre. Improvising is the composing of new music, reciting/acting new dramatic material, or creating new dance movements on the spur of the moment.

2. **Performing/Producing/Presenting:** Realizing artistic ideas and work through interpretation and presentation

   Performing is limited to the performing arts of music, dance and theatre. Performing generally involves sharing previously created works with an audience. Although the process of performing involves following a creative plan conceived by a composer, playwright or choreographer, there is still opportunity for creative interpretations within the performance.

   Producing is the process of sharing work in the area of media arts. Since media arts productions do not result in performances, the sharing process is different from the performing arts. Media artists still follow the same steps in the creation of works and preparation of works for sharing with others; however the result is more often a product such as a video or video game.

   Presenting is often associated with sharing in more formal settings such as exhibition in the visual arts. The same steps to prepare works for presenting are considered-the audience, venue and communication aspects of an exhibition.

3. **Responding:** Understanding and evaluating how the arts convey meaning

   Responding to the arts involves having the viewer take a close look to interpret the meanings in artistic works. The arts are created for the purpose of communication. Responding to them engages a thinking process that enables the viewer/audience to gather the intent of the work and the message being share by the artist.

   Responding also involves the process of evaluating art works. The viewer/audience will apply criteria to evaluate the effectiveness of artistic works.

4. **Connecting:** Relating artistic ideas and work with personal meaning and external context

   Connecting involves both looking inward and outward. Artists use personal experiences and gained knowledge to inform their own creative works. They also relate artistic ideas with the world around them; to society, culture, and history. This deepens the understanding of the work and appreciation of those who create the arts.

Anchor Standards
There are eleven Anchor Standards that are common across all art forms. These standards illustrate steps that are taken within each of the Artistic Processes.

Performance Standards
Each artistic discipline has a set of performance standards. These standards illustrate what each of the Anchor Standards might look like as students engage in the Artistic Processes within an artistic discipline. Performance standard are written for pre-kindergarten through eighth grade as grade level standards, and at the high school in three proficiency levels; Proficient, Accomplished and Advanced. All Performance Standards align to the eleven overarching Anchor Standards.

Discipline: Dance	**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work **Process Component:** Explore **Enduring Understanding**: Choreographers use a variety of sources as inspiration and transform concepts and ideas into movement for artistic expression. **Essential Question**: Where do choreographers get ideas for dances?	
4th **DA:Cr1.1.4**	**5th** **DA:Cr1.1.5**
a. Identify ideas for choreography generated from a variety of stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences). b. Develop a movement problem and manipulate the elements of dance as tools to find a solution.	a. Build content for choreography using several stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences, literary forms, natural phenomena, current news, social events). b. Construct and solve multiple movement problems to develop choreographic content.

Discipline: Dance	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan **Enduring Understanding**: The elements of dance, dance structures, and choreographic devices serve as both a foundation and a departure point for choreographers. **Essential Question**: What influences choice-making in creating choreography?	
4th **DA:Cr2.1.4**	**5th** **DA:Cr2.1.5**
a. Manipulate or modify choreographic devices to expand movement possibilities and create a variety of movement patterns and structures. Discuss movement choices. b. Develop a dance study that expresses and communicates a main idea. Discuss the reasons and effectiveness of the movement choices.	a. Manipulate or modify a variety of choreographic devices to expand choreographic possibilities and develop a main idea. Explain reasons for movement choices. b. Develop a dance study by selecting a specific movement vocabulary to communicate a main idea. Discuss how the dance communicates non-verbally.

Discipline: Dance	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Revise

Enduring Understanding: Choreographers analyze, evaluate, refine, and document their work to communicate meaning.

Essential Question: How do choreographers use self-reflection, feedback from others, and documentation to improve the quality of their work?

4th **DA:Cr3.1.4**	**5th** **DA:Cr3.1.5**
a. Revise movement based on peer feedback and self-reflection to improve communication of artistic intent in a short dance study. Explain choices made in the process. b. Depict the relationships between two or more dancers in a dance phrase by drawing a picture or using symbols (for example, next to, above, below, behind, in front of).	a. Explore through movement the feedback from others to expand choreographic possibilities for a short dance study that communicates artistic intent. Explain the movement choices and refinements. b. Record changes in a dance sequence through writing, symbols, or a form of media technology.

<table>
<tr><th>Discipline: Dance</th><th>Artistic Process: Performing</th></tr>
<tr><td colspan="2">Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Express

Enduring Understanding: Space, time, and energy are basic elements of dance.

Essential Question: How do dancers work with space, time and energy to communicate artistic expression?</td></tr>
<tr><th>4th
DA:Pr4.1.4</th><th>5th
DA:Pr4.1.5</th></tr>
<tr><td>a. Make static and dynamic shapes with positive and negative space. Perform elevated shapes (jump shapes) with soft landings and movement sequences alone and with others, establishing relationships with other dancers through focus of eyes.

b. Accompany other dancers using a variety of percussive instruments and sounds. Respond in movement to even and uneven rhythms. Recognize and respond to tempo changes as they occur in dance and music.

c. Analyze movements and phrases for use of energy and dynamic changes and use adverbs and adjectives to describe them. Based on the analysis, refine the phrases by incorporating a range of movement characteristics.</td><td>a. Integrate static and dynamic shapes and floor and air pathways into dance sequences. Establish relationships with other dancers through focus of eyes and other body parts. Convert inward focus to outward focus for projecting out to far space.

b. Dance to a variety of rhythms generated from internal and external sources. Perform movement phrases that show the ability to respond to changes in time.

c. Contrast bound and free-flowing movements. Motivate movement from both central initiation (torso) and peripheral initiation (distal) and analyze the relationship between initiation and energy.</td></tr>
</table>

Discipline: Dance	**Artistic Process**: Performing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Embody **Enduring Understanding**: Dancers use the mind-body connection and develop the body as an instrument for artistry and artistic expression. **Essential Question**: What must a dancer do to prepare the mind and body for artistic expression?	
4th **DA:Pr5.1.4**	**5th** **DA:Pr5.1.5**
a. Demonstrate fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness) and movement qualities when replicating and recalling patterns and sequences of locomotor and non-locomotor movements. b. Execute techniques that extend movement range, build strength, and develop endurance. Explain the relationship between execution of technique, safe body-use, and healthful nutrition. c. Coordinate phrases and timing with other dancers by cueing off each other and responding to stimuli cues (for example, music, text, or lighting). Reflect on feedback from others to inform personal dance performance goals.	a. Recall and execute a series of dance phrases using fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement). b. Demonstrate safe body-use practices during technical exercises and movement combinations. Discuss how these practices, along with healthful eating habits, promote strength, flexibility, endurance and injury prevention. c. Collaborate with peer ensemble members to repeat sequences, synchronize actions, and refine spatial relationships to improve performance quality. Apply feedback from others to establish personal performance goals.

Discipline: Dance	**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Dance performance is an interaction between performer, production elements, and audience that heightens and amplifies artistic expression. **Essential Question**: How does a dancer heighten artistry in a public performance?	
4th **DA:Pr6.1.4**	**5th** **DA:Pr6.1.5**
a. Consider how to establish a formal performance space from an informal setting (for example, gymnasium or grassy area). b. Identify, explore, and experiment with a variety of production elements to heighten the artistic intent and audience experience.	a. Demonstrate the ability to adapt dance to alternative performance venues by modifying spacing and movements to the performance space. b. Identify, explore, and select production elements that heighten and intensify the artistic intent of a dance and are adaptable for various performance spaces.

Discipline: Dance	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Dance is perceived and analyzed to comprehend its meaning. **Essential Question**: How is a dance understood?	
4th **DA:Re.7.1.4**	**5th** **DA:Re.7.1.5**
a. Find patterns of movement in dance works that create a style or theme. b. Demonstrate and explain how dance styles differ within a genre or within a cultural movement practice.	a. Find meaning or artistic intent from the patterns of movement in a dance work. b. Describe, using basic dance terminology, the qualities and characteristics of style used in a dance from one's own cultural movement practice. Compare them to the qualities and characteristics of style found in a different dance genre, style, or cultural movement practice, also using basic dance terminology.

<table>
<tr><td>Discipline: Dance</td><td>Artistic Process: Responding</td></tr>
<tr><td colspan="2">Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Dance is interpreted by considering intent, meaning, and artistic expression as communicated through the use of the body, elements of dance, dance technique, dance structure, and context.

Essential Question: How is dance interpreted?</td></tr>
<tr><td>4th
DA:Re8.1.4</td><td>5th
DA:Re8.1.5</td></tr>
<tr><td>Relate movements, ideas, and context to decipher meaning in a dance using basic dance terminology.</td><td>Interpret meaning in a dance based on its movements. Explain how the movements communicate the main idea of the dance using basic dance terminology.</td></tr>
</table>

<table>
<tr><td>Discipline: Dance</td><td>Artistic Process: Responding</td></tr>
<tr><td colspan="2">Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Critique

Enduring Understanding: Criteria for evaluating dance vary across genres, styles, and cultures.

Essential Question: What criteria are used to evaluate dance?</td></tr>
<tr><td>4th
DA:Re9.1.4</td><td>5th
DA:Re9.1.5</td></tr>
<tr><td>Discuss and demonstrate the characteristics that make a dance artistic and apply those characteristics to dances observed or performed in a specific genre, style, or cultural movement practice. Use basic dance terminology.</td><td>Define the characteristics of dance that make a dance artistic and meaningful. Relate them to the elements of dance in genres, styles, or cultural movement practices. Use basic dance terminology to describe characteristics that make a dance artistic and meaningful.</td></tr>
</table>

Discipline: Dance	**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: As dance is experienced, all personal experiences, knowledge, and contexts are integrated and synthesized to interpret meaning. **Essential Question**: How does dance deepen our understanding of ourselves, other knowledge, and events around us?	
4th **DA:Cn10.1.4**	**5th** **DA:Cn10.1.5**
a. Relate the main idea or content in a dance to other experiences. Explain how the main idea of a dance is similar to or different from one's own experiences, relationships, ideas or perspectives. b. Develop and research a question relating to a topic of study in school using multiple sources of references. Select key aspects about the topic and choreograph movements that communicate the information. Discuss what was learned from creating the dance and describe how the topic might be communicated using another form of expression.	a. Compare two dances with contrasting themes. Discuss feelings and ideas evoked by each. Describe how the themes and movements relate to points of view and experiences. b. Choose a topic, concept, or content from another discipline of study and research how other art forms have expressed the topic. Create a dance study that expresses the idea. Explain how the dance study expressed the idea and discuss how this learning process is similar to, or different from, other learning situations.

Discipline: Dance	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: Dance literacy includes deep knowledge and perspectives about societal, cultural, historical, and community contexts. **Essential Question**: How does knowing about societal, cultural, historical and community experiences expand dance literacy?	
4th **DA:Cn11.1.4**	**5th** **DA:Cn11.1.5**
Select and describe movements in a specific genre or style and explain how the movements relate to the culture, society, historical period, or community from which the dance originated.	Describe how the movement characteristics and qualities of a dance in a specific genre or style communicate the ideas and perspectives of the culture, historical period, or community from which the genre or style originated.

Discipline: Media Arts	**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Conceive **Enduring Understanding**: Media arts ideas, works, and processes are shaped by the imagination, creative processes, and by experiences, both within and outside of the arts. **Essential Question**: How do media artists generate ideas? How can ideas for media arts productions be formed and developed to be effective and original?	
4th (MA:Cr1.1.4)	**5th (MA:Cr1.1.5)**
Conceive of original artistic goals for media artworks using a variety of creative methods, such as brainstorming and modeling.	Envision original ideas and innovations for media artworks using personal experiences and/or the work of others.

Discipline: Media Arts	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Develop **Enduring Understanding**: Media artists plan, organize, and develop creative ideas, plans, and models into process structures that can effectively realize the artistic idea. **Essential Question**: How do media artists organize and develop ideas and models into process structures to achieve the desired end product?	
4th (MA:Cr2.1.4)	**5th (MA:Cr2.1.5)**
Discuss, test, and assemble ideas, plans, and models for media arts productions, considering the artistic goals and the presentation.	Develop, present, and test ideas, plans, models, and proposals for media arts productions, considering the artistic goals and audience.

Discipline: Media Arts	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Construct **Enduring Understanding**: The forming, integration, and refinement of aesthetic components, principles, and processes creates purpose, meaning, and artistic quality in media artworks. **Essential Question**: What is required to produce a media artwork that conveys purpose, meaning, and artistic quality? How do media artists improve/refine their work?	
4th (MA:Cr3.1.4)	**5th (MA:Cr3.1.5)**
a. Structure and arrange various content and components to convey purpose and meaning in different media arts productions, applying sets of associated principles, such as balance and contrast. b. Demonstrate intentional effect in refining media artworks, emphasizing elements for a purpose.	a. Create content and combine components to convey expression, purpose, and meaning in a variety of media arts productions, utilizing sets of associated principles, such as emphasis and exaggeration. b. Determine how elements and components can be altered for clear communication and intentional effects, and refine media artworks to improve clarity and purpose.

Discipline: Media Arts	**Artistic Process**: Producing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Integrate **Enduring Understanding**: Media artists integrate various forms and contents to develop complex, unified artworks. **Essential Question**: How are complex media arts experiences constructed?	
4th (MA:Pr4.1.4)	**5th (MA:Pr4.1.5)**
Demonstrate how a variety of academic, arts, and media forms and content may be mixed and coordinated into media artworks, such as narrative, dance, and media.	Create media artworks through the integration of multiple contents and forms, such as a media broadcast.

Discipline: Media Arts	**Artistic Process**: Producing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Practice **Enduring Understanding**: Media artists require a range of skills and abilities to creatively solve problems within and through media arts productions. **Essential Question**: What skills are required for creating effective media artworks and how are they improved? How are creativity and innovation developed within and through media arts productions? How do media artists use various tools and techniques?	
4th (MA:Pr5.1.4)	**5th (MA:Pr5.1.5)**
a. Enact identified roles to practice foundational artistic, design, technical, and soft skills, such as formal technique, equipment usage, production, and collaboration in media arts productions. b. Practice foundational innovative abilities, such as design thinking, in addressing problems within and through media arts productions. c. Demonstrate use of tools and techniques in standard and novel ways while constructing media artworks.	a. Enact various roles to practice fundamental ability in artistic, design, technical, and soft skills, such as formal technique, production, and collaboration in media arts productions. b. Practice fundamental creative and innovative abilities, such as expanding conventions, in addressing problems within and through media arts productions. c. Examine how tools and techniques could be used in standard and experimental ways in constructing media artworks.

Discipline: Media Arts	**Artistic Process**: Producing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Media artists purposefully present, share, and distribute media artworks for various contexts. **Essential Question**: How does time, place, audience, and context affect presenting or performing choices for media artworks? How can presenting or sharing media artworks in a public format help a media artist learn and grow?	
4th (MA:Pr6.1.4)	**5th (MA:Pr6.1.5)**
a. Explain the presentation conditions, and fulfill a role and processes in presenting or distributing media artworks. b. Explain results of and improvements for presenting media artworks.	a. Compare qualities and purposes of presentation formats, and fulfill a role and associated processes in presentation and/or distribution of media artworks. b. Compare results of and improvements for presenting media artworks.

Discipline: Media Arts	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Identifying the qualities and characteristics of media artworks improves one's artistic appreciation and production. **Essential Question**: How do we 'read' media artworks and discern their relational components? How do media artworks function to convey meaning and manage audience experience?	
4th (MA:Re7.1.4)	**5th (MA:Re7.1.5)**
a. Identify, describe, and explain how messages are created by components in media artworks. b. Identify, describe, and explain how various forms, methods, and styles in media artworks manage audience experience.	a. Identify, describe, and differentiate how message and meaning are created by components in media artworks. b. Identify, describe, and differentiate how various forms, methods, and styles in media artworks manage audience experience.

Discipline: Media Arts	**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Interpretation and appreciation require consideration of the intent, form, and context of the media and artwork. **Essential Question**: How do people relate to and interpret media artworks?	
4th (MA:Re8.1.4)	**5th (MA:Re8.1.5)**
Determine and explain reactions and interpretations to a variety of media artworks, considering their purpose and context.	Determine and compare personal and group interpretations of a variety of media artworks, considering their intention and context.

Discipline: Media Arts	**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Skillful evaluation and critique are critical components of experiencing, appreciating, and producing media artworks. **Essential Question**: How and why do media artists value and judge media artworks? When and how should we evaluate and critique media artworks to improve them?	
4th (MA:Re9.1.4)	**5th (MA:Re9.1.5)**
Identify and apply basic criteria for evaluating and improving media artworks and production processes, considering context.	Determine and apply criteria for evaluating media artworks and production processes, considering context, and practicing constructive feedback.

Discipline: Media Arts	**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Media artworks synthesize meaning and form cultural experience. **Essential Question**: How do we relate knowledge and experiences to understanding and making media artworks? How do we learn about and create meaning through producing media artworks?	
4th (MA:Cn10.1.4)	**5th (MA:Cn10.1.5)**
a. Examine and use personal and external resources, such as interests, research, and cultural understanding, to create media artworks. b. Examine and show how media artworks form meanings, situations, and/or cultural experiences, such as online spaces.	a. Access and use internal and external resources to create media artworks, such as interests, knowledge, and experiences. b. Examine and show how media artworks form meanings, situations, and cultural experiences, such as news and cultural events.

Discipline: Media Arts	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: Media artworks and ideas are better understood and produced by relating them to their purposes, values, and various contexts. **Essential Question**: How does media arts relate to its various contexts, purposes, and values? How does investigating these relationships inform and deepen the media artist's understanding and work?	
4th (MA:Cn11.1.4)	**5th (MA:Cn11.1.5)**
a. Explain verbally and/or in media artworks, how media artworks and ideas relate to everyday and cultural life, such as fantasy and reality, and technology use. b. Examine and interact appropriately with media arts tools and environments, considering ethics, rules, and fairness.	a. Research and show how media artworks and ideas relate to personal, social and community life, such as exploring commercial and information purposes, history, and ethics. b. Examine, discuss and interact appropriately with media arts tools and environments, considering ethics, rules, and media literacy.

Discipline: Music	**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Imagine **Enduring Understanding**: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources. **Essential Question**: How do musicians generate creative ideas?	
4th **MU:Cr1.1.4**	**5th** **MU:Cr1.1.5**
a. Improvise rhythmic, melodic, and harmonic ideas, and explain connection to specific purpose and context (such as social and cultural). b. Generate musical ideas (such as rhythms, melodies, and simple accompaniment patterns) within related tonalities (such as major and minor) and meters.	a. Improvise rhythmic, melodic, and harmonic ideas, and explain connection to specific purpose and context (such as social, cultural, and historical). b. Generate musical ideas (such as rhythms, melodies, and accompaniment patterns) within specific related tonalities, meters, and simple chord changes.

Discipline: Music	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan and Make **Enduring Understanding**: Musicians' creative choices are influenced by their expertise, context, and expressive intent. **Essential Question**: How do musicians make creative decisions?	
4th **MU:Cr2.1.4**	**5th** **MU:Cr2.1.5**
a. Demonstrate selected and organized musical ideas for an improvisation, arrangement, or composition to express intent, and explain connection to purpose and context. b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic, melodic, and simple harmonic musical ideas.	a. Demonstrate selected and developed musical ideas for improvisations, arrangements, or compositions to express intent, and explain connection to purpose and context. b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic, melodic, and two-chord harmonic musical ideas.

Discipline: Music	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Evaluate and Refine **Enduring Understanding**: Musicians evaluate, and refine their work through openness to new ideas, persistence, and the application of appropriate criteria. **Essential Question**: How do musicians improve the quality of their creative work?	
4th **MU:Cr3.1.4**	**5th** **MU:Cr3.1.5**
Evaluate, refine, and document revisions to personal music, applying teacher-provided and collaboratively-developed criteria and feedback to show improvement over time.	Evaluate, refine, and document revisions to personal music, applying teacher-provided and collaboratively-developed criteria and feedback, and explain rationale for changes.

Discipline: Music	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Present **Enduring Understanding**: Musicians' presentation of creative work is the culmination of a process of creation and communication. **Essential Question**: When is creative work ready to share?	
4th **MU:Cr3.2.4**	**5th** **MU:Cr3.2.5**
Present the final version of personal created music to others, and explain connection to expressive intent.	Present the final version of personal created music to others that demonstrates craftsmanship, and explain connection to expressive intent.

Discipline: Music	**Artistic Process**: Performing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Performers' interest in and knowledge of musical works, understanding of their own technical skill, and the context for a performance influence the selection of repertoire. **Essential Question**: How do performers select repertoire?	
4th **MU:Pr4.1.4**	**5th** **MU:Pr4.1.5**
Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, context, and technical skill.	Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, and context, as well as their personal and others' technical skill.

Discipline: Music	**Artistic Process**: Performing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Analyze **Enduring Understanding**: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance. **Essential Question**: How does understanding the structure and context of musical works inform performance?	
4th **MU:Pr4.2.4**	**5th** **MU:Pr4.2.5**
a. Demonstrate understanding of the structure and the elements of music (such as rhythm, pitch, and form) in music selected for performance. b. When analyzing selected music, read and perform using iconic and/or standard notation. c. Explain how context (such as social and cultural) informs a performance.	a. Demonstrate understanding of the structure and the elements of music (such as rhythm, pitch, form, and harmony) in music selected for performance. b. When analyzing selected music, read and perform using standard notation. c. Explain how context (such as social, cultural, and historical) informs performances.

Discipline: Music	**Artistic Process**: Performing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Interpret **Enduring Understanding**: Performers make interpretive decisions based on their understanding of context and expressive intent. **Essential Question**: How do performers interpret musical works?	
4th **MU:Pr4.3.4**	**5th** **MU:Pr4.3.5**
Demonstrate and explain how intent is conveyed through interpretive decisions and expressive qualities (such as dynamics, tempo, and timbre).	Demonstrate and explain how intent is conveyed through interpretive decisions and expressive qualities (such as dynamics, tempo, timbre, and articulation/style).

Discipline: Music	**Artistic Process**: Performing
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Rehearse, Evaluate, Refine **Enduring Understanding**: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria. **Essential Question**: How do musicians improve the quality of their performance?	
4th **MU:Pr5.1.4**	**5th** **MU:Pr5.1.5**
a. Apply teacher-provided and collaboratively-developed criteria and feedback to evaluate accuracy and expressiveness of ensemble and personal performances. b. Rehearse to refine technical accuracy and expressive qualities, and address performance challenges.	a. Apply teacher-provided and established criteria and feedback to evaluate the accuracy and expressiveness of ensemble and personal performances. b. Rehearse to refine technical accuracy and expressive qualities to address challenges, and show improvement over time.

Discipline: Music	**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Musicians judge performance based on criteria that vary across time, place, and culture. The context and how a work is presented influence the audience response. **Essential Question**: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?	
4th **MU:Pr6.1.4**	**5th** **MU:Pr6.1.5**
a. Perform music, alone or with others, with expression and technical accuracy, and appropriate interpretation. b. Demonstrate performance decorum and audience etiquette appropriate for the context, venue, and genre.	a. Perform music, alone or with others, with expression, technical accuracy, and appropriate interpretation. b. Demonstrate performance decorum and audience etiquette appropriate for the context, venue, genre, and style.

Discipline: Music	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Select **Enduring Understanding**: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes. **Essential Question**: How do individuals choose music to experience?	
4th **MU:Re7.1.4**	**5th** **MU:Re7.1.5**
Demonstrate and explain how selected music connects to and is influenced by specific interests, experiences, purposes, or contexts.	Demonstrate and explain, citing evidence, how selected music connects to and is influenced by specific interests, experiences, purposes, or contexts.

Discipline: Music	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music. **Essential Question**: How does understanding the structure and context of music inform a response?	
4th **MU:Re7.2.4**	**5th** **MU:Re7.2.5**
Demonstrate and explain how responses to music are informed by the structure, the use of the elements of music, and context (such as social and cultural).	Demonstrate and explain, citing evidence, how responses to music are informed by the structure, the use of the elements of music, and context (such as social, cultural, and historical).

Discipline: Music	**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent. **Essential Question**: How do we discern the musical creators' and performers' expressive intent?	
4th **MU:Re8.1.4**	**5th** **MU:Re8.1.5**
Demonstrate and explain how the expressive qualities (such as dynamics, tempo, and timbre) are used in performers' and personal interpretations to reflect expressive intent.	Demonstrate and explain how the expressive qualities (such as dynamics, tempo, timbre, and articulation) are used in performers' and personal interpretations to reflect expressive intent.

Discipline: Music	**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: The personal evaluation of musical work(s) and performance(s) is informed by analysis, interpretation, and established criteria. **Essential Question**: How do we judge the quality of musical work(s) and performance(s)?	
4th **MU:Re9.1.4**	**5th** **MU:Re9.1.5**
Evaluate musical works and performances, applying established criteria, and explain appropriateness to the context.	Evaluate musical works and performances, applying established criteria, and explain appropriateness to the context, citing evidence from the elements of music.

Discipline: Music	**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Enduring Understanding**: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing, and responding. **Essential Question**: How do musicians make meaningful connections to creating, performing, and responding?	
4th **MU:Cn10.1.4**	**5th** **MU:Cn10.1.5**
Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts, and daily life inform creating, performing, and responding to music?	
4th **MU:Cn11.1.4**	**5th** **MU:Cn11.1.5**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

<table>
<tr><td>Discipline: Theatre</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Envision/Conceptualize

Enduring Understanding: Theatre artists rely on intuition, curiosity, and critical inquiry.

Essential Question: What happens when theatre artists use their imaginations and/or learned theatre skills while engaging in creative exploration and inquiry?</td></tr>
<tr><td>4th
TH:Cr1.1.4.</td><td>5th
TH:Cr.1.1.5.</td></tr>
<tr><td>a. Articulate the visual details of imagined worlds, and improvised stories that support the given circumstances in a drama/theatre work.

b. Visualize and design technical elements that support the story and given circumstances in a drama/theatre work.

c. Imagine how a character might move to support the story and given circumstances in a drama/theatre work.</td><td>a. Identify physical qualities that might reveal a character’s inner traits in the imagined world of a drama/theatre work.

b. Propose design ideas that support the story and given circumstances in a drama/theatre work.

c. Imagine how a character’s inner thoughts impact the story and given circumstances in a drama/ theatre work</td></tr>
</table>

<table>
<tr><td>Discipline: Theatre</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Develop

Enduring Understanding: Theatre artists work to discover different ways of communicating meaning.

Essential Question: How, when, and why do theatre artists’ choices change?</td></tr>
<tr><td>4th
TH:Cr2.1.4.</td><td>5th
TH:Cr2.1.5.</td></tr>
<tr><td>a. Collaborate to devise original ideas for a drama/theatre work by asking questions about characters and plots.

b. Make and discuss group decisions and identify responsibilities required to present a drama/theatre work to peers.</td><td>a. Devise original ideas for a drama/theatre work that reflect collective inquiry about characters and their given circumstances.

b. Participate in defined responsibilities required to present a drama/theatre work informally to an audience.</td></tr>
</table>

Discipline: Theatre	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Rehearse **Enduring Understanding**: Theatre artists refine their work and practice their craft through rehearsal. **Essential Question**: How do theatre artists transform and edit their initial ideas?	
4th **TH:Cr3.1.4.**	**5th** **TH:Cr3.1.5.**
a. Revise and improve an improvised or scripted drama/theatre work through repetition and collaborative review. b. Develop physical and vocal exercise techniques for an improvised or scripted drama/theatre work. c. Collaborate on solutions to design and technical problems that arise in rehearsal for a drama/theatre work.	a. Revise and improve an improvised or scripted drama/theatre work through repetition and self-review. b. Use physical and vocal exploration for character development in an improvised or scripted drama/theatre work. c. Create innovative solutions to design and technical problems that arise in rehearsal for a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Performing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Theatre artists make strong choices to effectively convey meaning. **Essential Question**: Why are strong choices essential to interpreting a drama or theatre piece?	
4th **TH:Pr4.1.4.**	**5th** **TH:Pr4.1.5.**
a. Modify the dialogue and action to change the story in a drama/theatre work. b. Make physical choices to develop a character in a drama/theatre work.	a. Describe the underlying thoughts and emotions that create dialogue and action in a drama/theatre work. b. Use physical choices to create meaning in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Performing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Prepare **Enduring Understanding**: Theatre artists develop personal processes and skills for a performance or design. **Essential Question**: What can I do to fully prepare a performance or technical design?	
4th **TH:Pr5.1.4.**	**5th** **TH:Pr5.1.5.**
a. Practice selected exercises that can be used in a group setting for drama/theatre work. b. Propose the use of technical elements in a drama/theatre work.	a. Choose acting exercises that can be applied to a drama/theatre work. b. Demonstrate the use of technical elements in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Share, Present **Enduring Understanding**: Theatre artists share and present stories, ideas, and envisioned worlds to explore the human experience. **Essential Question**: What happens when theatre artists and audiences share a creative experience?	
4 **TH:Pr6.1.4.**	**5** **TH:Pr6.1.5.**
Share small-group drama/theatre work, with peers as audience.	Present drama/theatre work informally to an audience.

Discipline: Theatre	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Reflect **Enduring Understanding**: Theatre artists reflect to understand the impact of drama processes and theatre experiences. **Essential Question**: How do theatre artists comprehend the essence of drama processes and theatre experiences?	
4th **TH:Re7.1.4.**	**5th** **TH:Re7.1.5.**
Identify artistic choices made in a drama/theatre work through participation and observation.	Explain personal reactions to artistic choices made in a drama/theatre work through participation and observation.

Discipline: Theatre	**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Theatre artists' interpretations of drama/theatre work are influenced by personal experiences and aesthetics. **Essential Question**: How can the same work of art communicate different messages to different people?	
4th **TH:Re8.1.4.**	**5th** **TH:Re8.1.5.**
a. Compare and contrast multiple personal experiences when participating in or observing a drama/theatre work. b. Compare and contrast the qualities of characters in a drama/theatre work through physical characteristics and prop or costume design choices that reflect cultural perspectives. c. Identify and discuss physiological changes connected to emotions in drama/theatre work.	a. Justify responses based on personal experiences when participating in or observing a drama/theatre work. b. Explain responses to characters based on cultural perspectives when participating in or observing drama/theatre work. c. Investigate the effects of emotions on posture, gesture, breathing, and vocal intonation in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Theatre artists apply criteria to investigate, explore, and assess drama and theatre work. **Essential Question**: How are the theatre artist's processes and the audience's perspectives impacted by analysis and synthesis?	
4th **TH:Re9.1.4.**	**5th** **TH:Re9.1.5.**
a. Propose a plan to evaluate drama/theatre work. b. Investigate how technical elements may support a theme or idea in a drama/theatre work. c. Observe how a character's choices impact an audience's perspective in a drama/theatre work.	a. Develop and implement a plan to evaluate drama/theatre work. b. Assess how technical elements represent the theme of a drama/theatre work. c. Recognize how a character's circumstances impact an audience's perspective in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Empathize **Enduring Understanding**: Theatre artists allow awareness of interrelationships between self and others to influence and inform their work. **Essential Question**: What happens when theatre artists foster understanding between self and others through critical awareness, social responsibility, and the exploration of empathy?	
4th **TH:Cn10.1.4.**	**5th** **TH:Cn10.1.5.**
Identify the ways drama/theatre work reflects the perspectives of a community or culture.	Explain how drama/theatre connects oneself to a community or culture.

Discipline: Theatre	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Interrelate **Enduring Understanding**: Theatre artists understand and can communicate their creative process as they analyze the way the world may be understood. **Essential Question**: What happens when theatre artists allow an understanding of themselves and the world to inform perceptions about theatre and the purpose of their work?	
4th **TH:Cn11.1.4.**	**5th** **TH:Cn11.1.5.**
Respond to community and social issues and incorporate other content areas in drama/theatre work.	Investigate historical, global and social issues expressed in drama/theatre work.

Discipline: Theatre	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Research **Enduring Understanding**: Theatre artists critically inquire into the ways others have thought about and created drama processes and productions to inform their own work. **Essential Question**: In what ways can research into theatre histories, theories, literature, and performances alter the way a drama process or production is understood?	
4th **TH:Cn11.2.4.**	**5th** **TH:Cn11.2.5.**
a. Investigate cross-cultural approaches to storytelling in drama/theatre work. b. Compare the drama/theatre conventions of a given time period with those of the present.	a. Analyze commonalities and differences between stories set in different cultures in preparation for a drama/theatre work. b. Identify historical sources that explain drama/theatre terminology and conventions.

<table>
<tr><td>Discipline: Visual Arts</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Creativity and innovative thinking are essential life skills that can be developed.

Essential Question: What conditions, attitudes, and behaviors support creativity and innovative thinking?
What factors prevent or encourage people to take creative risks? How does collaboration expand the creative process?</td></tr>
<tr><td>4th
VA:Cr1.1.4</td><td>5th
VA:Cr1.1.5</td></tr>
<tr><td>Brainstorm multiple approaches to a creative art or design problem.</td><td>Combine ideas to generate an innovative idea for art-making.</td></tr>
</table>

<table>
<tr><td>Discipline: Visual Arts</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Artists and designers shape artistic investigations, following or breaking with traditions in pursuit of creative art-making goals.

Essential Question: How does knowing the contexts histories, and traditions of art forms help us create works of art and design? Why do artists follow or break from established traditions? How do artists determine what resources and criteria are needed to formulate artistic investigations?</td></tr>
<tr><td>4th
VA:Cr1.2.4</td><td>5th
VA:Cr1.2.5</td></tr>
<tr><td>Collaboratively set goals and create artwork that is meaningful and has purpose to the makers.</td><td>Identify and demonstrate diverse methods of artistic investigation to choose an approach for beginning a work of art.</td></tr>
</table>

Discipline: Visual Arts	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers experiment with forms, structures, materials, concepts, media, and art-making approaches. **Essential Question**: How do artists work? How do artists and designers determine whether a particular direction in their work is effective? How do artists and designers learn from trial and error?	
4th **VA:Cr2.1.4**	**5th** **VA:Cr2.1.5**
Explore and invent art-making techniques and approaches.	Experiment and develop skills in multiple art-making techniques and approaches through practice.

Discipline: Visual Arts	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers balance experimentation and safety, freedom and responsibility while developing and creating artworks. **Essential Question**: How do artists and designers care for and maintain materials, tools, and equipment? Why is it important for safety and health to understand and follow correct procedures in handling materials, tools, and equipment? What responsibilities come with the freedom to create?	
4th **VA:Cr2.2.4**	**5th** **VA:Cr2.2.5**
When making works of art, utilize and care for materials, tools, and equipment in a manner that prevents danger to oneself and others.	Demonstrate quality craftsmanship through care for and use of materials, tools, and equipment.

Discipline: Visual Arts	**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: People create and interact with objects, places, and design that define, shape, enhance, and empower their lives. **Essential Question**: How do objects, places, and design shape lives and communities? How do artists and designers determine goals for designing or redesigning objects, places, or systems? How do artists and designers create works of art or design that effectively communicate?	
4th **VA:Cr2.3.4**	**5th** **VA:Cr2.3.5**
Document, describe, and represent regional constructed environments.	Identify, describe, and visually document places and/or objects of personal significance.

Discipline: Visual Arts	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Reflect- Refine- Complete **Enduring Understanding**: Artist and designers develop excellence through practice and constructive critique, reflecting on, revising, and refining work over time. **Essential Question**: What role does persistence play in revising, refining, and developing work? How do artists grow and become accomplished in art forms? How does collaboratively reflecting on a work help us experience it more completely?	
4th **VA:Cr3.1.4**	**5th** **VA:Cr3.1.5**
Revise artwork in progress on the basis of insights gained through peer discussion.	Create artist statements using art vocabulary to describe personal choices in art-making.

Discipline: Visual Arts	**Artistic Process**: Presenting

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Artists and other presenters consider various techniques, methods, venues, and criteria when analyzing, selecting, and curating objects artifacts, and artworks for preservation and presentation.

Essential Question: How are artworks cared for and by whom? What criteria, methods, and processes are used to select work for preservation or presentation? Why do people value objects, artifacts, and artworks, and select them for presentation?

4th **VA:Pr4.1.4**	**5th** **VA:Pr4.1.5**
Analyze how past, present, and emerging technologies have impacted the preservation and presentation of artwork.	Define the roles and responsibilities of a curator, explaining the skills and knowledge needed in preserving, maintaining, and presenting objects, artifacts, and artwork.

Discipline: Visual Arts	**Artistic Process**: Presenting

Anchor Standard 5: Develop and refine artistic techniques and work for presentation.

Process Component: Analyze

Enduring Understanding: Artists, curators and others consider a variety of factors and methods including evolving technologies when preparing and refining artwork for display and or when deciding if and how to preserve and protect it.

Essential Question: What methods and processes are considered when preparing artwork for presentation or preservation? How does refining artwork affect its meaning to the viewer? What criteria are considered when selecting work for presentation, a portfolio, or a collection?

4th **VA:Pr5.1.4**	**5th** **VA:Pr5.1.5**
Analyze the various considerations for presenting and protecting art in various locations, indoor or outdoor settings, in temporary or permanent forms, and in physical or digital formats.	Develop a logical argument for safe and effective use of materials and techniques for preparing and presenting artwork.

Discipline: Visual Arts	**Artistic Process**: Presenting
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Share **Enduring Understanding**: Objects, artifacts, and artworks collected, preserved, or presented either by artists, museums, or other venues communicate meaning and a record of social, cultural, and political experiences resulting in the cultivating of appreciation and understanding. **Essential Question**: What is an art museum? How does the presenting and sharing of objects, artifacts, and artworks influence and shape ideas, beliefs, and experiences? How do objects, artifacts, and artworks collected, preserved, or presented, cultivate appreciation and understanding?	
4th **VA:Pr6.1.4**	**5th** **VA:Pr6.1.5**
Compare and contrast purposes of art museums, art galleries, and other venues, as well as the types of personal experiences they provide.	Cite evidence about how an exhibition in a museum or other venue presents ideas and provides information about a specific concept or topic.

Discipline: Visual Arts	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Individual aesthetic and empathetic awareness developed through engagement with art can lead to understanding and appreciation of self, others, the natural world, and constructed environments. **Essential Question**: How do life experiences influence the way you relate to art? How does learning about art impact how we perceive the world? What can we learn from our responses to art?	
4th **VA:Pr7.1.4**	**5th** **VA:Pr7.1.5**
Compare responses to a work of art before and after working in similar media.	Compare one's own interpretation of a work of art with the interpretation of others.

Discipline: Visual Arts	**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Visual imagery influences understanding of and responses to the world. **Essential Question**: What is an image? Where and how do we encounter images in our world? How do images influence our views of the world?	
4th **VA:Re7.2.4**	**5th** **VA:Re7.2.5**
Analyze components in visual imagery that convey messages.	Identify and analyze cultural associations suggested by visual imagery.

Discipline: Visual Arts	**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Analyze **Enduring Understanding**: People gain insights into meanings of artworks by engaging in the process of art criticism. **Essential Question**: What is the value of engaging in the process of art criticism? How can the viewer "read" a work of art as text? How does knowing and using visual art vocabularies help us understand and interpret works of art?	
4th **VA:Re8.1.4**	**5th** **VA:Re8.1.5**
Interpret art by referring to contextual information and analyzing relevant subject matter, characteristics of form, and use of media.	Interpret art by analyzing characteristics of form and structure, contextual information, subject matter, visual elements, and use of media to identify ideas and mood conveyed.

Discipline: Visual Arts	**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Interpret **Enduring Understanding**: People evaluate art based on various criteria. **Essential Question**: How does one determine criteria to evaluate a work of art? How and why might criteria vary? How is a personal preference different from an evaluation?	
4th **VA:Re9.1.4**	**5th** **VA:Re9.1.5**
Apply one set of criteria to evaluate more than one work of art.	Recognize differences in criteria used to evaluate works of art depending on styles, genres, and media as well as historical and cultural contexts.

Discipline: Visual Arts	**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Through art-making, people make meaning by investigating and developing awareness of perceptions, knowledge, and experiences. **Essential Question**: How does engaging in creating art enrich people's lives? How does making art attune people to their surroundings? How do people contribute to awareness and understanding of their lives and the lives of their communities through art-making?	
4th **VA:Cn10.1.4**	**5th** **VA:Cn10.1.5**
Create works of art that reflect community cultural traditions.	Apply formal and conceptual vocabularies of art and design to view surroundings in new ways through art-making.

<table>
<tr><td>Discipline: Visual Arts</td><td>Artistic Process: Connecting</td></tr>
<tr><td colspan="2">Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

Process Component: Relate

Enduring Understanding: People develop ideas and understandings of society, culture, and history through their interactions with and analysis of art.

Essential Question: How does art help us understand the lives of people of different times, places, and cultures? How is art used to impact the views of a society? How does art preserve aspects of life?</td></tr>
<tr><td>4th
VA:Cn11.1.4</td><td>5th
VA:Cn11.1.5</td></tr>
<tr><td>Through observation, infer information about time, place, and culture in which a work of art was created.</td><td>Identify how art is used to inform or change beliefs, values, or behaviors of an individual or society.</td></tr>
</table>

~~INTERMEDIATE~~
~~PRACTICAL LIVING~~
~~(HEALTH AND PHYSICAL EDUCATION)~~

~~Kentucky Academic Standards – Practical Living – Fourth Grade~~

~~The health program in the 4th grade should provide opportunities for students to build upon the knowledge, skills and practices learned in the primary health education program. Continued acquisition of health knowledge enables students to make a smooth transition to the middle grades and prepares them to assume more responsibility for their own health.~~

~~Health literacy in the 4th grade program further develops an understanding of the body functions as well as behaviors and decisions that foster life-long health. Students in 4th grade health education focus on responsibility for personal health throughout the life cycle as related to good nutritional health and safety practices, decision-making skills, disease prevention and benefits of exercise. Other topics included are community resources, prevention of violence and substance abuse.~~

~~Physical Education addresses both health-related and skill-related components that promote enhanced health behaviors and increase responsible decision-making. Physical Education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being.~~

~~The 4th grade physical education program continues the development and refinement of motor skills and their application to various games, sports and other physical activities. Defining fitness skills and building positive attitudes toward lifetime physical fitness are some benefits derived from participation in the 4th grade physical education program. Students in intermediate level physical education develop and refine movement patterns, socially acceptable behavior and sportsmanship through participation in activities and games. They also learn the relationship between exercise, rest and nutrition to growth and development~~

~~The Health and Physical Education content standards at the 4th grade level are directly aligned with Kentucky's **Academic Expectations.** The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (Think and Solve Problems) and Learning Goal 6 (Connect and Integrate Knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being, or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~**2.29** Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.32** Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~**3.2** Students demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.1** Students effectively use interpersonal skills.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 4 Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~responsibility to oneself promotes health enhancing behaviors.~~
- ~~physical, emotional and social changes are normal and each individual is unique in the growth and development process.~~
- ~~interpersonal skills and strategies can influence social, mental and emotional well-being and affect an individual's relationships.~~
- ~~culture, media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal health.~~
- ~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
- ~~positive health habits prevent the spreading of diseases and injuries to self and others.~~
- ~~self-management and coping strategies can enhance mental and emotional health.~~

~~Grade 4 Skills and Concepts – Personal and Physical Health~~
~~Students will~~

- ~~describe the relationship between personal health behaviors and individual well-being~~
- ~~explain the characteristics of mental/emotional, social and physical health~~
- ~~explain and exhibit responsibility to oneself and others~~
- ~~describe how individual behaviors and choices of diet, exercise and rest affect the body~~

~~Grade 4 Skills and Concepts – Growth and Development~~
~~Students will~~

- ~~explain why growth and development are unique to each individual~~
- ~~develop an awareness of the interrelatedness of body functions and the impact lifestyle choices has on body systems~~
- ~~describe physical, social and emotional changes that occur during preadolescence~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 4 Skills and Concepts – Social, Mental and Emotional Health~~
~~Students will~~

- ~~demonstrate social interaction skills by:~~
  - ~~using etiquette, politeness, sharing and other social interaction skills~~
  - ~~working and playing collaboratively in large and small groups~~
  - ~~using appropriate means to express needs, wants and feelings~~
  - ~~distinguishing between verbal and nonverbal communication~~
  - ~~describing characteristics needed to be a responsible friend and family member~~
  - ~~identifying social interaction skills that enhance individual health~~

- ~~describe how goal setting can lead to personal achievement~~
- ~~identify and describe common social and emotional problems (aggression, anxiety, depression)~~
- ~~demonstrate the ability to apply a decision-making process to solve health issues and health problems~~
- ~~identify self-management and coping strategies (goal setting, refusal skills, decision making and time management) that enhance health~~

~~Grade 4 Skills and Concepts – Family Health~~
~~Students will~~

- ~~describe how culture influences personal health behaviors~~
- ~~describe ways technology and media influences thoughts, feelings and personal health~~
- ~~explain how family traditions/values impact personal health practices~~
- ~~explain how information from school and family influences health~~

~~Grade 4 Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~
~~Students will~~

- ~~describe symptoms and treatments of:~~
  - ~~communicable diseases (cold, strep throat and chicken pox)~~
  - ~~non-communicable diseases (asthma, heart disease, diabetes, skin cancer)~~
- ~~demonstrate an understanding of how to maintain a healthy body by:~~
  - ~~explaining how body systems work together (e.g., digestive, circulatory and respiratory systems)~~
  - ~~listing body defenses that fight pathogens~~
  - ~~describing ways pathogens from the environment enter the body~~
  - ~~identifying and explaining behaviors that promote personal hygiene (e.g., the use of grooming products) or can affect self and others in the prevention and spread of disease (e.g., hand washing, care of teeth and eyes, covering coughs and sneezes, sun protection)~~
  - ~~describing reasons for regular visits to health care providers~~

~~Grade 4 Skills and Concepts – Alcohol, Tobacco and Other Drugs~~
~~Students will~~

- ~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs:~~
  - ~~distinguish between the use and misuse of drugs, alcohol and tobacco and identify the effects each use might have on the body~~
  - ~~describe their effects on physical, mental, emotional and social health (e.g., effects on family life)~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~2.30~~ ~~Students evaluate consumer products and services and make effective consumer decisions.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~3.2~~ ~~Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~3.5~~ ~~Students will demonstrate self-control and self-discipline.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use decision-making process to make informed decisions among options.~~

~~Grade 4 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~proper nutrition is essential to growth and development.~~
- ~~nutrients provide energy for daily living.~~
- ~~resources are available to assist in making nutritional choices.~~

~~Grade 4 Skills and Concepts~~

~~Students will~~

- ~~explain the role of the digestive system in nutrition~~
- ~~describe the relationship between food choices in staying healthy~~
- ~~explain how to use resources (e.g., Food Guide Pyramid (FGP), Dietary Guidelines for Americans) in making healthful food choices~~
- ~~identify nutrients which are important to growth and development of healthy bodies~~
- ~~identify and explain the nutritional information provided on food labels~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work.~~

~~Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~

~~**2.33** Students demonstrate the skills to evaluate and use services and resources available in their community.~~

~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~

~~**4.3** Students individually demonstrate consistent, responsive and caring behavior.~~

~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~

~~**5.1** Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~

~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 4 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
- ~~community resources are available to assist in hazardous situations.~~

~~Grade 4 Skills and Concepts~~

~~Students will~~

- ~~practice safety rules/procedures for crossing streets/highway, riding in cars and on buses and using playground equipment~~
- ~~identify and explain ways to prevent injuries at home and at school (e.g., seat belts, helmets, knee pads, falls, poisonings) in a variety of situations~~
- ~~explain and demonstrate school and home safety procedures (e.g., tornado, fire, earthquake drills)~~
- ~~identify the effects injuries have on the body (e.g., skeletal system, skin, eyes)~~
- ~~identify proper procedures (e.g., calling 911, Heimlich maneuver, stop, drop & roll, apply pressure) for dealing with a variety of emergency situations (e.g., choking, bleeding, burns)~~
- ~~demonstrate awareness of how to avoid danger (e.g., fires, strangers) (e.g., through role plays, discussions, drawing)~~
- ~~identify the available health and safety agencies in a community and the services they provide (e.g., health department, fire department, police, ambulance services)~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movement's skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Grade 4 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~spatial awareness, motor skills and movement patterns are needed to perform a variety of physical activities.~~
- ~~movement concepts, principles and strategies apply to the learning and performance of physical activities.~~

~~Grade 4 Skills and Concepts~~

~~Students will~~

- ~~demonstrate a variety of locomotor and combination skills in a movement pattern~~
- ~~use non-locomotor, locomotor and combination skills to demonstrate movements in creative sequences and in simple patterned dances, games and other activities~~
- ~~demonstrate a variety of non-locomotor, locomotor and combination skills while participating in different games and sports~~
- ~~develop manipulative skills of throwing, catching, kicking and striking while developing motor skills (e.g., sliding, running, jumping) for use in games and other activities that lead to more complex games and sports (e.g., basketball, volleyball, soccer, softball)~~
- ~~demonstrate and explain how movement patterns are influenced by space, force and time~~
- ~~willingly try new movement and skills~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movement's skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~3.1~~ ~~Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~3.7~~ ~~Students demonstrate the ability to learn on one's own.~~
~~4.2~~ ~~Students use productive team membership skills.~~

~~Grade 4 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~physical activity provides opportunities for social interaction, challenges and fun.~~
- ~~participation in regular physical activity has physical, mental and social benefits.~~
- ~~practice is a basic component for improving sport skills.~~
- ~~rules impact the effective participation in physical activities.~~
- ~~personal and social behavior that shows respect to self and others impacts enjoyment and safety in physical activity settings.~~
- ~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~
- ~~principles and techniques are used to improve physical fitness.~~

~~Big Idea: Lifetime Physical Wellness (Physical Education) – Continued~~

~~Grade 4 Skills and Concepts~~
~~Students will~~

- ~~identify likes and dislikes connected with participating in sports and physical activities; explain how physical activity provides opportunities for enjoyment, challenge, self-expression and social interaction~~
- ~~identify and engage in physical activities that promote physical fitness and health~~
- ~~describe the potential positive and negative (e.g., injury) effects of regular participation in moderate to vigorous physical activities~~
- ~~participate in daily physical activity during and after school~~
- ~~relate the concept of practice to the importance of learning new skills; explain why repeated appropriate practice contributes to increased skill development~~
- ~~when participating in a variety of physical activities and games:~~
  - ~~explain basic rules needed to make games fair~~
  - ~~identify the need for rules in social settings and choose appropriate behaviors~~
  - ~~demonstrate cooperation with partners and small groups~~
- ~~demonstrate and apply the concept of sportsmanship (e.g., complying with rules, responding appropriately) in games, sports and physical activities~~
- ~~explain how rules of play and sportsmanship for spectators and participants during games or activities can make them safe and enjoyable~~
- ~~identify and participate in activities to enhance the health related fitness components (e.g., aerobic capacity/cardio-respiratory endurance, muscular endurance, muscular strength and flexibility)~~
- ~~identify the components of fitness (muscular strength, muscular endurance, flexibility, body composition, cardio-respiratory endurance); describe the meaning of F.I.T.T. Principle (Frequency, Intensity, Type, Time)~~

~~Kentucky Academic Standards – Practical Living – Fifth Grade~~

~~The health program in the 5th grade should provide opportunities for students to build upon the knowledge, skills and practices learned in the fourth grade health education program. Continued acquisition of health knowledge enables students to make a smooth transition to the middle grades and prepares them to assume more responsibility for their own health.~~

~~Health literacy in the 5th grade program further develops an understanding of the body functions as well as behaviors and decisions that foster life-long health. Students in 5th grade health education focus on responsibility for personal health throughout the life cycle as related to good nutritional health and safety practices, decision-making skills, disease prevention and benefits of exercise. Other topics included are community resources, prevention of violence and substance abuse.~~

~~Students in 5th grade apply movement principles and concepts to enhance their movement performance, personal fitness and game strategy and tactics. They develop proficiency in games and dance. Students demonstrate specialized skills alone, with a partner or in a small group. They access and use resources to improve personal fitness as they exhibit a physically active lifestyle. Students continue to develop responsible personal and social behaviors as they work with others in safe and respectful ways.~~

~~Students in the 5th grade program are actively engaged in physical activity with developmentally appropriate instruction for effective learning to take place. The major goal for physical education at this level is to inspire children to be active for life.~~

~~The Health and Physical Education content standards at the 5th grade level are directly aligned with Kentucky's~~ ~~**Academic Expectations**~~~~. The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~2.29~~ ~~Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.32~~ ~~Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~Grade 5 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~maintaining a healthy lifestyle is an individual's responsibility.~~
- ~~physical, emotional and social changes are normal in the growth and development process.~~
- ~~social interaction skills can influence an individual's physical, mental and emotional health and affect relationships.~~
- ~~physical, social, mental and emotional health are impacted by the environment, lifestyle, family history, peers and other factors.~~
- ~~culture, media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal health.~~
- ~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
- ~~positive health habits prevent the spreading of diseases and injuries to self and others.~~
- ~~self-management and coping strategies can enhance mental and emotional health.~~
- ~~a variety of resources are available to inform, treat and counsel individuals with physical, mental, social and emotional health needs.~~

~~Grade 5 Skills and Concepts – Personal and Physical Health~~

~~Students will~~

- ~~explain the importance of assuming responsibility for personal health behaviors~~
- ~~determine health goals by identifying personal strengths and weakness~~
- ~~describe how individual behaviors and choices of diet, exercise and rest affect the body~~

~~Grade 5 Skills and Concepts – Growth and Development~~

~~Students will~~

- ~~explain the concept of maturity as it relates to physical, social and emotional development~~
- ~~describe physical, social and emotional changes that occur during preadolescence~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 5 Skills and Concepts – Social, Mental and Emotional Health~~
~~Students will~~

- ~~demonstrate social interaction skills by:~~
  - ~~using appropriate means to express needs, wants and feelings~~
  - ~~using effective social interaction skills (e.g., listening, cooperation, making friends, empathy)~~
  - ~~recommending ways to avoid or reduce stressful situations/harmful behaviors in relationships (e.g. bullying, peer pressure, conflict)~~
- ~~demonstrate the ability to apply a decision-making process to solve health issues and health problems~~
- ~~identify common social and emotional problems (aggression, anxiety, depression)~~
- ~~identify self-management and coping strategies (goal setting, refusal skills, decision making and time management) that enhance health~~

~~Grade 5 Skills and Concepts – Family and Community Health~~
~~Students will~~

- ~~analyze how personal health, health behaviors and use of health services can be influenced by:~~
  - ~~family traditions/values~~
  - ~~technology and media messages~~
  - ~~cultural beliefs~~
  - ~~physical and social environments~~
  - ~~information from peers~~

~~Grade 5 Skills and Concepts – Communicable, Non-Communicable and Chronic Disease Prevention~~
~~Students will~~

- ~~demonstrate an understanding of diseases by:~~
  - ~~describing symptoms and treatments of communicable diseases (cold, strep throat, chicken pox)~~
  - ~~describing symptoms and treatments of non-communicable diseases (asthma, heart disease, diabetes, skin cancer)~~
- ~~investigate family history, environment, lifestyle and other risk factors related to the cause or prevention of disease and other health problems~~
- ~~demonstrate an understanding of how to maintain a healthy body by:~~
  - ~~explaining how body systems work together (e.g., digestive, circulatory and respiratory systems)~~
  - ~~describing ways pathogens from the environment enter the body and body defenses that fight pathogens~~
  - ~~identifying and explaining behaviors that promote personal hygiene (e.g., the use of grooming products) or can affect self and others in the prevention and spread of disease (e.g., hand washing, care of teeth and eyes, covering coughs and sneezes, sun protection)~~
  - ~~describing reasons for regular visits to health care providers~~

~~Grade 5 Skills and Concepts – Alcohol, Tobacco and Other Drugs~~
~~Students will~~

- ~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs by:~~
  - ~~distinguishing between the use and misuse of drugs, alcohol and tobacco and identify the effects each use might have on the body~~
  - ~~describing their effects on physical, mental, emotional and social health (e.g., effects on family life)~~

- ~~identifying illegal drugs (inhalants, marijuana, stimulants, depressants) and describing how their usage affects the body systems~~
- ~~identifying resources available to individuals seeking treatment or counseling for negative behaviors or addictions~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~**2.30** Students evaluate consumer products and services and make effective consumer decisions.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**3.5** Students will demonstrate self-control and self-discipline.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use decision-making process to make informed decisions among options.~~

~~Grade 5 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~proper nutrition is essential to growth and development.~~
- ~~nutrients provide energy for daily living.~~
- ~~resources are available to assist in making nutritional choices.~~

~~Grade 5 Skills and Concepts~~

~~Students will~~

- ~~provide examples of foods that are sources of the six nutrients (protein, carbohydrates, fats, minerals, vitamins, water)~~
- ~~identify the role of nutrients and food sources which are important in the growth and development of healthy bodies~~
- ~~interpret and explain the recommendations of national resources (e.g., Food Guide Pyramid (FGP), Dietary Guidelines for Americans) in making healthful food choices~~
- ~~explain the role of the digestive system in nutrition~~
- ~~explain how the nutritional information provided on food labels impacts dietary choices~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work.~~

~~Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being~~

~~2.33~~ ~~Students demonstrate the skills to evaluate and use services and resources available in their community~~

~~3.2~~ ~~Students will demonstrate the ability to maintain a healthy lifestyle~~

~~4.3~~ ~~Students individually demonstrate consistent, responsive and caring behavior~~

~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others~~

~~5.1~~ ~~Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations~~

~~5.4~~ ~~Students use a decision-making process to make informed decisions among options~~

~~Grade 5 Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
- ~~community and state resources are available to assist in hazardous situations.~~
- ~~proper procedures must be used in emergency situations.~~

~~Grade 5 Skills and Concepts~~

~~Students will~~

- ~~explain and practice safety rules/procedures for crossing streets/highway, riding in cars and on buses and using playground equipment~~
- ~~identify and explain ways to prevent injuries at home and at school (e.g., seat belts, helmets, knee pads, falls, poisonings) for a variety of situations~~
- ~~demonstrate school and home safety procedures (e.g., tornado, fire, earthquake drills)~~
- ~~explain and demonstrate the effects injuries have on the body (e.g., skeletal system, skin, eyes)~~
- ~~describe proper procedures (e.g., calling 911, Heimlich maneuver, stop, drop & roll, apply pressure) for dealing with a variety of emergency situations (e.g., choking, bleeding, burns and broken bones)~~
- ~~explain safety practices (e.g., use of seatbelts/helmets/life vests) for dealing with a variety of health hazards (e.g., crossing the street, talking to strangers, dealing with threatening situations) while at home, school and play~~
- ~~describe how to avoid dangerous situations involving strangers, fires and internet safety~~
- ~~identify the available community and state health and safety agencies and the services they provide (e.g., health department, fire department, state police, hospital transport services)~~
- ~~access and use reliable resources on safety guidelines for avoiding injuries and dangerous situations~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movement's skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Grade 5 Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~spatial awareness, motor skills and movement patterns are needed to perform a variety of physical activities.~~
- ~~movement concepts, principles and strategies apply to the learning and performance of physical activities.~~

~~Grade 5 Skills and Concepts~~
~~Students will~~

- ~~demonstrate a variety of locomotor and combination skills in a movement pattern~~
- ~~use non-locomotor, locomotor and combination skills to demonstrate movements in creative sequences and in simple patterned dances, games and other activities~~
- ~~demonstrate a variety of non-locomotor, locomotor and combination skills while participating in different games and sports~~
- ~~develop manipulative skills of throwing, catching, kicking and striking while developing motor skills (e.g., sliding, running, jumping) for use in games and other activities that lead to more complex games and sports (e.g., football, volleyball, soccer, softball)~~
- ~~demonstrate and explain how movement patterns are influenced by space, force and time~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movement's skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~3.1~~ ~~Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~3.7~~ ~~Students demonstrate the ability to learn on one's own.~~
~~4.2~~ ~~Students use productive team membership skills.~~

~~Grade 5 Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~physical activity provides opportunities for social interaction, challenges, and fun.~~
- ~~participation in regular physical activity has physical, mental and social benefits.~~
- ~~practice is a basic component for improving sport skills.~~
- ~~rules impact the effective participation in physical activities.~~
- ~~personal and social behavior that shows respect to self and others impacts enjoyment and safety in physical activity settings.~~
- ~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~
- ~~fitness principles and techniques are used to improve/maintain physical health.~~

~~Big Idea: Lifetime Physical Wellness (Physical Education) – Continued~~

~~Grade 5 Skills and Concepts~~
~~Students will~~

- ~~explain how physical activity provides opportunities for enjoyment, challenge, self-expression and social interaction~~
- ~~explore a variety of physical activities in order to determine like and dislikes of games, sports and other activities~~
- ~~identify and explain health benefits that result from regular participation in physical activity~~
- ~~describe how physical activity is related to emotion/mental health~~
- ~~participate in daily physical activity during and after school~~
- ~~investigate the role of practice for successful participation in physical activity; explain why repeated appropriate practice contributes to increased skill development~~
- ~~investigate personal skill proficiency through a variety of tasks and explain why some skills are more developed than others~~
- ~~when participating in a variety of physical activities and games:~~
  - ~~explain the need for rules in social settings~~
  - ~~recognize and use appropriate safety principles, rules, procedures and etiquette~~
- ~~demonstrate appropriate behaviors of sportsmanship, cooperation, teamwork and conflict resolution in physical activity settings~~
- ~~explain how rules of play and sportsmanship for spectators and participants during games and/or activities make them safe and enjoyable~~
- ~~describe and demonstrate the health related fitness components (muscular strength, muscular endurance, flexibility, body composition, cardio respiratory endurance)~~
- ~~explain the meaning of F.I.T.T. Principle (Frequency, Intensity, Type, Time) as it relates to fitness~~
- ~~identify lifetime physical activities (e.g., biking, swimming) that meet requirements for improving fitness~~

INTERMEDIATE SCIENCE

The Kentucky Academic Standards for Science are written as a set of performance expectations that are assessable statements of what students should know and be able to do. An underlying assumption of these standards is that all students should be held accountable for demonstrating their achievement of all performance expectations. A coherent and complete view of what students should be able to do comes when the performance expectations are viewed in tandem with the contents of the foundation boxes that lie just below the performance expectations. These three boxes include the practices, core disciplinary ideas, and crosscutting concepts, derived from the National Research Council's *Framework for K12 Science Education* that were used to construct this set of performance expectations.

Science and Engineering Practices. The blue box on the left includes just the science and engineering practices used to construct the performance expectations in the box above. These statements are derived from and grouped by the eight categories detailed in the *Framework* to further explain the science and engineering practices important to emphasize in each grade band. Most sets of performance expectations emphasize only a few of the practice categories; however, all practices are emphasized within a grade band.

Disciplinary Core Ideas (DCIs). The orange box in the middle includes statements that are taken from the *Framework* about the most essential ideas in the major science disciplines that all students should understand during 13 years of school. Including these detailed statements was very helpful to the writing team as they analyzed and "unpacked" the disciplinary core ideas and sub-ideas to reach a level that is helpful in describing what each student should understand about each sub-idea at the end of grades 2, 5, 8, and 12. Although they appear in paragraph form in the *Framework*, here they are bulleted to be certain that each statement is distinct.

Crosscutting Concepts. The green box on the right includes statements derived from the *Framework's* list of crosscutting concepts, which apply to one or more of the performance expectations in the box above. Most sets of performance expectations limit the number of crosscutting concepts so as focus on those that are readily apparent when considering the DCIs; however, all are emphasized within a grade band. Aspects of the Nature of Science relevant to the standard are also listed in this box, as are the interdependence of science and engineering, and the influence of engineering, technology, and science on society and the natural world.

Connection Boxes

Three Connection Boxes, below the Foundation Boxes, are designed to support a coherent vision of the standards by showing how the performance expectations in each standard connect to other performance expectations in science, [~~as well as to the KAS standards in Mathematics and English/Language Arts~~.] The ***two[*** ~~three~~] boxes include:

- Connections to other DCIs in this grade level or band. This box contains the names of science topics in other disciplines that have related disciplinary core ideas at the same grade level. For example, both Physical Science and Life Science performance expectations contain core ideas related to Photosynthesis, and could be taught in relation to one another.

- Articulation of DCIs across grade levels. This box contains the names of other science topics that either 1) provide a foundation for student understanding of the core ideas in this set of performance expectations (usually at prior grade levels) or 2) build on the foundation provided by the core ideas in this set of performance expectations (usually at subsequent grade levels).

- ~~[Connections to the Kentucky Academic Standards in mathematics and English/Language Arts. This box contains the coding and names of pre-requisite or co-requisite Kentucky Academic Standards in English Language Arts & and Literacy and Mathematics that align to the performance expectations. An effort has been made to ensure that the mathematical skills that students need for science were taught in a previous year where possible.]~~

4. Energy

4. Energy

Students who demonstrate understanding can:

4-PS3-1. **Use evidence to construct an explanation relating the speed of an object to the energy of that object.** [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]

4-PS3-2. **Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.** [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-3. **Ask questions and predict outcomes about the changes in energy that occur when objects collide.** [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-4. **Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*** [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]

4-ESS3-1. **Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.** [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; nonrenewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.
- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
- Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)
- Apply scientific ideas to solve design problems. (4-PS3-4)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.
- Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)

Disciplinary Core Ideas

PS3.A: Definitions of Energy
- The faster a given object is moving, the more energy it possesses. (4-PS3-1)
- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3)

PS3.B: Conservation of Energy and Energy Transfer
- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3)
- Light also transfers energy from place to place. (4-PS3-2)
- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4)

PS3.C: Relationship Between Energy and Forces
- When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)

PS3.D: Energy in Chemical Processes and Everyday Life
- The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)

ESS3.A: Natural Resources
- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)

ETS1.A: Defining Engineering Problems
- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).
- Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. *(secondary to 4-PS3-4)*

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are
- routinely identified and used to explain change. (4-ESS3-1)

Energy and Matter
- Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2),(4-PS3-3),(4-PS3-4)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1)

Influence of Engineering, Technology, and Science on Society and the Natural World
- Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)
- Engineers improve existing technologies or develop new ones. (4-PS3-4)

Connections to Nature of Science

Science is a Human Endeavor
- Most scientists and engineers work in teams. (4-PS3-4)
- Science affects everyday life. (4-PS3-4)

Connections to other DCIs in fourth grade: N/A

Articulation of DCIs across grade-levels: **K.PS2.B** (4-PS3-3); **K.ETS1.A** (4-PS3-4); **2.ETS1.B** (4-PS3-4); **3.PS2.A** (4-PS3-3); **5.PS3.D** (4-PS3-4); **5.LS1.C** (4-PS3-4); **5.ESS3.C** (4-ESS3-1); **MS.PS2.A** (4-PS3-3); **MS.PS2.B** (4-PS3-2); **MS.PS3.A** (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4); **MS.PS3.B** (4-PS3-2),(4-PS3-3),(4-PS3-4); **MS.PS3.C** (4-PS3-3); **MS.PS3.D** (4-ESS3-1); **MS.PS4.B** (4-PS3-2); **MS.ESS2.A** (4-ESS3-1); **MS.ESS3.A** (4-ESS3-1); **MS.ESS3.C** (4-ESS3-1); **MS.ESS3.D** (4-ESS3-1); **MS.ETS1.B** (4-PS3-4); **MS.ETS1.C** (4-PS3-4)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS3-1)~~
~~**RI.4.3** Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1)~~
~~**RI.4.9** Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. *(4-PS3-1)*~~
~~**W.4.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)~~
~~***W.4.7*** Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2),(4-PS3-3),(4-PS3-4),*(4-ESS3-1)*~~
~~**W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4),(4-ESS3-1)~~
~~***W.4.9*** Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1),*(4-ESS3-1)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(4-ESS3-1)*~~
~~**MP.4** Model with mathematics. *(4-ESS3-1)*~~
~~**4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-1)~~
~~**4.OA.A.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. *(4-PS3-4)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

4. Waves: Waves and Information

<table>
<tr><td colspan="3">4. Waves: Waves and Information</td></tr>
<tr><td colspan="3">Students who demonstrate understanding can:
4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]
4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.* [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]</td></tr>
<tr><td colspan="3">The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:</td></tr>
<tr><td>Science and Engineering Practices</td><td>Disciplinary Core Ideas</td><td>Crosscutting Concepts</td></tr>
<tr><td>Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
• Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
• Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
• Science findings are based on recognizing patterns. (4-PS4-1)</td><td>PS4.A: Wave Properties
• Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2). (4-PS4-1)
• Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

PS4.C: Information Technologies and Instrumentation
• Digitized information transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)

ETS1.C: Optimizing The Design Solution
• Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)</td><td>Patterns
• Similarities and differences in patterns can be used to sort and classify natural phenomena. (4-PS4-1)
• Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
• Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)</td></tr>
<tr><td colspan="3">Connections to other DCIs in fourth grade: 4.PS3.A (4-PS4-1); 4.PS3.B (4-PS4-1); 4.ETS1.A (4-PS4-3)</td></tr>
<tr><td colspan="3">Articulation of DCIs across grade-levels: K.ETS1.A (4-PS4-3); 1.PS4.C (4-PS4-3); 2.ETS1.B (4-PS4-3); 2.ETS1.C (4-PS4-3); 3.PS2.A (4-PS4-3); MS.PS4.A (4-PS4-1); MS.PS4.C (4-PS4-3); MS.ETS1.B (4-PS4-3)</td></tr>
<tr><td colspan="3">~~[Kentucky Academic Standards Connections: ELA/Literacy –~~
~~RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS4-3)~~
~~RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3)~~
~~SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1)~~
~~Mathematics –~~
~~MP.4 Model with mathematics. (4-PS4-1)~~
~~4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1)]~~</td></tr>
</table>

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

4. Structure, Function, and Information Processing

4. Structure, Function, and Information Processing

Students who demonstrate understanding can:

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model to describe phenomena. (4-PS4-2) • Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Construct an argument with evidence, data, and/or a model. (4-LS1-1)	**PS4.B: Electromagnetic Radiation** • An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) **LS1.A: Structure and Function** • Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) **LS1.D: Information Processing** • Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	**Cause and Effect** • Cause and effect relationships are routinely identified. (4-PS4-2) **Systems and System Models** • A system can be described in terms of its components and their interactions. (4-LS1-1), (LS1-2)

Connections to other DCIs in this grade-level: N/A

Articulation of DCIs across grade-levels: **1.PS4.B** (4-PS4-2); **1.LS1.A** (4-LS1-1); **1.LS1.D** (4-LS1-2); **3.LS3.B** (4-LS1-1); **MS.PS4.B** (4-PS4-2); **MS.LS1.A** (4-LS1-1),(4-LS1-2); **MS.LS1.D** (4-PS4-2),(4-LS1-2)

~~*Kentucky Academic Standards Connections:*~~
~~*[ELA/Literacy –*~~
~~**W.4.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)~~
~~**SL.4.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. *(4-PS4-2),(4-LS1-2)*~~
~~*Mathematics –*~~
~~**MP.4** Model with mathematics. *(4-PS4-2)*~~
~~**4.G.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. *(4-PS4-2)*~~
~~**4.G.A.3** Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric figures and draw lines of symmetry. *(4-LS1-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea. The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

4. Earth's Systems: Processes that Shape the Earth

4. Earth's Systems: Processes that Shape the Earth

Students who demonstrate understanding can:

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from water to land over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features. [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
- Identify the evidence that supports particular points in an explanation. (4-ESS1-1)
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth
- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

ESS2.A: Earth Materials and Systems
- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

ESS2.B: Plate Tectonics and Large-Scale System Interactions
- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)

ESS2.E: Biogeology
- Living things affect the physical characteristics of their regions. (4-ESS2-1)

ESS3.B: Natural Hazards
- A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) *(Note: This Disciplinary Core Idea can also be found in 3.WC.)*

ETS1.B: Designing Solutions to Engineering Problems
- Testing a solution involves investigating how well it performs under a range of likely conditions. *(secondary to 4-ESS3-2)*

Crosscutting Concepts

Patterns
- Patterns can be used as evidence to support an explanation. (4-ESS1-1),(4-ESS2-2)

Cause and Effect
- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1),(4-ESS3-2)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Science assumes consistent patterns in natural systems. (4-ESS1-1)

Connections to other DCIs in fourth grade: **4.ETS1.C** (4-ESS3-2)

Articulation of DCIs across grade-levels: **K.ETS1.A** (4-ESS3-2); **2.ESS1.C** (4-ESS1-1),(4-ESS2-1); **2.ESS2.A** (4-ESS2-1); **2.ESS2.B** (4-ESS2-2); **2.ESS2.C** (4-ESS2-2); **2.ETS1.B** (4-ESS3-2); **2.ETS1.C** (4-ESS3-2); **3.LS4.A** (4-ESS1-1); **5.ESS2.A** (4-ESS2-1); **5.ESS2.C** (4-ESS2-2); **MS.LS4.A** (4-ESS1-1); **MS.ESS1.C** (4-ESS1-1),(4-ESS2-2); **MS.ESS2.A** (4-ESS1-1),(4-ESS2-2),(4-ESS3-2); **MS.ESS2.B** (4-ESS1-1),(4-ESS2-2); **MS.ESS3.B** (4-ESS3-2); **MS.ETS1.B** (4-ESS3-2)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RI.4.1** Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)~~

~~**RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2)~~

~~**RI.4.9** Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2)~~

~~**W.4.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1),(4-ESS2-1)~~

~~**W.4.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS1-1),(4-ESS2-1)~~

~~***W.4.9*** Draw evidence from literary or informational texts to support analysis, reflection, and research. *(4-ESS1-1)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. *(4-ESS1-1),(4-ESS2-1),(4-ESS3-2)*~~

~~**MP.4** Model with mathematics. *(4-ESS1-1)*,(4-ESS2-1),*(4-ESS3-2)*~~

~~**MP.5** Use appropriate tools strategically. (4-ESS2-1)~~

~~**4.MD.A.1** Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *(4-ESS1-1),(4-ESS2-1)*~~

~~**4.MD.A.2** Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. *(4-ESS2-1),(4-ESS2-2)*~~

~~**4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. *(4-ESS3-2]*)~~

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5. Structure and Properties of Matter

5. Structure and Properties of Matter

Students who demonstrate understanding can:

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that forms new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]

5-PS1-3. Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]

5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Develop a model to describe phenomena. (5-PS1-1)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.
- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4)
- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.
- Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon; the effects of air on larger particles or objects. (5-PS1-1)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)
- Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)

PS1.B: Chemical Reactions
- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)

Scale, Proportion, and Quantity
- Natural objects exist from the very small to the immensely large. (5-PS1-1)
- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2),(5-PS1-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Science assumes consistent patterns in natural systems. (5-PS1-2)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: **2.PS1.A** (5-PS1-1),(5-PS1-2),(5-PS1-3); **2.PS1.B** (5-PS1-2),(5-PS1-4); **MS.PS1.A** (5-PS1-1),(5-PS1-2),(5-PS1-3),(5-PS1-4); **MS.PS1.B** (5-PS1-2),(5-PS1-4)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-PS1-1)*~~
~~**W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. *(5-PS1-2),(5-PS1-3)*,(5-PS1-4)~~
~~**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. *(5-PS1-2),(5-PS1-3)*,(5-PS1-4)~~
~~**W.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. *(5-PS1-2),(5-PS1-3),(5-PS1-4)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(5-PS1-1)*,(5-PS1-2),(5-PS1-3)~~
~~**MP.4** Model with mathematics. *(5-PS1-1)*,(5-PS1-2),(5-PS1-3)~~
~~**MP.5** Use appropriate tools strategically. (5-PS1-2),(5-PS1-3)~~
~~**5.NBT.A.1** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *(5-PS1-1)*~~
~~**5.NF.B.7** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. *(5-PS1-1)*~~
~~**5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. *(5-PS1-2)*~~
~~**5.MD.C.3** Recognize volume as an attribute of solid figures and understand concepts of volume measurement. *(5-PS1-1)*~~
~~**5.MD.C.4** Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units. *(5-PS1-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

5. Matter and Energy in Organisms and Ecosystems

5. Matter and Energy in Organisms and Ecosystems

Students who demonstrate understanding can:

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.]

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Use models to describe phenomena. (5-PS3-1)
- Develop a model to describe phenomena. (5-LS2-1)

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K– 2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
- Support an argument with evidence, data, or a model. (5-LS1-1)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- Science explanations describe the mechanisms for natural events. (5-LS2-1)

Disciplinary Core Ideas

PS3.D: Energy in Chemical Processes and Everyday Life
- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms
- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. *(secondary to 5-PS3-1)*
- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

LS2.A: Interdependent Relationships in Ecosystems
- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

Crosscutting Concepts

Systems and System Models
- A system can be described in terms of its components and their interactions. (5-LS2-1)

Energy and Matter
- Matter is transported into, out of, and within systems. (5-LS1-1)
- Energy can be transferred in various ways and between objects. (5-PS3-1)

Connections to other DCIs in fifth grade: **5.PS1.A** (5-LS1-1),(5-LS2-1);**5.ESS2.A** (5-LS2-1)

Articulation of DCIs across grade-levels: **K.LS1.C** (5-PS3-1),(5-LS1-1); **2.PS1.A** (5-LS2-1); **2.LS2.A** (5-PS3-1),(5-LS1-1); **2.LS4.D** (5-LS2-1); **4.PS3.A** (5-PS3-1); **4.PS3.B** (5-PS3-1); **4.PS3.D** (5-PS3-1); **4.ESS2.E** (5-LS2-1); **MS.PS3.D** (5-PS3-1),(5-LS2-1); **MS.PS4.B** (5-PS3-1); **MS.LS1.C** (5-PS3-1),(5-LS1-1),(5-LS2-1); **MS.LS2.A** (5-LS2-1); **MS.LS2.B** (5-PS3-1),(5-LS2-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-LS1-1)*~~
~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-PS3-1),(5-LS2-1)*~~
~~**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)~~
~~**W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)~~
~~**SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. *(5-PS3-1),(5-LS2-1)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(5-LS1-1),(5-LS2-1)*~~
~~**MP.4** Model with mathematics. *(5-LS1-1),(5-LS2-1)*~~
~~**MP.5** Use appropriate tools strategically. *(5-LS1-1)*~~
~~**5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5-LS1-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

5. Earth's Systems

5. Earth's Systems

Students who demonstrate understanding can:

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an example to describe a scientific principle. (5-ESS2-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)	**ESS2.A: Earth Materials and Systems** • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1) **ESS2.C: The Roles of Water in Earth's Surface Processes** • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2) **ESS3.C: Human Impacts on Earth Systems** • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	**Scale, Proportion, and Quantity** • Standard units are used to measure and describe physical quantities such as weight, and volume. (5-ESS2-2) **Systems and System Models** • A system can be described in terms of its components and their interactions. (5-ESS2-1),(5-ESS3-1) --- ***Connections to Nature of Science*** **Science Addresses Questions About the Natural and Material World** • Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: **2.ESS2.A** (5-ESS2-1); **2.ESS2.C** (5-ESS2-2); **3.ESS2.D** (5-ESS2-1); **4.ESS2.A** (5-ESS2-1); **MS.ESS2.A** (5-ESS2-1); **MS.ESS2.C** (5-ESS2-1),(5-ESS2-2); **MS.ESS2.D** (5-ESS2-1); **MS.ESS3.A** (5-ESS2-2),(5-ESS3-1); **MS.ESS3.C** (5-ESS3-1); **MS.ESS3.D** (5-ESS3-1)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-ESS3-1)*~~
~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-ESS2-1),(5-ESS2-2)*,(5-ESS3-1)~~
~~**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1)~~
~~**W.5.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. *(5-ESS2-2)*,(5-ESS3-1)~~
~~***W.5.9*** Draw evidence from literary or informational texts to support analysis, reflection, and research. *(5-ESS3-1)*~~
~~**SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. *(5-ESS2-1),(5-ESS2-2)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(5-ESS2-1)*,(5-ESS2-2),*(5-ESS3-1)*~~
~~**MP.4** Model with mathematics. *(5-ESS2-1)*,(5-ESS2-2),*(5-ESS3-1)*~~
~~**5.G.2** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. *(5-ESS2-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

5. Space Systems: Stars and the Solar System

5. Space Systems: Stars and the Solar System

Students who demonstrate understanding can:

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]

5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. (5-PS2-1),(5-ESS1-1)	**PS2.B: Types of Interactions** • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1) **ESS1.A: The Universe and its Stars** • The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1) **ESS1.B: Earth and the Solar System** • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)	**Patterns** • Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2) **Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1) **Scale, Proportion, and Quantity** • Natural objects exist from the very small to the immensely large. (5-ESS1-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: **1.ESS1.A** (5-ESS1-2); **1.ESS1.B** (5-ESS1-2); **3.PS2.A** (5-PS2-1),(5-ESS1-2); **3.PS2.B** (5-PS2-1); **MS.PS2.B** (5-PS2-1)**; MS.ESS1.A** (5-ESS1-1),(5-ESS1-2)**; MS.ESS1.B** (5-PS2-1),(5-ESS1-1),(5-ESS1-2); **MS.ESS2.C** (5-PS2-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-PS2-1),(5-ESS1-1)*~~

~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-ESS1-1)*~~

~~**RI.5.8** Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). *(5-ESS1-1)*~~

~~**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-PS2-1),(5-ESS1-1)~~

~~**W.5.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1),(5-ESS1-1)~~

~~**SL.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. *(5-ESS1-2)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. *(5-ESS1-1)*,(5-ESS1-2)~~

~~**MP.4** Model with mathematics. (5-ESS1-1),(5-ESS1-2)~~

~~**5.NBT.A.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *(5-ESS1-1)*~~

~~**5.G.A.2** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2)]~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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3-5. Engineering Design

3-5. Engineering Design

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

ETS1.C: Optimizing the Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

Crosscutting Concepts

Influence of Science, Engineering, and Technology on Society and the Natural World

- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)
- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

Connections to 3-5-ETS1.A: Defining and Delimiting Engineering Problems include:
Fourth Grade: 4-PS3-4
Connections to 3-5-ETS1.B: Designing Solutions to Engineering Problems include:
Fourth Grade: 4-ESS3-2
Connections to 3-5-ETS1.C: Optimizing the Design Solution include:
Fourth Grade: 4-PS4-3

Articulation of DCIs across grade-bands: **K-2.ETS1.A** (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); **K-2.ETS1.B** (3-5-ETS1-2); **K-2.ETS1.C** (3-5-ETS1-2),(3-5-ETS1-3); **MS.ETS1.A** (3-5-ETS1-1); **MS.ETS1.B** (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); **MS.ETS1.C** (3-5-ETS1-2),(3-5-ETS1-3)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RI.5.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(3-5-ETS-2)*~~
~~**RI.5.7** Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(3-5-ETS-2)*~~
~~**RI.5.9** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS-2)~~
~~**W.5.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1),(3-5-ETS1-3)~~
~~***W.5.8*** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. *(3-5-ETS1-1),(3-5-ETS1-3)*~~
~~***W.5.9*** Draw evidence from literary or informational texts to support analysis, reflection, and research. *(3-5-ETS1-1),(3-5-ETS1-3)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**MP.4** Model with mathematics. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**MP.5** Use appropriate tools strategically. *(3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3)*~~
~~**3-5.OA** Operations and Algebraic Thinking *(3-5-ETS1-1),(3-5-ETS1-2)]*~~

INTERMEDIATE SOCIAL STUDIES

Kentucky Academic Standards – Social Studies – Fourth Grade

Social studies in the intermediate grades has a different level/grade context each year. For example, grade four focuses on Kentucky studies and regions of the United States. Grade five includes an integrated focus on United States history. Regardless of the level/grade context, students incorporate each of the five areas of social studies in an integrated fashion to explore the content.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the intermediate level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five "Big Ideas" that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics allows students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 and Students understand the democratic principles of justice, equality, responsibility, and freedom apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- the government of Kentucky was formed to establish order, provide security and accomplish common goals.
- the Constitution of Kentucky establishes a government of limited powers that are shared among different levels and branches.
- all citizens of Kentucky have rights and responsibilities as members of a democratic society, including civic participation.
- fundamental values and principles of American representative democracy are expressed in Kentucky's Constitution.

Grade 4 Skills and Concepts

Students will

- demonstrate an understanding of the nature of government:
  - explore basic functions of state government (e.g., to establish order, to provide security and to accomplish common goals)
  - explain and give examples of services state governments provide (e.g., state police and fire protection, state parks, highway maintenance, snow removal)
  - describe how the state government provides services to its citizens (e.g., collecting taxes)
  - describe the structure of state government (e.g., the executive, legislative and judicial branches) and explain why power is shared among different branches
  - investigate and give examples of state laws and explain their purpose
- explore rights and responsibilities:
  - describe, give examples, and compare rights and responsibilities
  - describe the benefits of citizenship and find examples of citizenship in current events/news media
- use information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental) to explain basic democratic principles (e.g. life, liberty, pursuit of safety and happiness, acquiring and protecting property) found in Kentucky's Constitution

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals connecting all cultures. Culture influences viewpoints, rules and institutions in a global society.
Students should understand that people form cultural groups throughout the United States and the World and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.
- cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior and respond to human needs.
- interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.
- a variety of factors promote cultural diversity in the state of Kentucky.
- an appreciation of the diverse complexity of cultures is essential to interact effectively and work cooperatively with the many diverse ethnic and cultural groups of today.

Grade 4 Skills and Concepts

Students will

- develop an understanding of the nature of culture:
  - explore and compare cultural elements (e.g., beliefs, traditions, languages, skills, literature, the arts) of diverse groups (e.g., Native Americans and early settlers) in the early settlement of Kentucky
  - examine the influences/contributions of diverse groups in Kentucky
- investigate social institutions (e.g., family, government, economy, education, religion) in Kentucky
  and explain their functions
- describe conflicts that occurred between diverse groups (e.g., Native Americans and the early settlers) in the settlement of Kentucky
- investigate and compare culture/cultural events of diverse groups in Kentucky today with the past
  using information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental)

Big Idea: Economics

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others and the nation as a whole.

The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- the basic economic problem confronting individuals and groups in Kentucky today is scarcity; as a result of scarcity, economic choices and decisions must be made.
- a variety of fundamental economic concepts impact individuals and groups.
- economic institutions are created to help individuals, groups and businesses accomplish common goals.
- markets enable buyers and sellers to exchange goods and services.
- production and distribution of goods and services have changed over time in Kentucky.
- individuals, groups and businesses demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.

Grade 4 Skills and Concepts

Students will

- develop an understanding of the nature of limited resources and scarcity:
  - use a variety of sources to research and give examples of productive resources (e.g., natural,
    human, capital) found in regions of Kentucky
  - explain why individuals, groups, and businesses must make economic decisions due to the scarcity of resources
  - investigate banks in Kentucky; explain and give examples of the roles banks play (e.g., loan money, save money) in helping people deal with scarcity
  - investigate and give examples of markets (past and present); and explain how goods and services were/are exchanged
- use a variety of sources to investigate and trace change over time (e.g., draw, chart, map, timeline) in the production, distribution, and consumption of goods and services (e.g., products made in Kentucky)
- investigate and give examples of specialization and explain how it promotes trade between places and regions of the United States (e.g., Kentucky imports and exports, Midwest exports corn, South exports citrus)

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- the use of geographic tools (e.g., maps, globes, charts, graphs) and mental maps help interpret information, understand and analyze patterns, spatial data and geographic issues.
- patterns emerge as humans move, settle and interact on Earth's surface and can be identified by examining the location of physical and human characteristics, how they are arranged and why they are in particular locations. Economic, political, cultural and social processes interact to shape patterns of human populations, interdependence, cooperation and conflict.
- regions help us to see Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups.
- people depend on, adapt to, or modify the environment to meet basic needs. Human actions modified the physical environment and in turn, the physical environment limited and/or promoted human activities in the settlement of Kentucky.

Grade 4 Skills and Concepts

Students will

- demonstrate an understanding of patterns on the Earth's surface, using a variety of geographic tools (e.g., maps, globes, charts, graphs):
  - locate and describe major landforms, bodies of water and natural resources located in regions of Kentucky and the United States
  - locate, in absolute and relative terms, major landforms and bodies of water in regions of Kentucky and the United States
  - analyze and compare patterns of movement and settlement in Kentucky
  - explain and give examples of how physical factors (e.g., rivers, mountains) impacted human activities during the early settlement of Kentucky
- use information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental) to investigate regions of Kentucky:
  - compare regions in Kentucky by their human characteristics (e.g., settlement patterns, languages, and religious beliefs) and physical characteristics (e.g., climate, landforms, bodies of water)
  - describe patterns of human settlement in regions of Kentucky and explain relationships between these patterns and the physical characteristics (e.g., climate, landforms, bodies of water) of the region
  - explain the influence of the physical characteristics of regions (e.g., climates, landforms, bodies of water) on decisions that were made about where to locate things (e.g., factories stores, bridges)
  - analyze how advances in technology (e.g., dams, roads, irrigation) have allowed people to settle in places previously inaccessible (Kentucky)
- investigate interactions among human activities and the physical environment in regions of Kentucky:
  - explain how people modified the physical environment (e.g., dams, roads, bridges) to meet their needs
  - describe how the physical environment (e.g., mountains as barriers or protection, rivers as barriers or transportation) promoted and/or restricted human activities (e.g., exploration, migration, trade, settlement, development) and land use in Kentucky

Big Idea: Historical Perspective

History is an account of events, people, ideas, and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns, and events, and how individuals and societies have changed over time in Kentucky, the United States, and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- history is an account of human activities that is interpretive in nature and a variety of tools (e.g., primary and secondary sources) are needed to analyze and understand historical events.
- the history of Kentucky can be analyzed by examining the connected events shaped by multiple cause-effect relationships, tying past to present.
- the history of Kentucky has been impacted by significant individuals, groups and advances in technology.

Grade 4 Skills and Concepts

Students will

- demonstrate an understanding of the nature of history using a variety of tools (e.g., primary and secondary sources):
    - investigate and chronologically describe (e.g., timelines, charts) significant events in Kentucky history, from early development as a territory to development as a state
    - interpret and describe events in Kentucky's history in terms of their importance
    - examine cause and effect relationships that influenced Kentucky's history
    - explain reasons that different groups of people explored and settled in Kentucky
    - investigate the influences/contributions of diverse groups to the culture of Kentucky today
- use information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental):
    - examine and compare factual and fictional accounts of historical events in Kentucky's history
    - investigate change over time (e.g., transportation, communication, education, technology, lifestyles and conditions) in Kentucky's history
    - describe the significance of historical documents, symbols, and songs related to Kentucky's history (e.g., Kentucky's Constitution, state flag, state song)

Kentucky Academic Standards – Social Studies – Fifth Grade

Social studies in the intermediate grades has a different level/grade context each year. For example, grade four focuses on Kentucky studies and regions of the United States. Grade five includes an integrated focus on United States history. Regardless of the level/grade context, students incorporate each of the five areas of social studies in an integrated fashion to explore the content.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the intermediate level are directly aligned with Kentucky's Academic Expectations. Social Studies standards are organized around five “Big Ideas” that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure and the role of citizens. Understanding the historical development of structures of power, authority and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- the government of the United States was developed from a colonial base of representative democracy by people who envisioned an independent country and new purposes for the government.
- the United States Government was formed to establish order, provide security and accomplish common goals.
- the fundamental values and principles (e.g., liberty, justice, individual human dignity) of American representative democracy are expressed in historical documents (e.g., the Declaration of Independence, the Constitution of the United States, including the Preamble and the Bill of Rights).
- the Constitution of the United States establishes a government of limited powers that are shared among different levels and branches.
- as members of a democratic society, all citizens of the United States have certain rights and responsibilities, including civic participation.

Grade 5 Skills and Concepts

Students will

- demonstrate an understanding of government, using information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental):
  - investigate the basic functions of the United States Government, as defined in the Preamble to the U.S. Constitution, (e.g., establish justice, ensure domestic tranquility, provide for the common defense, promote the general welfare, secure the blessings of liberty) and explain their significance today
  - explain how democratic governments work to promote the "common good" (e.g., making, enacting, enforcing laws that protect rights and property of all citizens)

- describe the basic duties of the three branches of government (executive, legislative, judicial); explain why the framers of the U.S. Constitution felt it was important to establish a government with limited powers that are shared among different branches and different levels (e.g., local, state, federal)
- analyze information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental) to describe fundamental values and principles of American representative democracy (e.g., liberty, justice) found in the Declaration of Independence and the U.S. Constitution; explain their significance today
- investigate the rights and responsibilities of U.S. citizens:
  - describe and give examples of specific rights guaranteed to all U.S. citizens in the Bill of Rights (e.g., freedom of religion, freedom of speech, freedom of press) and explain why they are important today
  - describe some of the responsibilities U.S. citizens have in order for democratic governments to function effectively (e.g. voting, community service, paying taxes) and find examples of civic participation in current events/news (e.g., television, radio, articles, Internet)

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals connecting all cultures. Culture influences viewpoints, rules, and institutions in a global society.
Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.
- cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior and respond to human needs.
- interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.
- a variety of factors promote cultural diversity in a society, nation and world.
- an understanding and appreciation of the diverse complexity of cultures is essential to interact effectively and work cooperatively with the many diverse ethnic and cultural groups of today.

Grade 5 Skills and Concepts

Students will

- demonstrate an understanding of culture and cultural elements (e.g., beliefs, traditions, languages, skills, literature, the arts) of diverse groups:
  - investigate cultural similarities and differences of diverse groups (e.g., English, French, Spanish and Dutch Colonists, West Africans, Immigrants of the 1800's) during the early development of the United States
  - research the contributions of diverse groups to the culture (e.g., beliefs, traditions, literature, the arts) of the United States today
  - investigate factors that promoted cultural diversity in the history of the United States
- examine social institutions (e.g., family, religion, education, government, economy) in the United States and explain their functions
- describe conflicts that occurred among and between diverse groups (e.g., Native Americans and the early Explorers, Native Americans and the Colonists, the British Government and the English Colonists, Native Americans and the U.S. Government) during the settlement of the United States; explain the causes of these conflicts and the outcomes
- describe causes of conflicts between individuals and/or groups today and give examples of how to resolve them peacefully

Big Idea: Economics

Economics includes the study of production, distribution, and consumption of goods and services. Students need to understand how their economic decisions affect them, others, and the nation as a whole. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- the basic economic problem confronting individuals, groups and businesses in the United States today is scarcity: as a result of scarcity, economic choices and decisions must be made.
- a variety of fundamental economic concepts (e.g., supply and demand, opportunity cost) impact individuals, groups and businesses in the United States today.
- economic institutions are created to help individuals, groups and businesses accomplish common goals.
- markets enable buyers and sellers to exchange goods and services.
- production, distribution and consumption of goods and services have changed over time in the United States.
- individuals, groups and businesses in the United States demonstrate interdependence as they make economic decisions about the use of resources (e.g., natural, human, capital) in the production, distribution, and consumption of goods and services.

Grade 5 Skills and Concepts

Students will

- demonstrate an understanding using information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental) of the connection between resources, limited productive resources and scarcity:
  - investigate different kinds of resources (e.g., natural, human, capital)
  - explain how individuals and groups in the United States make economic decisions based upon limited productive resources (natural, human, capital) and give examples of how these decisions create interdependence between individuals, groups and businesses
- demonstrate an understanding of how people deal with scarcity; explain the roles banks play in helping people deal with scarcity (e.g., loan money, save money, lines of credit, interest-bearing accounts)
- demonstrate an understanding of markets:
  - explain how goods and services are/were exchanged
  - investigate and give examples of markets; explain how markets have changed over time during the history of the United States
- use a variety of sources:
  - investigate and trace (e.g., write, draw, chart, timeline) change over time in the production, distribution and consumption of goods and services in the United States
  - research specialization in the United States; explain how specialization promotes trade between individuals, groups and businesses in the United States and world; describe the impact of specialization on the production of goods in the United States

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- the use of geographic tools (e.g., maps, globes, charts, graphs) and mental maps help interpret information, understand and analyze patterns, spatial data and geographic issues.
- patterns emerge as humans move, settle and interact on Earth's surface and can be identified by examining the location of physical and human characteristics, how they are arranged and why they are in particular locations. Economic, political, cultural and social processes interact to shape patterns of human populations, interdependence, cooperation and conflict.
- regions help us to see Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups.
- people depend on, adapt to, and/or modify the environment to meet basic needs. Human actions modified the physical environment and in turn, the physical environment limited and/or promoted human activities in the settlement of the United States.

Grade 5 Skills and Concepts

Students will

- demonstrate an understanding of patterns on the Earth's surface, using a variety of geographic tools (e.g., maps, globes, charts, graphs):
    - locate, in absolute or relative terms, major landforms and bodies of water in the United States
    - locate and explain patterns on Earth's surface (e.g., how different factors such as rivers, mountains and plains impact where human activities are located)
- investigate regions on the Earth's surface and analyze information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental):
    - explain how places and regions in the U.S. are defined by their human characteristics (e.g., language, settlement patterns, religious beliefs) and physical characteristics (e.g., climate, landforms, bodies of water)
    - locate and describe patterns of human settlement and explain how these patterns were influenced by the physical characteristics (e.g., climate, landforms, bodies of water) of places and regions in the United States
    - investigate how advances in technology (e.g., dams, roads, air conditioning, irrigation) over time have allowed people to settle in places previously inaccessible in the United States
- investigate how humans modify the physical environment:
    - describe how people modified the physical environment (e.g., dams, roads, bridges) to meet their needs during the early settlement of the United States
    - analyze how the physical environment (e.g., mountains as barriers or protection, rivers as barriers or transportation) promoted and restricted human activities during the early settlement of the United States
    - explain how different perspectives of individuals and groups impact decisions about the use of land (e.g., farming, industrial, residential, recreational) in the United States

Big Idea: Historical Perspective

History is an account of events, people, ideas, and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments, and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States, and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- history is an account of human activities that is interpretive in nature. A variety of tools (e.g., primary and secondary sources) are needed to understand and analyze historical events.
- the history of the United States can be analyzed by examining significant eras (*Colonization and Settlement, Revolution and a New Nation, Expansion and Conflict, Industrialization and Immigration and the Twentieth Century*) to develop a chronological understanding and recognize cause and effect relationships and multiple causation, tying past to present.
- the history of the United States has been impacted by significant individuals, groups and advances in technology.
- geography, culture, and economics have a significant impact on historical perspectives and events.

Grade 5 Skills and Concepts

Students will

- demonstrate an understanding of the interpretative nature of history using a variety of tools (e.g., primary and secondary sources):
  - investigate and chronologically describe major events in United States history (e.g., using timelines, charts, fictional and report writing, role playing)
  - explain and draw inferences about the importance of major events in United States history
  - examine cause and effect relationships in the history of the United States; identify examples of multiple causes of major historical events
  - explain reasons that individuals and groups explored and settled in the United States
  - research influences/contributions of diverse groups to the culture (e.g., beliefs, traditions, literature, the arts) of the United States today
- use information from print and non-print sources (e.g., documents, informational passages/texts, interviews, digital and environmental):
  - examine factual and fictional accounts of significant historical events and people in United States history
  - explore change over time (e.g., transportation, communication, education, technology, lifestyles and conditions) in the United States
  - compare reasons (e.g., freedoms, opportunities, fleeing negative situations) immigrants came/come to America
  - investigate the events surrounding patriotic symbols, songs, landmarks (e.g., American flag, Statue of Liberty, the Star-Spangled Banner), and selected readings (e.g., Dr. Martin Luther King's speech: I Have a Dream), and explain their historical significance
- investigate patterns across in U.S. history (e.g., major events/conflicts/culture; compare with major events/conflicts/culture to the present)

INTERMEDIATE TECHNOLOGY

Kentucky Academic Standards – Technology – Intermediate

Technology use in the 21st century has become a vital component of all aspects of life. For students in Kentucky to be contributing citizens, they must receive an education that incorporates technology literacy at all levels. Technology literacy is the ability of students to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century. The Technology Kentucky Academic Standards provides a framework for integrating technology into all content areas. It reflects the basic skills required for each student to be competitive in the global economy.

For students to gain the technology competencies, it is essential that they have access to technology during the school day in all grade levels. Instruction should provide opportunities for students to gain and demonstrate technology skills that build primary through grade 12.

The technology content standards should be integrated into each curricular discipline. The purpose of integrating technology is to help students make useful connections between what they learn in each content area and the real world. Technology knowledge, concepts and skills should be interwoven into lessons or units and taught in partnership with other content areas. Technology lends itself to curriculum integration and team teaching. Technology can enhance learning for all students, and for some it is essential for access to learning.

The technology content standards are organized by grade spans: primary, intermediate, middle, and high. The technology Kentucky Academic Standards at the intermediate level builds upon primary experiences. It continues to build competencies related to technology literacy. Students interpret critique and evaluate digital texts, synthesize information and solve problems. Students create and use technology for developing ideas and opinions, for communicating and collaborating with others and for personal fulfillment. These experiences enhance and extend students' technology skills.

The technology content standards at the intermediate grade span are directly aligned with Kentucky's **Academic Expectations**. Technology standards are organized around three Big Ideas that are important to the discipline of technology. The three Big Ideas in technology are: **1) Information, Communication and Productivity; 2) Safety and Ethical/Social Issues;** and **3) Research, Inquiry/Problem-Solving and Innovation**. The Big Ideas are conceptual organizers for technology. Each grade level span ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of *Enduring Knowledge/Understandings* that represent overarching generalizations linked to the Big Ideas of Technology. The understandings represent the desired results--what learning will focus upon and what knowledge students will be able to explain or apply. *Understandings* can be used to frame development of units of study and lesson plans.

Skills and Concepts describe ways that students demonstrate their learning and are specific to each grade level span. The skills and concepts for technology are fundamental to technology literacy, safe use and inquiry. The skills and concepts build on prior learning.

Big Idea: Information, Communication and Productivity

Students demonstrate a sound understanding of the nature and operations of technology systems.
Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Academic Expectations

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.
3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.
6.1 Students connect knowledge and experiences from different subject areas.
6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences.

Intermediate Enduring Knowledge – Understandings
Students will understand that

- appropriate terminology, computer operations and applications assist in gaining confidence in the use of technology.
- technology requires proper care and maintenance to be used effectively.
- a variety of media is used to support directed and independent learning.
- technology is used to communicate in a variety of ways including global communications.
- technology (e.g. keyboarding, word processing, spreadsheets, presentation) is used effectively and efficiently to accomplish a task.

Intermediate Skills and Concepts – Information
Students will

- investigate different technology devices (e.g., CPU, monitor, keyboard, disk drive, printer, mouse)
- describe the uses of technology (e.g., computers, telephones, cell phones, digital and video cameras, Internet) at home, school and workplace
- use appropriate technology terms (e.g., hardware, software, CD, hard drive)
- explain the use of networks and the need for login procedures (e.g., stand alone, network, file server, LANs network resources)
- demonstrate proper keyboarding techniques, optimal posture and correct hand placement (e.g., home row finger placement) at the computer workstation

Intermediate Skills and Concepts – Communication
Students will

- use technology to communicate in a variety of modes (e.g., audio, speech to text, print, media)
- participate in online group projects and learning activities using technology communications
- create a variety of tasks using technology devices and systems to support authentic learning
- use technology to collect data for content area assignments/projects
- use a variety of tools and formats (oral presentations, journals and multimedia presentations) to summarize and communicate the results of observations and investigations
- use online collaborative tools (e.g., email, videoconferencing)

Intermediate Skills and Concepts – Productivity
Students will

- develop, publish and present information in print and digital formats
- use productivity tools to produce content area assignments/projects

Big Idea: Safety and Ethical/Social Issues

Students understand safe, ethical and social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

Academic Expectations

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.
3.6 Students demonstrate the ability to make decisions based on ethical values.
4.3 Students individually demonstrate consistent, responsive, and caring behavior.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multi- cultural and world view.

Intermediate Enduring Knowledge – Understandings
Students will understand that

- responsible and ethical use of technology is necessary to ensure safety.
- technology is used in collaborative and interactive projects to enhance learning.
- acceptable technology etiquette is essential to respectful social interactions and good citizenship.
- technology is used in jobs and careers to support the needs of the local and global community.
- assistive technology supports learning to ensure equitable access to a productive life.

Intermediate Skills and Concepts – Safety
Students will

- explain the importance of safe Internet use (e.g., iSafe skills)
- apply safe behavior when using technology

Intermediate Skills and Concepts – Ethical Issues
Students will

- investigate basic issues related to responsible use of technology and describe personal consequences of inappropriate use (e.g., plagiarism, intellectual property, copyright and the conditions of Acceptable Usage Policy)
- explore, investigate and practice the use of technology in an appropriate, safe and responsible manner
- use ethical behavior while using technology in personal and community contexts

Intermediate Skills and Concepts – Social Issues
Students will

- use technology to collaborate and engage in interactive projects with others (e.g., local, national and global) and credit all participants for their contribution to the work
- use proper social etiquette with any technology (e.g., email, blogs, IM, telephone, help desk)
- investigate how assistive technologies supports learning
- explain how technology has had an influence on our world
- explain how technology supports career options and lifelong learning

Big Idea: Research, Inquiry/Problem-Solving and Innovation

Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Academic Expectations

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.
2.3 Students identify and analyze systems and the ways their components work together or affect each other.
5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.
5.2 Students use creative thinking skills to develop or invent novel, constructive ideas or products.
5.4 Students use a decision-making process to make informed decisions among options.
5.5 Students use problem-solving processes to develop solutions to relatively complex problems.
6.1 Students connect knowledge and experiences from different subject areas.

Intermediate Enduring Knowledge – Understandings

Students will understand that

- technology assists in gathering, organizing and evaluating information from a variety of sources to answer essential questions.
- technology supports critical thinking skills used in inquiry/problem solving to make informed decisions.
- technology is used to produce an innovative product or system.

Intermediate Skills and Concepts – Research

Students will

- gather and use accurate information from a variety of electronic sources (e.g. teacher-selected web sites, CDROM, encyclopedias and automated card catalog, online virtual library; word processing, database, spreadsheet) in all content areas
- correctly cite sources
- evaluate the accuracy, relevance, appropriateness, comprehensiveness and bias of electronic information sources
- use technology tools to process data and report results
- use content-specific tools to enhance understanding of content (e.g., environmental probes, sensors, robotics, simulation software and measuring devices)

Intermediate Skills and Concepts – Inquiry/Problem-solving

Students will

- determine which technology is useful and select the appropriate tool(s) (e.g., calculators, data collection probes, videos, educational software) to inquire/problem- solve in self-directed and extended learning
- use technology to solve problems using critical thinking and problem-solving strategies
- solve content-specific problems using a combinations of technologies

Intermediate Skills and Concepts – Innovation

Students will

- use technology to organize and develop creative solutions, ideas or product

INTERMEDIATE VOCATIONAL STUDIES

Kentucky Academic Standards – Vocational Studies – Fourth Grade

The vocational studies program at the fourth grade develops an awareness of careers. This awareness includes the purpose of having a job, concepts of consumer decision-making, saving money, and connections between work and learning. The challenge is to empower students to make a connection between school and the world of work and to be productive citizens.

The fourth grade level provides appropriate opportunities for students to be involved in activities designed to develop an appreciation of work and an awareness of self and jobs/careers. They should examine the relationship between school studies and work; this will enable them to make vital connections that will give meaning to their learning. Elementary students should begin to develop work habits, study skills, team skills and set short-term goals.

The vocational studies program at the fourth grade includes active, hands-on work with concrete materials and appropriate technologies. Although the vocational studies program for fourth grade is divided into five areas, each area is designed to interact with the others in an integrated fashion. Because of this integration, students are able to develop broad conceptual understandings in vocational studies. All content teachers are responsible for providing instruction in the vocational studies area.

The vocational studies content standards at the fourth grade are directly aligned with Kentucky's **Academic Expectations.** The vocational studies standards are organized around five "Big Ideas" that are important to the discipline of Vocational Studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school career to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for vocational studies are fundamental to career awareness and builds on prior learning.

Academic Expectations 2.36 and 2.37 bring forward the career awareness in Vocational Studies. Vocational Studies provide a connection to Kentucky Learning Goal 3 (become self-sufficient individual) and Learning Goal 4 (become a responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
Students demonstrate the skills to evaluate and use services and resources available in their community.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- fundamental economic concepts are important for consumer decision-making.
- consumer decisions are influenced by economic and social factors.
- values have a role in making consumer decisions.
- consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.
- an individual has multiple life roles that impact responsibility to be a valuable family and community member.

Grade 4 Skills and Concepts

Students will

- investigate economic concepts and why they are important for consumer decisions by:
  - examining how individuals and families make choices to satisfy needs and wants as they relate to consumer decisions
  - explain bartering, and how money makes it easier for people to get things they want
  - determining ways in which goods and services used by families impact the environment
- describe how culture, media and technology can influence consumer decisions by:
  - comparing and evaluating products and services based on major factors (e.g., price, quality, features) when making consumer decisions
  - describing how different types of media, technology and advertising impact the family and consumer decision-making
  - identify ways in which consumer decisions (e.g., buying and selling) affect families and friends
- identify ways that individuals have rights and responsibilities as a consumer
- evaluate consumer actions (e.g., reusing, reducing, recycling) and how they influence the use of resources and impact the environment by:
  - describing how consumption, conservation, and waste management practices are related
  - identifying ways the physical environment is related to individual and community health
- examine individual, family, and community roles and responsibilities by:
  - investigating a variety of resources (e.g., current events, surveys, children's magazines) and explain ways in which consumers are addressing the effects of renewable resources on the environment
  - describing jobs carried out by people at school and in the community that support success in school

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- management of financial resources is needed to meet goals of individuals and families.
- budgets are a basic component in making financial decisions.
- various services are provided by financial institutions (e.g., banks, credit unions).

Grade 4 Skills and Concepts

Students will

- explain how financial management is needed to meet goals of individuals and families by:
  - identifying goals pertaining to money that might affect individuals and families
  - describing different ways to save and invest money (e.g., piggy bank, local bank, savings bonds)
- define credit and how it can be used to make purchases
- explain the purpose of a budget and define the basic components (income, expenses, savings)
- investigate basic services (e.g., deposits, check cashing) provided by financial institutions (e.g., banks, credit unions)

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers.
The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
5.4 Students use a decision-making process to make informed decision among options.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- people need to work to meet basic needs.
- a variety of career choices are available in planning for job/careers.
- the connection between work and academics can influence one's future job/career.
- individual and societal needs can impact future jobs/careers.
- self-knowledge is an important part of the career planning process.

Grade 4 Skills and Concepts

Students will

- explain why people need to work (e.g., chores, jobs, employment) to meet basic needs (e.g., food, clothing, shelter)
- recognize that the roles of individuals at home, in the workplace, and in the community are constantly changing
- investigate the connection between work and learning and how it can influence one's future job/career by:
  - explaining different jobs/careers that use what they learn in school (mathematics, reading/writing, science, social studies) impacts future jobs/careers
  - describing work done by school personnel and other individuals in the community
- evaluate how individual and societal needs can impact future jobs/careers by:
  - recognizing how career choices may change as a person matures
  - examining and grouping careers in clusters
- recognize self-knowledge (e.g., interests, abilities) is helpful when selecting and preparing for a career path and that unique interests may lead to career choices

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
Students demonstrate skills and work habits that lead to success in future schooling and work.
3.7 Students demonstrate the ability to make decisions based on ethical values.
4.1 Students effectively use interpersonal skills.
4.2 Students use productive team membership skills.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- interpersonal skills are needed to be a responsible friend, family and team member.
- attitudes and work habits contribute to success at home, school and work.
- academics contribute to obtaining and succeeding in employment.

Grade 4 Skills and Concepts

Students will

- explain how interpersonal skills are needed to be a responsible friend, family and team member by:
  - identifying ways to cooperate at both home and school
  - learning the importance of developing good team skills (e.g., cooperation, communication) and explain how these skills are used to complete tasks
  - demonstrating how to work cooperatively by contributing ideas, suggestions and efforts
- describe how attitudes and work habits contribute to success at home, school and work by:
  - describing study skills needed in school
  - developing personal responsibilities for their own learning and behaviors
  - explaining how effective communication skills (e.g., reading, writing, speaking, and listening) impacts work-related situations and give examples for success at home, school and work
  - learning how to follow routines (e.g., rules, schedules, directions) with minimal supervision
  - identifying consequences for actions when disobeying rules and routines
  - identifying the importance of developing good work habits
- examine potential job/careers in the community
- identify how employability skills prepare them for obtaining and maintaining employment
- identify ways academics can impact success in employment

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

Grade 4 Enduring Knowledge – Understandings

Students will understand that

- technology skills can enhance learning and impact productivity at home, school and the workplace.
- communication skills is essential for jobs/careers.

Grade 4 Skills and Concepts

Students will

- explore how technology is used in different jobs/careers
- investigate how technology in school and at work enhances learning and provide access to information and resources by:
  - explain how technology tools (e.g., computer programs, Internet, email, cell phones) are used in homes, schools and jobs
- identify ways written communication skills are used at school and in the workplace

Kentucky Academic Standards – Vocational Studies – Fifth Grade

The vocational studies program at the fifth grade develops an awareness of careers. This awareness includes the purpose of having a job, concepts of consumer decision-making, saving money, and connections between work and learning. The challenge is to empower students to make a connection between school and the world of work and to be productive citizens.

The fifth grade provides appropriate opportunities for students to be involved in activities designed to develop an appreciation of work and an awareness of self and jobs/careers. They should examine the relationship between school studies and work; this will enable them to make vital connections that will give meaning to their learning. Elementary students should begin to develop work habits, study skills, team skills and set short-term goals.

The vocational studies program at the fifth grade includes active, hands-on work with concrete materials and appropriate technologies. Although the vocational studies program for fifth grade is divided into five areas, each area is designed to interact with the others in an integrated fashion. Because of this integration, students are able to develop broad conceptual understandings in vocational studies. All content teachers are responsible for providing instruction in the vocational studies area.

The vocational studies content standards at the fifth grade are directly aligned with Kentucky's **Academic Expectations.** The Vocational Studies standards are organized around five "Big Ideas" that are important to the discipline of Vocational Studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school career to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for vocational studies are fundamental to career awareness and builds on prior learning.

Academic Expectations 2.36 and 2.37 bring forward the career awareness in Vocational Studies. Vocational Studies provide a connection to Kentucky Learning Goal 3 (become self-sufficient individual) and Learning Goal 4 (become a responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- fundamental economic concepts are important for consumer decision-making.
- culture, media and technology can influence consumer decisions.
- values have a role in making consumer decision.
- consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.
- an individual has multiple life roles that impact responsibility to be a valuable family and community member.

Grade 5 Skills and Concepts

Students will

- investigate economic concepts and why they are important for consumer decisions by:
  - analyzing the differences between needs and wants and how individuals and families make choices
  - determining ways in which goods and services used by families impact the environment
  - recognizing the relationship between supply and demand and its role in meeting consumer needs
- describe how culture, media and technology can influence consumer decisions by:
  - identifying the ways family and consumer resources are impacted by the environment
  - comparing and evaluating products and services based on major factors (e.g., price, quality, features) when making consumer decisions
  - identifying advertising techniques (bandwagon, facts and figures, emotional appeal, endorsement/testimonial) and explain how they impact the consumer
- analyze ways that an individual has rights and responsibilities as a consumer
- describe how consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment by:
  - describing some community activities that promote healthy environments
- examine individual, family, and community roles and responsibilities by:
  - investigating a variety of resources and explain ways in which consumers are addressing the effects of renewable resources on the environment
  - describing jobs carried out by people at school and in the community that support success in school

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- management of financial resources is needed to meet goals of individuals and families.
- saving plans and budgets are a basic component in making financial decisions.
- various services are provided by financial institutions (e.g., banks, credit unions).

Grade 5 Skills and Concepts

Students will

- explain how financial management is needed to meet goals of individuals and families by:
  - investigating goals pertaining to money that might affect individuals and families
  - describing various types of expenses (e.g., food, clothing, entertainment) and savings (e.g., piggy bank, bank account, savings bonds)
- investigate savings plans and budgets in making financial decisions by:
  - developing a simple savings plan that would achieve a specific goal
  - explaining the purpose of a budget and define the basic components (income, expenses, savings)
- explain credit and the effect of having fees with credit
- describe how basic services (e.g., deposits, check cashing) are provided by financial institutions (e.g., banks, credit unions)

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers.
The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations
2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
5.4 Students use a decision-making process to make informed decision among options.

Grade 5 Enduring Knowledge – Understandings
Students will understand that

- people need to work to meet basic needs.
- a variety of career choices are available in planning for job/careers.
- the connection between work and academics can influence one's future job/career.
- individual and societal needs can impact future jobs/careers.
- awareness of career opportunities and the skills needed for different careers is an important part of the career planning process.
- an Individual Learning Plan (ILP) is an academic and career planning tool.
- self-knowledge is an important part of the career planning process.

Grade 5 Skills and Concepts
Students will

- explain that people need to work (e.g., chores, jobs, employment) to meet basic needs (e.g., food, clothing, shelter), provide self-satisfaction and enjoyment
- investigate a variety of career choices available in planning for jobs/careers by:
  - identifying different job opportunities in the home, school, and community (e.g., home business, flexible schedule)
  - recognizing that the roles of individuals at home, in the workplace, and in the community are constantly changing
- analyze the connection between work and academics which can influence one's future job/careers by:
  - explaining different jobs/careers that use what they learn in school (e.g., mathematics, reading/writing, science, social studies) impacts future jobs/careers
  - explaining how educational planning can impact future career opportunities
  - researching career choice through the use of technology
- evaluate how individual and societal needs can impact future jobs/careers by:
  - describing the impact of individual interests and abilities on career choices
  - identifying and describe jobs in career clusters (e.g., ~~Arts and Humanities~~ Visual and Performing Arts, Construction, Manufacturing, Science and Mathematics)
- recognize sources of career information (e.g., Career Day, guest speaker, field trips, informal personal surveys)
- identify the components of an Individual Learning Plan (ILP)
- recognize how self-knowledge (e.g., interests, abilities) is helpful when selecting and preparing for a career path and that unique interests may lead to career choices

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing résumé and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
3.8 Students demonstrate the ability to make decisions based on ethical values.
4.1 Students effectively use interpersonal skills.
4.2 Students use productive team membership skills.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- interpersonal skills are needed to be a responsible friend, family and team member.
- attitudes and work habits contribute to success at home, school and work.
- academics contribute to obtaining and succeeding in employment.

Grade 5 Skills and Concepts

Students will

- explain how interpersonal skills are needed to be a responsible friend, family and team member by:
  - examining ways to cooperate at home, school and work
  - demonstrating effective group interaction strategies (e.g., communicating effectively, conflict resolution, compromise) to develop team skills
  - explaining the importance of working cooperatively with others by contributing ideas, suggestions and efforts to complete a task
- describe how attitudes and work habits contribute to success at home, school and work by:
  - describing study skills needed in school
  - explaining how attitudes and work habits transfer from the home and school to the workplace
  - explaining how effective communication skills (e.g., reading, writing, speaking, and listening) impact work-related situations and give examples for success at home, school and work
  - identifying consequences for actions when disobeying rules and routines when employed
  - identifying the importance of developing good work habits (e.g., attendance, work done on time, follow directions)
- examine potential job/careers in the community
- describe employability skills needed to prepare individuals for obtaining and maintaining employment
- explain how success in an academic course of study could contribute to the ability to achieve and succeed in employment (e.g., Science/Medicine, Language Arts/Librarian)

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

Grade 5 Enduring Knowledge – Understandings

Students will understand that

- technology skills can enhance learning and impact productivity at home, school and the workplace.
- communication skills are used in a variety of ways at home, school and in the workplace.

Grade 5 Skills and Concepts

Students will

- evaluate how technology tools (e.g., computer programs, Internet, email, cell phones) are used in homes, schools and jobs by:
  - explaining how technology provides access to information and resources at home, school and the workplace
- demonstrate how to work cooperatively and collaboratively with peers when using technology in the classroom by:
  - explaining how written communication skills are used at school and in the workplace

SECONDARY EDUCATION

Secondary: Middle Level and High School Education

In the twenty-first century, Kentucky's students successful transition to postsecondary education, the workforce, and the military requires a middle level and high school education program that provide a range of relevant, meaningful and rigorous academic opportunities anchored in real-life contexts for learning. At these levels, schools support students in developing a personal connection to the school and caring adults. The curriculum reflects the core belief that all students are capable of learning at high levels and focuses on the goal of preparing every student for active, responsible citizenship and lifelong learning.

Students at the middle and high school levels are developing possible career interests and exploring careers while continuing to develop a strong academic foundation through a variety of learning opportunities. As students' progress through the middle and high school level programs, students increase their depth of knowledge and understandings of the content areas, develop and apply more advanced skills and concepts to support their understandings, and increase the complexity of the application and integration of knowledge. In order to achieve these results, districts and schools assist students in planning for their choices and provide the opportunity for each student to learn. Schools provide individual supports for learning that are essential for students to access the curriculum, achieve at high levels and maximize successful transition to postsecondary choices.

The goal of secondary education is to make the middle level and high school experience meaningful for every student. The Kentucky Board of Education has established the following expectations for secondary education:

- Every student will graduate and hold a diploma that credentials proficiency and college and work place readiness. The diploma will be a student's passport to the next level of learning and career opportunity.
- Every student's educational experience will be guided by an Individual Learning Plan (ILP) for lifelong learning. The student will be supported by participation in a rigorous curriculum, an environment of high expectations, and relevant learning opportunities.
- Every student will be engaged in ongoing, meaningful conversations with educators, parents and other caring adults who place high priority on helping that student reach his or her learning goals.

Individual Learning Plan

Beginning with the graduating class of 2013, all Kentucky students will have an Individual Learning Plan (ILP) by the end of the sixth grade year to guide their middle level and high school learning experiences. An ILP is a comprehensive learning plan that emphasizes academic and career development for each student. A district shall implement a comprehensive advising and guidance process throughout the middle level and high school experience to provide support for the development and implementation of an ILP for each student.

Local districts shall develop a method to evaluate the effectiveness and the impact of the ILP process. The evaluation method shall include input from students, parents and school staff. As part of the evaluation criteria, the district shall include, but not be limited to, Transition to Adult Life data.

Middle level and high schools within each district will work cooperatively to ensure that each student and parent receives information regarding:

- Relationship between educational and career opportunities
- Financial planning for postsecondary education

The ILP shall be readily available to each student and his or her parent. Through the advising and guidance process, the ILP is reviewed and approved at least annually by the students, parents and school officials.

The sixth- and seventh-grade years of the ILP process are focused on career exploration and related postsecondary education and training. During the eighth-grade year, teachers, students and parents will set learning goals for the student based on academic and career interests. The completed ILP shall identify required academic courses, electives and extracurricular opportunities aligned to the student's postsecondary goals.

The district and school shall use information from the ILP about student needs to plan academic and elective offerings. Information regarding individual student achievement contained in the ILP and discussed through the advising and guidance process will serve to identify additional supports and interventions that may be necessary for each student's success.

ILPs are not static documents; they change as students' progress and as goals change. Schools should develop multiple guidance and advising strategies to ensure that timely and accurate information is available to students as they reassess their ILPs a minimum of once a year.

MIDDLE LEVEL EDUCATION

Middle Level Education

The middle level program, most often viewed as grades six through eight, expands and extends students' learning from the elementary grades and prepares them for the high school experience. It reflects a challenging academic curriculum, provides a variety of relevant learning experiences and supports the developmental needs of students through ongoing, structured relationships with teachers, peers, counselors and other adults. Students at the middle level continue to develop and expand their abilities to solve problems, make connections and integrate knowledge within and across content areas as well as to their own life. They reason and communicate their ideas.

The content standards outlined in the *Kentucky Academic Standards* define the middle level curriculum necessary to meet the minimum high school graduation requirements. In addition, effective middle level programs should encompass more than the content outlined in the *Kentucky Academic Standards* to fully address Kentucky's learning goals and academic expectations.

Age-appropriate, relevant classroom experiences that enrich and enhance the curriculum should be included in middle level programs. These opportunities should support academic learning and foster fitness and health. They allow students to pursue personal interests, explore career options and experience the arts. These opportunities may be provided through exploratory or enrichment classes or by integration into the curriculum.

An effective formal advising and guidance process typically provides all students with at least one adult mentor at the school to guide and encourage them to take rigorous academic courses and to remind them that doing well in school matters to future success.

Content documents for the middle level are arranged sequentially by grade. Schools have the opportunity to create integrated, interdisciplinary or multidisciplinary programs that personalize the educational process for all students and ensure a successful transition to high school.

MIDDLE LEVEL ~~ARTS AND HUMANITIES~~ VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – ~~Arts and Humanities~~ Visual and Performing Arts– Middle Level

Grades 6-8

The ~~arts and humanities~~ visual and performing arts program in the middle level centers on establishing grounding in the arts so that students are able to communicate at a basic level in each of the art forms of dance, media arts, music, theatre, and visual arts. Emphasis should be placed on exposing students to a variety of arts through active experiences. Students may have already begun to, or at this level may choose to focus on one art form for more in-depth study. This more in-depth study will help students to prepare should they choose specialization in an art form at the high school level. Working toward this grounding in the arts engages students in arts literacy development, analysis and critique of the arts, and active sharing of their own work with others.

The Standards

The standards are directly related to the *National Core Arts Standards*. These are process standards, which are designed to engage students in artistic processes and creative expression as put forward in Senate Bill 1 (2009), KRS 158:6451, Section 1, Schools shall develop their students' ability to: "Express their creative talents and interests in visual arts, music, dance, and dramatic arts".

Standards Organization

The standards are organized around four arts processes:

1. **Creating:** Conceiving and developing new artistic ideas and work
   Creating involves planning and creating new dance, media arts, music, theatre, or visual arts. Creating may involve improvising in music, dance or theatre. Improvising is the composing of new music, reciting/acting new dramatic material, or creating new dance movements on the spur of the moment.

2. **Performing/Producing/Presenting:** Realizing artistic ideas and work through interpretation and presentation

   Performing is limited to the performing arts of music, dance and theatre. Performing generally involves sharing previously created works with an audience. Although the process of performing involves following a creative plan conceived by a composer, playwright or choreographer, there is still opportunity for creative interpretations within the performance.

   Producing is the process of sharing work in the area of media arts. Since media arts productions do not result in performances, the sharing process is different from the performing arts. Media artists still follow the same steps in the creation of works and preparation of works for sharing with others; however the result is more often a product such as a video or video game.

   Presenting is often associated with sharing in more formal settings such as exhibition in the visual arts. The same steps to prepare works for presenting are considered-the audience, venue and communication aspects of an exhibition.

3. **Responding:** Understanding and evaluating how the arts convey meaning

   Responding to the arts involves having the viewer take a close look to interpret the meanings in artistic works. The arts are created for the purpose of communication. Responding to them engages a thinking process that enables the viewer/audience to gather the intent of the work and the message being share by the artist.

   Responding also involves the process of evaluating art works. The viewer/audience will apply criteria to evaluate the effectiveness of artistic works.

4. **Connecting:** Relating artistic ideas and work with personal meaning and external context

   Connecting involves both looking inward and outward. Artists use personal experiences and gained knowledge to inform their own creative works. They also relate artistic ideas with the world around them; to society, culture, and history. This deepens the understanding of the work and appreciation of those who create the arts.

Anchor Standards
There are eleven Anchor Standards that are common across all art forms. These standards illustrate steps that are taken within each of the Artistic Processes.

Performance Standards
Each artistic discipline has a set of performance standards. These standards illustrate what each of the Anchor Standards might look like as students engage in the Artistic Processes within an artistic discipline. Performance standard are written for pre-kindergarten through eighth grade as grade level standards, and at the high school in three proficiency levels; Proficient, Accomplished, Advanced. All Performance Standards align to the eleven overarching Anchor Standards.

Discipline: Dance		**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Explore **Enduring Understanding**: Choreographers use a variety of sources as inspiration and transform concepts and ideas into movement for artistic expression. **Essential Question**: Where do choreographers get ideas for dances?		
6th **DA:Cr1.1.6**	**7th** **DA:Cr1.1.7**	**8th** **DA:Cr1.1.8**
a. Relate similar or contrasting ideas to develop choreography using a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events). b. Explore various movement vocabularies to transfer ideas into choreography.	a. Compare a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events) and make selections to expand movement vocabulary and artistic expression. b. Explore various movement vocabularies to express an artistic intent in choreography. Explain and discuss the choices made using genre-specific dance terminology.	a. Implement movement from a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events) to develop dance content for an original dance study or dance. b. Identify and select personal preferences to create an original dance study or dance. Use genre-specific dance terminology to articulate and justify choices made in movement development to communicate intent.

Discipline: Dance		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work **Process Component:** Plan **Enduring Understanding**: The elements of dance, dance structures, and choreographic devices serve as both a foundation and a departure point for choreographers. **Essential Question**: What influences choice-making in creating choreography?		
6th **DA:Cr2.1.6**	**7th** **DA:Cr2.1.7**	**8th** **DA:Cr2.1.8**

a. Explore choreographic devices and dance structures to develop a dance study that supports an artistic intent. Explain the goal or purpose of the dance. b. Determine artistic criteria to choreograph a dance study that communicates personal or cultural meaning. Based on the criteria, evaluate why some movements are more or less effective than others.	a. Use a variety of choreographic devices and dance structures to develop a dance study with a clear artistic intent. Articulate reasons for movement and structural choices. b. Determine artistic criteria to choreograph a dance study that communicates personal or cultural meaning. Articulate how the artistic criteria serve to communicate the meaning of the dance.	a. Collaborate to select and apply a variety of choreographic devices and dance structures to choreograph an original dance study or dance with a clear artistic intent. Articulate the group process for making movement and structural choices. b. Define and apply artistic criteria to choreograph a dance that communicates personal or cultural meaning. Discuss how the criteria clarify or intensify the meaning of the dance.

Discipline: Dance	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Revise

Enduring Understanding: Choreographers analyze, evaluate, refine, and document their work to communicate meaning.

Essential Question: How do choreographers use self-reflection, feedback from others, and documentation to improve the quality of their work?

6th **DA:Cr3.1.6**	**7th** **DA:Cr3.1.7**	**8th** **DA:Cr3.1.8**
a. Revise dance compositions using collaboratively developed artistic criteria. Explain reasons for revisions and how choices made relate to artistic intent. b. Explore or invent a system to record a dance sequence	a. Evaluate possible revisions of dance compositions and, if necessary, consider revisions of artistic criteria based on self-reflection and feedback of others. Explain reasons for choices and how they clarify artistic intent. b. Investigate a recognized system to document a dance sequence by using words,	a. Revise choreography collaboratively or independently based on artistic criteria, self-reflection, and the feedback of others. Articulate the reasons for choices and revisions and explain how they clarify and enhance the artistic intent. b. Experiment with aspects of a recognized system to document a section of a dance by using words,

through writing, symbols, or a form of media technology.	symbols, or media technologies.	symbols, or media technologies.

Discipline: Dance	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Express

Enduring Understanding: Space, time, and energy are basic elements of dance.

Essential Question: How do dancers work with space, time and energy to communicate artistic expression?

6th DA:Pr4.1.6	7th DA:Pr4.1.7	8th DA:Pr4.1.8
a. Refine partner and ensemble skills in the ability to judge distance and spatial design. Establish diverse pathways, levels, and patterns in space. Maintain focus with partner or group in near and far space.	a. Expand movement vocabulary of floor and air pattern designs. Incorporate and modify body designs from different dance genres and styles for the purpose of expanding movement vocabulary to include differently designed shapes and movements for interest and contrast.	a. Sculpt the body in space and design body shapes in relation to other dancers, objects, and environment. Use focus of eyes during complex floor and air patterns or direct and indirect pathways.
b. Use combinations of sudden and sustained timing as it relates to both the time and the dynamics of a phrase or dance work. Accurately use accented and unaccented beats in 3/4 and 4/4 meter.	b. Vary durational approach in dance phrasing by using timing accents and variations within a phrase to add interest kinesthetically, rhythmically, and visually.	b. Analyze and select metric, kinetic, and breath phrasing and apply appropriately to dance phrases. Perform dance phrases of different lengths that use various timings within the same section. Use different tempi in different body parts at the same time.
c. Use the internal body force created by varying tensions within one's musculature for movement initiation and dynamic expression. Distinguish between bound and free-flowing movements	c. Compare and contrast movement characteristics from a variety of dance genres or styles. Discuss specific characteristics and use adverbs and adjectives to describe them. Determine	c. Direct energy and dynamics in such a way that movement is textured. Incorporate energy and dynamics to technique exercises and dance performance. Use energy

and appropriately apply them to technique exercises and dance phrases.	what dancers must do to perform them clearly.	and dynamics to enhance and project movements.

Discipline: Dance		**Artistic Process**: Performing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Embody **Enduring Understanding**: Dancers use the mind-body connection and develop the body as an instrument for artistry and artistic expression. **Essential Question**: What must a dancer do to prepare the mind and body for artistic expression?		
6th **DA:Pr5.1.6**	**7th** **DA:Pr5.1.7**	**8th** **DA:Pr5.1.8**
a. Embody technical dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement) to accurately execute changes of direction, levels, facings, pathways, elevations and landings, extensions of limbs, and movement transitions. b. Apply basic anatomical knowledge, proprioceptive feedback, spatial awareness, and nutrition to promote safe and healthful strategies when warming up and dancing. c. Collaborate as an ensemble to refine dances by identifying what works and does not work in executing complex patterns, sequences, and formations. Solve movement problems to dances by testing options and finding good results.	a. Apply body-use strategies to accommodate physical maturational development to technical dance skills (for example, functional alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement, weight shifts, flexibility/range of motion). b. Utilize healthful practices and sound nutrition in dance activities and everyday life. Discuss benefits of practices and how choices enhance performance. c. Collaborate with peers to practice and refine dances. Develop group performance expectations through observation and analyses (for example, view live or recorded professional dancers and collaboratively develop group performance	a. Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to replicate, recall, and execute spatial designs and musical or rhythmical dance phrases. b. Evaluate personal healthful practices in dance activities and everyday life including nutrition and injury prevention. Discuss choices made, the effects experienced, and methods for improvement. c. Collaborate with peers to discover strategies for achieving performance accuracy, clarity, and expressiveness. Articulate personal performance goals and practice to reach goals. Document personal

Document self-improvements over time	expectations based on information gained from observations).	improvement over time (for example, journaling, portfolio, or timeline).

Discipline: Dance		**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Dance performance is an interaction between performer, production elements, and audience that heightens and amplifies artistic expression. **Essential Question**: How does a dancer heighten artistry in a public performance?		
6th **DA:Pr6.1.6**	**7th** **DA:Pr6.1.7**	**8th** **DA:Pr6.1.8**
a. Recognize needs and adapt movements to performance area. Use performance etiquette and performance practices during class, rehearsal and performance. Post-	a. Recommend changes to and adapt movements to performance area. Use performance etiquette and performance practices during class, rehearsal and performance. Maintain	a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Use performance etiquette and

performance, accept notes from choreographer and make corrections as needed and apply to future performances. b. Compare and contrast a variety of possible production elements that would intensify and heighten the artistic intent of the work. Select choices and explain reasons for the decisions made using production terminology.	journal documenting these efforts. Post-performance, accept notes from choreographer and apply corrections to future performances. b. Explore possibilities of producing dance in a variety of venues or for different audiences and, using production terminology, explain how the production elements would be handled in different situations.	performance practices during class, rehearsal and performance. Document efforts and create a plan for ongoing improvements. Post-performance, accept notes from choreographer and apply corrections to future performances. b. Collaborate to design and execute production elements that would intensify and heighten the artistic intent of a dance performed on a stage, in a different venue, or for different audiences. Explain reasons for choices using production terminology.

Discipline: Dance		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Dance is perceived and analyzed to comprehend its meaning. **Essential Question**: How is a dance understood?		
6th **DA:Re.7.1.6**	**7th** **DA:Re.7.1.7**	**8th** **DA:Re.7.1.8**
a. Describe or demonstrate recurring patterns of movement and their relationships in dance. b. Explain how the elements of dance are used in a variety of dance genres, styles, or	a. Compare, contrast, and discuss patterns of movement and their relationships in dance. b. Compare and contrast how the elements of dance are used in a variety of genres,	a. Describe, demonstrate and discuss patterns of movement and their relationships in dance in context of artistic intent. b. Explain how the elements of dance are used in a variety of genres, styles, or cultural

cultural movement practices. Use genre-specific dance terminology.	styles, or cultural movement practices. Use genre-specific dance terminology.	movement practices to communicate intent. Use genre-specific dance terminology.

Discipline: Dance	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Dance is interpreted by considering intent, meaning, and artistic expression as communicated through the use of the body, elements of dance, dance technique, dance structure, and context.

Essential Question: How is dance interpreted?

6th DA:Re8.1.6	7th DA:Re8.1.7	8th DA:Re8.1.8
Explain how the artistic expression of a dance is achieved through the elements of dance, use of body, dance technique, dance structure, and context. Explain how these communicate the intent of the dance using genre specific dance terminology.	Compare the meaning of different dances. Explain how the artistic expression of each dance is achieved through the elements of dance, use of body, dance technique, and context. Use genre specific dance terminology.	Select a dance and explain how artistic expression is achieved through relationships among the elements of dance, use of body, dance technique and context. Cite evidence in the dance to support your interpretation using genre specific dance terminology.

Discipline: Dance	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Critique

Enduring Understanding: Criteria for evaluating dance vary across genres, styles, and cultures.

Essential Question: What criteria are used to evaluate dance?

6th DA:Re9.1.6	7th DA:Re9.1.7	8th DA:Re9.1.8
a. Discuss the characteristics and artistic intent of a dance	a. Compare artistic intent, content and context from	a. Use artistic criteria to determine what makes an

from a genre, style, or cultural movement practice and develop artistic criteria to critique the dance using genre-specific dance terminology.	dances to examine the characteristics of genre, style, or cultural movement practice. Based on the comparison, refine artistic criteria using genre-specific dance terminology.	effective performance. Consider content, context, genre, style, or cultural movement practice to comprehend artistic expression. Use genre-specific dance terminology.

Discipline: Dance		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: As dance is experienced, all personal experiences, knowledge, and contexts are integrated and synthesized to interpret meaning. **Essential Question**: How does dance deepen our understanding of ourselves, other knowledge, and events around us?		
6th **DA:Cn10.1.6**	**7th** **DA:Cn10.1.7**	**8th** **DA:Cn10.1.8**
a. Observe the movement characteristics or qualities observed in a specific dance genre. Describe differences and similarities about what was observed to one's attitudes and movement preferences. b. Conduct research using a variety of resources to find information about a social issue of great interest. Use the information to create a dance study that expresses a specific point of view on the topic. Discuss whether the experience of creating and sharing the dance reinforces personal views or offers new knowledge and perspectives.	a. Compare and contrast the movement characteristics or qualities found in a variety of dance genres. Discuss how the movement characteristics or qualities differ from one's own movement characteristics or qualities and how different perspectives are communicated. b. Research the historical development of a dance genre or style. Use knowledge gained from the research to create a dance study that evokes the essence of the style or genre. Share the study with peers as part of a lecture demonstration that tells the story of the historical journey of the chosen genre or style. Document the process of research and application.	a. Relate connections found between different dances and discuss the relevance of the connections to the development of one's personal perspectives. b. Investigate two contrasting topics using a variety of research methods. Identify and organize ideas to create representative movement phrases. Create a dance study exploring the contrasting ideas. Discuss how the research informed the choreographic process and deepens understanding of the topics.

Discipline: Dance		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: Dance literacy includes deep knowledge and perspectives about societal, cultural, historical, and community contexts. **Essential Question**: How does knowing about societal, cultural, historical and community experiences expand dance literacy?		
6th **DA:Cn11.1.6**	**7th** **DA:Cn11.1.7**	**8th** **DA:Cn11.1.8**
Interpret and show how the movement and qualities of a dance communicate its cultural, historical, and/or community purpose or meaning.	Compare, contrast, and discuss dances performed by people in various localities or communities. Formulate possible reasons why similarities and differences developed in relation to the ideas and perspectives important to each social group.	Analyze and discuss, how dances from a variety of cultures, societies, historical periods, or communities reveal the ideas and perspectives of the people.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Conceive **Enduring Understanding**: Media arts ideas, works, and processes are shaped by the imagination, creative processes, and by experiences, both within and outside of the arts. **Essential Question**: How do media artists generate ideas? How can ideas for media arts productions be formed and developed to be effective and original?		
6th (MA:Cr1.1.6)	**7th (MA:Cr1.1.7)**	**8th (MA:Cr1.1.8)**
Formulate variations of goals and solutions for media artworks by practicing chosen creative processes, such as sketching, improvising and	Produce a variety of ideas and solutions for media artworks through application of chosen inventive processes, such as concept	Generate ideas, goals, and solutions for original media artworks through application of focused creative processes, such as divergent

brainstorming.	modeling and prototyping.	thinking and experimenting.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Develop **Enduring Understanding**: Media artists plan, organize, and develop creative ideas, plans, and models into process structures that can effectively realize the artistic idea. **Essential Question**: How do media artists organize and develop ideas and models into process structures to achieve the desired end product?		
6th (MA:Cr2.1.6)	**7th (MA:Cr2.1.7)**	**8th (MA:Cr2.1.8)**
Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent.	Design, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering expressive intent and resources.	Structure and critique ideas, plans, prototypes, and production processes for media arts productions, considering intent, resources, and the presentation context.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Construct **Enduring Understanding**: The forming, integration, and refinement of aesthetic components, principles, and processes creates purpose, meaning, and artistic quality in media artworks. **Essential Question**: What is required to produce a media artwork that conveys purpose, meaning, and artistic quality? How do media artists improve/refine their work?		
6th (MA:Cr3.1.6)	**7th (MA:Cr3.1.7)**	**8th (MA:Cr3.1.8)**
a. Experiment with multiple approaches to produce content and components for determined purpose and	a. Coordinate production processes to integrate content and components for determined purpose and	a. Implement production processes to integrate content and stylistic conventions for determined

meaning in media arts productions, utilizing a range of associated principles, such as point of view and perspective. b. Appraise how elements and components can be altered for intentional effects and audience, and refine media artworks to reflect purpose and audience.	meaning in media arts productions, demonstrating understanding of associated principles, such as narrative structures and composition. b. Improve and refine media artworks by intentionally emphasizing particular expressive elements to reflect an understanding of purpose, audience, or place.	meaning in media arts productions, demonstrating understanding of associated principles, such as theme and unity. b. Refine and modify media artworks, improving technical quality and intentionally accentuating selected expressive and stylistic elements, to reflect an understanding of purpose, audience, and place.

Discipline: Media	**Artistic Process**: Producing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Integrate

Enduring Understanding: Media artists integrate various forms and contents to develop complex, unified artworks.

Essential Question: How are complex media arts experiences constructed?

6th (MA:Pr4.1.6)	**7th (MA:Pr4.1.7)**	**8th (MA:Pr4.1.8)**
Validate how integrating multiple contents and forms can support a central idea in a media artwork, such as media, narratives, and	Integrate multiple contents and forms into unified media arts productions that convey consistent perspectives and narratives, such as an	Integrate multiple contents and forms into unified media arts productions that convey specific themes or ideas, such as interdisciplinary

performance.	interactive video game.	projects, or multimedia theatre.

Discipline: Media Arts		**Artistic Process**: Producing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Practice **Enduring Understanding**: Media artists require a range of skills and abilities to creatively solve problems within and through media arts productions. **Essential Question**: What skills are required for creating effective media artworks and how are they improved? How are creativity and innovation developed within and through media arts productions? How do media artists use various tools and techniques?		
6th (MA:Pr5.1.6)	**7th (MA:Pr5.1.7)**	**8th (MA:Pr5.1.8)**

a. Develop a variety of artistic, design, technical, and soft skills through performing various assigned roles in producing media artworks, such as invention, formal technique, production, self-initiative, and problem-solving. b. Develop a variety of creative and adaptive innovation abilities, such as testing constraints, in developing solutions within and through media arts productions. c. Demonstrate adaptability using tools and techniques in standard and experimental ways in constructing media artworks.	a. Exhibit an increasing set of artistic, design, technical, and soft skills through performing various roles in producing media artworks, such as creative problem-solving and organizing. b. Exhibit an increasing set of creative and adaptive innovation abilities, such as exploratory processes, in developing solutions within and through media arts productions. c. Demonstrate adaptability using tools and techniques in standard and experimental ways to achieve an assigned purpose in constructing media artworks.	a. Demonstrate a defined range of artistic, design, technical, and soft skills, through performing specified roles in producing media artworks, such as strategizing and collaborative communication. b. Demonstrate a defined range of creative and adaptive innovation abilities, such as divergent solutions and bending conventions, in developing new solutions for identified problems within and through media arts productions. c. Demonstrate adaptability using tools, techniques and content in standard and experimental ways to communicate intent in the production of media artworks.

Discipline: Media Arts	**Artistic Process**: Producing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Media artists purposefully present, share, and distribute media artworks for various contexts.

Essential Question: How does time, place, audience, and context affect presenting or performing choices for media artworks? How can presenting or sharing media artworks in a public format help a media artist learn and grow?

6th (MA:Pr6.1.6)	**7th (MA:Pr6.1.7)**	**8th (MA:Pr6.1.8)**

a. Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks. b. Analyze results of and improvements for presenting media artworks.	a. Evaluate various presentation formats in order to fulfill various tasks and defined processes in the presentation and/or distribution of media artworks. b. Evaluate the results of and improvements for presenting media artworks, considering impacts on personal growth.	a. Design the presentation and distribution of media artworks through multiple formats and/or contexts. b. Evaluate the results of and implement improvements for presenting media artworks, considering impacts on personal growth and external effects.

Discipline: Media Arts	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Perceive

Enduring Understanding: Identifying the qualities and characteristics of media artworks improves one's artistic appreciation and production.

Essential Question: How do we 'read' media artworks and discern their relational components? How do media artworks function to convey meaning and manage audience experience?

6th (MA:Re7.1.6)	**7th (MA:Re7.1.7)**	**8th (MA:Re7.1.8)**

a. Identify, describe, and analyze how message and meaning are created by components in media artworks. b. Identify, describe, and analyze how various forms, methods, and styles in media artworks manage audience experience.	a. Describe, compare, and analyze the qualities of and relationships between the components in media artworks. b. Describe, compare, and analyze how various forms, methods, and styles in media artworks interact with personal preferences in influencing audience experience.	a. Compare, contrast, and analyze the qualities of and relationships between the components and style in media artworks. b. Compare, contrast, and analyze how various forms, methods, and styles in media artworks manage audience experience and create intention.

Discipline: Media Arts		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Interpretation and appreciation require consideration of the intent, form, and context of the media and artwork. **Essential Question**: How do people relate to and interpret media artworks?		
6th (MA:Re8.1.6)	**7th (MA:Re8.1.7)**	**8th (MA:Re8.1.8)**
Analyze the intent of a variety of media artworks, using given criteria.	Analyze the intent and meaning of a variety of media artworks, using self-developed criteria.	Analyze the intent and meanings of a variety of media artworks, focusing on intentions, forms, and various contexts.

Discipline: Media Arts	**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Skillful evaluation and critique are critical components of experiencing, appreciating, and producing media artworks. **Essential Question**: How and why do media artists value and judge media artworks? When and how should we evaluate and critique media artworks to improve them?	

6th (MA:Re9.1.6)	7th (MA:Re9.1.7)	8th (MA:Re9.1.8)
Determine and apply specific criteria to evaluate various media artworks and production processes, considering context and practicing constructive feedback.	Develop and apply criteria to evaluate various media artworks and production processes, considering context, and practicing constructive feedback.	Evaluate media art works and production processes with developed criteria, considering context and artistic goals.

Discipline: Media Arts	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Process Component: Synthesize

Enduring Understanding: Media artworks synthesize meaning and form cultural experience.

Essential Question: How do we relate knowledge and experiences to understanding and making media artworks? How do we learn about and create meaning through producing media artworks?

6th (MA:Cn10.1.6)	7th (MA:Cn10.1.7)	8th (MA:Cn10.1.8)
a. Access, evaluate, and use internal and external resources to create media artworks, such as knowledge, experiences, interests, and research. b. Explain and show how media artworks form new meanings, situations, and cultural experiences, such as historical events.	a. Access, evaluate and use internal and external resources to inform the creation of media artworks, such as experiences, interests, research, and exemplary works. b. Explain and show how media artworks form new meanings and knowledge, situations, and cultural experiences, such as learning, and new information.	a. Access, evaluate, and use internal and external resources to inform the creation of media artworks, such as cultural and societal knowledge, research, and exemplary works. b. Explain and demonstrate how media artworks expand meaning and knowledge, and create cultural experiences, such as local and global events.

Discipline: Media Arts	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Process Component: Relate

Enduring Understanding: Media artworks and ideas are better understood and produced by relating them to their purposes, values, and various contexts.

Essential Question: How does media arts relate to its various contexts, purposes, and values? How does investigating these relationships inform and deepen the media artist's understanding and work?		
6th (MA:Cn11.1.6)	**7th (MA:Cn11.1.7)**	**8th (MA:Cn11.1.8)**
a. Research and show how media artworks and ideas relate to personal life, and social, community, and cultural situations, such as personal identity, history, and entertainment. b. Analyze and interact appropriately with media arts tools and environments, considering fair use and copyright, ethics, and media literacy.	a. Research and demonstrate how media artworks and ideas relate to various situations, purposes and values, such as community, vocations, and social media. b. Analyze and responsibly interact with media arts tools and environments, considering copyright, ethics, media literacy, and social media.	a. Demonstrate and explain how media artworks and ideas relate to various contexts, purposes, and values, such as democracy, environment, and connecting people and places. b. Analyze and responsibly interact with media arts tools, environments, legal, and technological contexts, considering ethics, media literacy, social media, and virtual worlds.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Imagine

Enduring Understanding: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources.

Essential Question: How do musicians generate creative ideas?

6th MU:Cr1.1.6	7th MU:Cr1.1.7	8th MU:Cr1.1.8
Generate simple rhythmic, melodic, and harmonic phrases within AB and ABA forms that convey expressive intent.	Generate rhythmic, melodic, and harmonic phrases and variations over harmonic accompaniments within AB, ABA, or theme and variation forms that convey expressive intent.	Generate rhythmic, melodic and harmonic phrases and harmonic accompaniments within expanded forms (including introductions, transitions, and codas) that convey expressive intent.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Plan and Make

Enduring Understanding: Musicians' creative choices are influenced by their expertise, context, and expressive intent.

Essential Question: How do musicians make creative decisions?

6th MU:Cr2.1.6	7th MU:Cr2.1.7	8th MU:Cr2.1.8
a. Select, organize, construct, and document personal musical ideas for arrangements and compositions within AB or ABA form that demonstrate an effective beginning, middle, and ending, and convey expressive intent. b. Use standard and/or iconic notation and/or audio/ video recording to document personal simple rhythmic phrases, melodic phrases, and two-chord harmonic musical ideas.	a. Select, organize, develop and document personal musical ideas for arrangements, songs, and compositions within AB, ABA, or theme and variation forms that demonstrate unity and variety and convey expressive intent. b. Use standard and/or iconic notation and/or audio/ video recording to document personal simple rhythmic phrases, melodic phrases, and harmonic sequences.	a. Select, organize, and document personal musical ideas for arrangements, songs, and compositions within expanded forms that demonstrate tension and release, unity and variety, balance, and convey expressive intent. b. Use standard and/or iconic notation and/or audio/ video recording to document personal rhythmic phrases, melodic phrases, and harmonic sequences.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Evaluate and Refine

Enduring Understanding: Musicians evaluate, and refine their work through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their creative work?

6th MU:Cr3.1.6	7th MU:Cr3.1.7	8th MU:Cr3.1.8
a. Evaluate their own work, applying teacher-provided criteria such as application of selected elements of music, and use of sound sources. b. Describe the rationale for making revisions to the music based on evaluation criteria and feedback from their teacher.	a. Evaluate their own work, applying selected criteria such as appropriate application of elements of music including style, form, and use of sound sources. b. Describe the rationale for making revisions to the music based on evaluation criteria and feedback from others (teacher and peers).	a. Evaluate their own work by selecting and applying criteria including appropriate application of compositional techniques, style, form, and use of sound sources. b. Describe the rationale for refining works by explaining the choices, based on evaluation criteria.

Discipline: Music	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Present

Enduring Understanding: Musicians' presentation of creative work is the culmination of a process of creation and communication.

Essential Question: When is creative work ready to share?

6th MU:Cr3.2.6	7th MU:Cr3.2.7	8th MU:Cr3.2.8
Present the final version of their documented personal composition or arrangement, using craftsmanship and originality to demonstrate an effective beginning, middle, and ending, and convey expressive intent.	Present the final version of their documented personal composition, song, or arrangement, using craftsmanship and originality to demonstrate unity and variety, and convey expressive intent.	Present the final version of their documented personal composition, song, or arrangement, using craftsmanship and originality to demonstrate the application of compositional techniques for creating unity and variety, tension and release, and balance to convey expressive intent.

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Performers' interest in and knowledge of musical works, understanding of their own technical skill, and the context for a performance influence the selection of repertoire.

Essential Question: How do performers select repertoire?

6th MU:Pr4.1.6	7th MU:Pr4.1.7	8th MU:Pr4.1.8
Apply teacher-provided criteria for selecting music to perform for a specific purpose and/or context, and explain why each was chosen.	Apply collaboratively-developed criteria for selecting music of contrasting styles for a program with a specific purpose and/or context and, after discussion, identify expressive qualities, technical challenges, and reasons for choices.	Apply personally-developed criteria for selecting music of contrasting styles for a program with a specific purpose and/or context, and explain expressive qualities, technical challenges, and reasons for choices.

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

6th MU:Pr4.2.6	7th MU:Pr4.2.7	8th MU:Pr4.2.8
a. Explain how understanding the structure and the elements of music are used in music selected for performance. b. When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch, articulation, and dynamics. c. Identify how cultural and historical context inform performances.	a. Explain and demonstrate the structure of contrasting pieces of music selected for performance and how elements of music are used. b. When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch articulation, dynamics, tempo, and form. c. Identify how cultural and historical context inform performances and result in different music interpretations.	a. Compare the structure of contrasting pieces of music selected for performance, explaining how the elements of music are used in each. b. When analyzing selected music, sight-read in treble or bass clef simple rhythmic, melodic, and/or harmonic notation. c. Identity how cultural and historical context inform performances and result in different musical effects.

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Interpret

Enduring Understanding: Performers make interpretive decisions based on their understanding of context and expressive intent.

Essential Question: How do performers interpret musical works?

6th **MU:Pr4.3.6**	**7th** **MU:Pr4.3.7**	**8th** **MU:Pr4.3.8**
Perform a selected piece of music demonstrating how their interpretations of the elements of music and the expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing) convey intent.	Perform contrasting pieces of music demonstrating their interpretations of the elements of music and expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing) convey intent.	Perform contrasting pieces of music, demonstrating as well as explaining how the music's intent is conveyed by their interpretations of the elements of music and expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing).

Discipline: Music	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic techniques and work for presentation.

Process Component: Rehearse, Evaluate, Refine

Enduring Understanding: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their performance?

6th **MU:Pr5.1.6**	**7th** **MU:Pr5.1.7**	**8th** **MU:Pr5.1.8**
Identify and apply teacher-provided criteria (such as correct interpretation of notation, technical accuracy, originality, and interest) to rehearse, refine, and determine when a piece is ready to perform.	Identify and apply collaboratively-developed criteria (such as demonstrating correct interpretation of notation, technical skill of performer, originality, emotional impact, and interest) to rehearse, refine, and determine when the music is ready to perform.	Identify and apply personally-developed criteria (such as demonstrating correct interpretation of notation, technical skill of performer, originality, emotional impact, variety, and interest) to rehearse, refine, and determine when the music is ready to perform.

Discipline: Music		**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Musicians judge performance based on criteria that vary across time, place, and culture. The context and how a work is presented influence the audience response. **Essential Question**: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?		
6th **MU:Pr6.1.6**	**7th** **MU:Pr6.1.7**	**8th** **MU:Pr6.1.8**
a. Perform the music with technical accuracy to convey the creator's intent. b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue and purpose.	a. Perform the music with technical accuracy and stylistic expression to convey the creator's intent. b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue, purpose, and context.	a. Perform the music with technical accuracy, stylistic expression, and culturally authentic practices in music to convey the creator's intent. b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue, purpose, context, and style.

Discipline: Music		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Select **Enduring Understanding**: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes. **Essential Question**: How do individuals choose music to experience?		
6th **MU: Re7.1.6**	**7th** **MU:Re7.1.7**	**8th** **MU:Re7.1.8**
Select or choose music to listen to and explain the connections to specific interests or experiences for a specific purpose.	Select or choose contrasting music to listen to and compare the connections to specific interests or experiences for a specific purpose.	Select programs of music (such as a CD mix or live performances) and demonstrate the connections to an interest or experience for a specific purpose.

Discipline: Music		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music. **Essential Question**: How does understanding the structure and context of music inform a response?		
6th **MU: Re7.2.6**	**7th** **MU:Re7.2.7**	**8th** **MU:Re7.2.8**
a. Describe how the elements of music and expressive qualities relate to the structure of the pieces. b. Identify the context of music from a variety of genres, cultures, and historical periods.	a. Classify and explain how the elements of music and expressive qualities relate to the structure of contrasting pieces. b. Identify and compare the context of music from a variety of genres, cultures, and historical periods.	a. Compare how the elements of music and expressive qualities relate to the structure within programs of music. b. Identify and compare the context of programs of music from a variety of genres, cultures, and historical periods.

Discipline: Music		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent. **Essential Question**: How do we discern the musical creators' and performers' expressive intent?		
6th **MU: Re8.1.6**	**7th** **MU:Re8.1.7**	**8th** **MU:Re8.1.8**
Describe a personal interpretation of how creators' and performers' application of the elements of music and expressive qualities, within genres and cultural and historical context, convey expressive intent.	Describe a personal interpretation of contrasting works and explain how creators' and performers' application of the elements of music and expressive qualities, within genres, cultures, and historical periods, convey expressive intent.	Support personal interpretation of contrasting programs of music and explain how creators' or performers' apply the elements of music and expressive qualities, within genres, cultures, and historical periods to convey expressive intent.

Discipline: Music		**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: The personal evaluation of musical work(s) and performance(s) is informed by analysis, interpretation, and established criteria. **Essential Question**: How do we judge the quality of musical work(s) and performance(s)?		
6th **MU: Re9.1.6**	**7th** **MU:Re9.1.7**	**8th** **MU:Re9.1.8**
Apply teacher-provided criteria to evaluate musical works or performances.	Select from teacher-provided criteria to evaluate musical works or performances.	Apply appropriate personally-developed criteria to evaluate musical works or performances.

Discipline: Music		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Enduring Understanding**: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing, and responding. **Essential Question**: How do musicians make meaningful connections to creating, performing, and responding?		
6th **MU: Cn10.1.6**	**7th** **MU:Cn10.1.7**	**8th** **MU:Cn10.1.8**
Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts, and daily life inform creating, performing, and responding to music?		
6th **MU: Cn11.1.6**	**7th** **MU:Cn11.1.7**	**8th** **MU:Cn11.1.8**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

Discipline: Theatre	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Envision/Conceptualize

Enduring Understanding: Theatre artists rely on intuition, curiosity, and critical inquiry.

Essential Question: What happens when theatre artists use their imaginations and/or learned theatre skills while engaging in creative exploration and inquiry?

6th **TH:Cr1.1.6**	**7th** **TH:Cr.1.1.7.**	**8th** **TH:Cr1.1.8.**
a. Identify possible solutions to staging challenges in a drama/theatre work. b. Identify solutions to design challenges in a drama/theatre work. c. Explore a scripted or improvised character by imagining the given circumstances in a drama/theatre work.	a. Investigate multiple perspectives and solutions to staging challenges in a drama/theatre work. b. Explain and present solutions to design challenges in a drama/ theatre work. c. Envision and describe a scripted or improvised character's inner thoughts and objectives in a drama/theatre work.	a. Imagine and explore multiple perspectives and solutions to staging problems in a drama/ theatre work. b. Imagine and explore solutions to design challenges of a performance space in a drama/theatre work. c. Develop a scripted or improvised character by articulating the character's inner thoughts, objectives, and motivations in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Develop

Enduring Understanding: Theatre artists work to discover different ways of communicating meaning.

Essential Question: How, when, and why do theatre artists' choices change?

6th **TH:Cr2.1.6.**	**7th** **TH:Cr2.1.7.**	**8th** **TH:Cr2.1.8.**
a. Use critical analysis to improve, refine, and evolve original ideas and artistic choices in a devised or scripted drama/theatre work. b. Contribute ideas and accept and incorporate the ideas of others in preparing or devising drama/theatre work.	a. Examine and justify original ideas and artistic choices in a drama/theatre work based on critical analysis, background knowledge, and historical and cultural context. b. Demonstrate mutual respect for self and others and their roles in preparing or devising drama/theatre work.	a. Articulate and apply critical analysis, background knowledge, research, and historical and cultural context to the development of original ideas for a drama/theatre work. b. Share leadership and responsibilities to develop collaborative goals when preparing or devising drama/theatre work.

Discipline: Theatre	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Rehearse

Enduring Understanding: Theatre artists refine their work and practice their craft through rehearsal.

Essential Question: How do theatre artists transform and edit their initial ideas?

6th **TH:Cr3.1.6.**	**7th** **TH:Cr3.1.7.**	**8th** **TH:Cr3.1.8.**
a. Articulate and examine choices to refine a devised or scripted drama/theatre work.	a. Demonstrate focus and concentration in the rehearsal process to analyze and refine choices in a devised or scripted drama/theatre work.	a. Use repetition and analysis in order to revise devised or scripted drama/theatre work.
b. Identify effective physical and vocal traits of characters in an improvised or scripted drama/theatre work.	b. Develop effective physical and vocal traits of characters in an improvised or scripted drama/theatre work.	b. Refine effective physical, vocal, and physiological traits of characters in an improvised or scripted drama/ theatre work.
c. Explore a planned technical design during the rehearsal process for a devised or scripted drama/theatre work.	c. Consider multiple planned technical design elements during the rehearsal process for a devised or scripted drama/theatre work.	c. Implement and refine a planned technical design using simple technology during the rehearsal process for devised or scripted drama/ theatre work.

Discipline: Theatre	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Theatre artists make strong choices to effectively convey meaning.

Essential Question: Why are strong choices essential to interpreting a drama or theatre piece?

6th TH:Pr4.1.6.	7th TH:Pr4.1.7.	8th TH:Pr4.1.8.
a. Identify the essential events in a story or script that make up the dramatic structure in a drama/theatre work. b. Experiment with various physical choices to communicate character in a drama/theatre work.	a. Consider various staging choices to enhance the story in a drama/theatre work. b. Use various character objectives in a drama/theatre work.	a. Explore different pacing to better communicate the story in a drama/theatre work. b. Use various character objectives and tactics in a drama/theatre work to overcome an obstacle.

Discipline: Theatre	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic technique and work for presentation.

Process Component: Prepare

Enduring Understanding: Theatre artists develop personal processes and skills for a performance or design.

Essential Question: What can I do to fully prepare a performance or technical design?

6th TH:Pr5.1.6.	7th TH:Pr5.1.7.	8th TH:Pr5.1.8.
a. Recognize how acting exercises and techniques can be applied to a drama/theatre work. b. Articulate how technical elements are integrated into a drama/ theatre work.	a. Participate in a variety of acting exercises and techniques that can be applied in a rehearsal or drama/theatre performance. b. Choose a variety of technical elements that can be applied to a design in a drama/theatre work.	a. Use a variety of acting techniques to increase skills in a rehearsal or drama/theatre performance. b. Use a variety of technical elements to create a design for a rehearsal or drama/theatre production.

Discipline: Theatre		**Artistic Process**: Performing
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Share, Present **Enduring Understanding**: Theatre artists share and present stories, ideas, and envisioned worlds to explore the human experience. **Essential Question**: What happens when theatre artists and audiences share a creative experience?		
6th **TH:Pr6.1.6.**	**7th** **TH:Pr6.1.7.**	**8th** **TH:Pr6.1.8.**
Adapt a drama/theatre work and present it informally for an audience.	Participate in rehearsals for a drama/theatre work that will be shared with an audience.	Perform a rehearsed drama/theatre work for an audience.

Discipline: Theatre		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Reflect **Enduring Understanding**: Theatre artists reflect to understand the impact of drama processes and theatre experiences. **Essential Question**: How do theatre artists comprehend the essence of drama processes and theatre experiences?		
6th **TH:Re7.1.6.**	**7th** **TH:Re7.1.7.**	**8th** **TH:Re7.1.8.**
Describe and record personal reactions to artistic choices in a drama/theatre work.	Compare recorded personal and peer reactions to artistic choices in a drama/ theatre work.	Apply criteria to the evaluation of artistic choices in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Theatre artists' interpretations of drama/theatre work are influenced by personal experiences and aesthetics.

Essential Question: How can the same work of art communicate different messages to different people?

6th **TH:Re8.1.6.**	**7th** **TH:Re8.1.7.**	**8th** **TH:Re8.1.8.**
a. Explain how artists make choices based on personal experience in a drama/theatre work. b. Identify cultural perspectives that may influence the evaluation of a drama/theatre work. c. Identify personal aesthetics, preferences, and beliefs through participation in or observation of drama/ theatre work.	a. Identify the artistic choices made based on personal experience in a drama/theatre work. b. Describe how cultural perspectives can influence the evaluation of drama/theatre work. c. Interpret how the use of personal aesthetics, preferences, and beliefs can be used to discuss drama/theatre work.	a. Recognize and share artistic choices when participating in or observing a drama/theatre work. b. Analyze how cultural perspectives influence the evaluation of a drama/theatre work. c. Apply personal aesthetics, preferences, and beliefs to evaluate a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Evaluate

Enduring Understanding: Theatre artists apply criteria to investigate, explore, and assess drama and theatre work.

Essential Question: How are the theatre artist's processes and the audience's perspectives impacted by analysis and synthesis?

6th **TH:Re9.1.6.**	**7th** **TH:Re9.1.7.**	**8th** **TH:Re9.1.8.**
a. Use supporting evidence and criteria to evaluate drama/theatre work. b. Apply the production elements used in a drama/theatre work to assess aesthetic choices. c. Identify a specific audience or purpose for a drama/theatre work.	a. Explain preferences, using supporting evidence and criteria to evaluate drama/theatre work. b. Consider the aesthetics of the production elements in a drama/theatre work. c. Identify how the intended purpose of a drama/theatre work appeals to a specific audience.	a. Respond to a drama/ theatre work using supporting evidence, personal aesthetics, and artistic criteria. b. Apply the production elements used in a drama/theatre work to assess aesthetic choices. c. Assess the impact of a drama/theatre work on a specific audience.

Discipline: Theatre	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Process Component: Empathize

Enduring Understanding: Theatre artists allow awareness of interrelationships between self and others to influence and inform their work.

Essential Question: What happens when theatre artists foster understanding between self and others through critical awareness, social responsibility, and the exploration of empathy?

6th **TH:Cn10.1.6.**	**7th** **TH:Cn10.1.7.**	**8th** **TH:Cn10.1.8.**

Explain how the actions and motivations of characters in a drama/theatre work impact perspectives of a community or culture.	Incorporate multiple perspectives and diverse community ideas in a drama/theatre work.	Examine a community issue through multiple perspectives in a drama/theatre work.

Discipline: Theatre		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Interrelate **Enduring Understanding**: Theatre artists understand and can communicate their creative process as they analyze the way the world may be understood. **Essential Question**: What happens when theatre artists allow an understanding of themselves and the world to inform perceptions about theatre and the purpose of their work?		
6th **TH:Cn11.1.6.**	**7th** **TH:Cn11.1.7.**	**8th** **TH:Cn11.1.8.**
Identify universal themes or common social issues and express them through a drama/theatre work.	Incorporate music, dance, art, and/or media to strengthen the meaning and conflict in a drama/theatre work with a particular cultural, global, or historic context.	Use different forms of drama/theatre work to examine contemporary social, cultural, or global issues.

Discipline: Theatre		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Research **Enduring Understanding**: Theatre artists critically inquire into the ways others have thought about and created drama processes and productions to inform their own work. **Essential Question**: In what ways can research into theatre histories, theories, literature, and performances alter the way a drama process or production is understood?		
6th **TH:Cn11.2.6.**	**7th** **TH:Cn11.2.7.**	**8th** **TH:Cn11.2.8.**
a. Research and analyze two different versions of the same drama/theatre story to determine differences and similarities in the visual and aural world of each story. b. Investigate the time period and place of a drama/theatre work to better understand performance and design choices.	a. Research and discuss how a playwright might have intended a drama/theatre work to be produced. b. Examine artifacts from a time period and geographic location to better understand performance and design choices in a drama/theatre work.	a. Research the story elements of a staged drama/theatre work and compare them to another production of the same work. b. Identify and use artifacts from a time period and place to develop performance and design choices in a drama/theatre work.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Creativity and innovative thinking are essential life skills that can be developed.

Essential Question: What conditions, attitudes, and behaviors support creativity and innovative thinking?
What factors prevent or encourage people to take creative risks? How does collaboration expand the creative process?

6^{th} **VA:Cr1.1.6**	**7^{th}** **VA:Cr1.1.7**	**8^{th}** **VA:Cr1.1.8**
Combine concepts collaboratively to generate innovative ideas for creating art.	Apply methods to overcome creative blocks.	Document early stages of the creative process visually and/or verbally in traditional or new media.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Artists and designers shape artistic investigations, following or breaking with traditions in pursuit of creative art-making goals.

Essential Question: How does knowing the contexts histories, and traditions of art forms help us create works of art and design? Why do artists follow or break from established traditions? How do artists determine what resources and criteria are needed to formulate artistic investigations?

6^{th} **VA:Cr1.2.6**	**7^{th}** **VA:Cr1.2.7**	**8^{th}** **VA:Cr1.2.8**
Formulate an artistic investigation of personally relevant content for creating art.	Develop criteria to guide making a work of art or design to meet an identified goal.	Collaboratively shape an artistic investigation of an aspect of present-day life using a contemporary

		practice of art and design.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers experiment with forms, structures, materials, concepts, media, and art-making approaches. **Essential Question**: How do artists work? How do artists and designers determine whether a particular direction in their work is effective? How do artists and designers learn from trial and error?		
6th **VA:Cr2.1..6**	**7th** **VA:Cr2.1.7**	**8th** **VA:Cr2.1.8**
Demonstrate openness in trying new ideas, materials, methods, and approaches in making works of art and design.	Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.	Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of art-making or designing.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: Artists and designers balance experimentation and safety, freedom and responsibility while developing and creating artworks. **Essential Question**: How do artists and designers care for and maintain materials, tools, and equipment? Why is it important for safety and health to understand and follow correct procedures in handling materials, tools, and equipment? What responsibilities come with the freedom to create?		
6th **VA:Cr2.2.6**	**7th** **VA:Cr2.2.7**	**8th** **VA:Cr2.2.8**
Explain environmental implications of conservation, care, and clean-up of art	Demonstrate awareness of ethical responsibility to oneself and others when	Demonstrate awareness of practices, issues, and ethics of appropriation, fair use,

materials, tools, and equipment.	posting and sharing images and other materials through the Internet, social media, and other communication formats.	copyright, open source, and creative commons as they apply to creating works of art and design.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: People create and interact with objects, places, and design that define, shape, enhance, and empower their lives. **Essential Question**: How do objects, places, and design shape lives and communities? How do artists and designers determine goals for designing or redesigning objects, places, or systems? How do artists and designers create works of art or design that effectively communicate?		
6th **VA:Cr2.3.6**	**7th** **VA:Cr2.3.7**	**8th** **VA:Cr2.3.8**
Design or redesign objects, places, or systems that meet the identified needs of diverse users.	Apply visual organizational strategies to design and produce a work of art, design, or media that clearly communicates information or ideas.	Select, organize, and design images and words to make visually clear and compelling presentations.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Reflect- Refine- Complete **Enduring Understanding**: Artist and designers develop excellence through practice and constructive critique, reflecting on, revising, and refining work over time. **Essential Question**: What role does persistence play in revising, refining, and developing work? How do artists grow and become accomplished in art forms? How does collaboratively reflecting on a work help us experience it more completely?		
6th **VA:Cr3.1.6**	**7th** **VA:Cr3.1.7**	**8th** **VA:Cr3.1.8**
Reflect on whether personal artwork conveys the intended meaning and revise	Reflect on and explain important information about personal artwork in an artist	Apply relevant criteria to examine, reflect on, and plan revisions for a work of art or

accordingly.	statement or another format.	design in progress.

Discipline: Visual Arts		**Artistic Process**: Presenting
Anchor Standard 4: Select, analyze and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Artists and other presenters consider various techniques, methods, venues, and criteria when analyzing, selecting, and curating objects artifacts, and artworks for preservation and presentation. **Essential Question**: How are artworks cared for and by whom? What criteria, methods, and processes are used to select work for preservation or presentation? Why do people value objects, artifacts, and artworks, and select them for presentation?		
6th **VA:Pr4.1.6**	**7th** **VA:Pr4.1.7**	**8th** **VA:Pr4.1.8**
Analyze similarities and differences associated with preserving and presenting two-dimensional, three-dimensional, and digital artwork.	Compare and contrast how technologies have changed the way artwork is preserved, presented, and experienced.	Develop and apply criteria for evaluating a collection of artwork for presentation.

Discipline: Visual Arts		**Artistic Process**: Presenting
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Analyze **Enduring Understanding**: Artists, curators and others consider a variety of factors and methods including evolving technologies when preparing and refining artwork for display and or when deciding if and how to preserve and protect it. **Essential Question**: What methods and processes are considered when preparing artwork for presentation or preservation? How does refining artwork affect its meaning to the viewer? What criteria are considered when selecting work for presentation, a portfolio, or a collection?		
6th **VA:Pr5.1.6**	**7th** **VA:Pr5.1.7**	**8th** **VA:Pr5.1.8**
Individually or collaboratively, develop a visual plan for	Based on criteria, analyze and evaluate methods for	Collaboratively prepare and present selected theme-

displaying works of art, analyzing exhibit space, the needs of the viewer, and the layout of the exhibit.	preparing and presenting art.	based artwork for display, and formulate exhibition narratives for the viewer.

Discipline: Visual Arts		**Artistic Process**: Presenting
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Share **Enduring Understanding**: Objects, artifacts, and artworks collected, preserved, or presented either by artists, museums, or other venues communicate meaning and a record of social, cultural, and political experiences resulting in the cultivating of appreciation and understanding. **Essential Question**: What is an art museum? How does the presenting and sharing of objects, artifacts, and artworks influence and shape ideas, beliefs, and experiences? How do objects, artifacts, and artworks collected, preserved, or presented, cultivate appreciation and understanding?		
6th **VA:Pr6.1.6**	**7th** **VA:Pr6.1.7**	**8th** **VA:Pr6.1.8**
Assess, explain, and provide evidence of how museums or other venues reflect history and values of a community.	Compare and contrast viewing and experiencing collections and exhibitions in different venues.	Analyze why and how an exhibition or collection may influence ideas, beliefs, and experiences.

Discipline: Visual Arts		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Individual aesthetic and empathetic awareness developed through engagement with art can lead to understanding and appreciation of self, others, the natural world, and constructed environments. **Essential Question**: How do life experiences influence the way you relate to art? How does learning about art impact how we perceive the world? What can we learn from our responses to art?		
6th **VA:Pr7.1.6**	**7th** **VA:Pr7.1.7**	**8th** **VA:Pr7.1.8**
Identify and interpret works of art or design that reveal how	Explain how the method of display, the location, and the	Explain how a person's aesthetic choices are

people live around the world and what they value.	experience of an artwork influence how it is perceived and valued.	influenced by culture and environment and impact the visual image that one conveys to others.

Discipline: Visual Arts	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Perceive

Enduring Understanding: Visual imagery influences understanding of and responses to the world.

Essential Question: What is an image? Where and how do we encounter images in our world? How do images influence our views of the world?

6th **VA:Re7.2.6**	7th **VA:Re7.2.7**	8th **VA:Re7.2.8**
Analyze ways that visual components and cultural associations suggested by images influence ideas, emotions, and actions.	Analyze multiple ways that images influence specific audiences.	Compare and contrast contexts and media in which viewers encounter images that influence ideas, emotions, and actions.

Discipline: Visual Arts	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Analyze

Enduring Understanding: People gain insights into meanings of artworks by engaging in the process of art criticism.

Essential Question: What is the value of engaging in the process of art criticism? How can the viewer "read" a work of art as text? How does knowing and using visual art vocabularies help us understand and interpret works of art?

6th **VA:Re8.1.6**	7th **VA:Re8.1.7**	8th **VA:Re8.1.8**
Interpret art by distinguishing between relevant and non-relevant contextual information and analyzing subject matter,	Interpret art by analyzing art-making approaches, the characteristics of form and structure, relevant contextual information, subject matter,	Interpret art by analyzing how the interaction of subject matter, characteristics of form and structure, use of media, art-making approaches, and

characteristics of form and structure, and use of media to identify ideas and mood conveyed.	and use of media to identify ideas and mood conveyed.	relevant contextual information contributes to understanding messages or ideas and mood conveyed.

Discipline: Visual Arts		**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Interpret **Enduring Understanding**: People evaluate art based on various criteria. **Essential Question**: How does one determine criteria to evaluate a work of art? How and why might criteria vary? How is a personal preference different from an evaluation?		
6th **VA:Re9.1.6**	**7th** **VA:Re9.1.7**	**8th** **VA:Re9.1.8**
Develop and apply relevant criteria to evaluate a work of art.	Compare and explain the difference between an evaluation of an artwork based on personal criteria and an evaluation of an artwork based on a set of established criteria.	Create a convincing and logical argument to support an evaluation of art.

Discipline: Visual Arts		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Through art-making, people make meaning by investigating and developing awareness of perceptions, knowledge, and experiences. **Essential Question**: How does engaging in creating art enrich people's lives? How does making art attune people to their surroundings? How do people contribute to awareness and understanding of their lives and the lives of their communities through art-making?		
6th **VA:Cn10.1.6**	**7th** **VA:Cn10.1.7**	**8th** **VA:Cn10.1.8**
Generate a collection of ideas reflecting current interests and concerns that	Individually or collaboratively create visual documentation of places and times in which	Make art collaboratively to reflect on and reinforce positive aspects of group

could be investigated in art-making.	people gather to make and experience art or design in the community.	identity.

Discipline: Visual Arts		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: People develop ideas and understandings of society, culture, and history through their interactions with and analysis of art. **Essential Question**: How does art help us understand the lives of people of different times, places, and cultures? How is art used to impact the views of a society? How does art preserve aspects of life?		
6th **VA:Cn11.1.6**	**7th** **VA:Cn11.1.7**	**8th** **VA:Cn11.1.8**
Analyze how art reflects changing times, traditions, resources, and cultural uses.	Analyze how response to art is influenced by understanding the time and place in which it was created, the available resources, and cultural uses.	Distinguish different ways art is used to represent, establish, reinforce, and reflect group identity.

~~MIDDLE LEVEL ENGLISH LANGUAGE ARTS~~

~~STANDARDS FOR~~
~~English Language Arts~~
~~6-8~~

~~Kentucky Academic Standards~~

~~The standards are organized around the follow features:~~

- ~~**Reading and Literature:** Text complexity and the growth of comprehension~~
- ~~**Writing and Research:** Text types, grade-level focuses, and research~~
- ~~**Speaking and Listening:** Flexible communication~~
- ~~**Language Development:** Conventions and vocabulary~~

~~Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, and Language~~

~~The descriptions that follow are not standards themselves but instead offer a portrait of students who meet the standards set out in this document. As students advance through the grades and master the standards in reading, writing, speaking, listening, and language, they are able to exhibit with increasing fullness and regularity these capacities of the literate individual.~~

~~They demonstrate independence.~~

~~Students can, without significant scaffolding, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and convey intricate or multifaceted information. Likewise, students are able independently to discern a speaker's key points, request clarification, and ask relevant questions. They build on others' ideas, articulate their own ideas, and confirm they have been understood. Without prompting, they demonstrate command of standard English and acquire and use a wide-ranging vocabulary. More broadly, they become self-directed learners, effectively seeking out and using resources to assist them, including teachers, peers, and print and digital reference materials.~~

~~They build strong content knowledge.~~

~~Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.~~

~~They respond to the varying demands of audience, task, purpose, and discipline.~~

~~Students adapt their communication in relation to audience, task, purpose, and discipline. They set and adjust purpose for reading, writing, speaking, listening, and language use as warranted by the task. They appreciate nuances, such as how the composition of an audience should affect tone when speaking and how the connotations of words affect meaning. They also know that different disciplines call for different types of evidence (e.g., documentary evidence in history, experimental evidence in science).~~

~~They comprehend as well as critique.~~

~~Students are engaged and open-minded—but discerning—readers and listeners. They work diligently to understand precisely what an author or speaker is saying, but they also question an author's or speaker's assumptions and premises and assess the veracity of claims and the soundness of reasoning.~~

~~They value evidence.~~

~~Students cite specific evidence when offering an oral or written interpretation of a text. They use relevant evidence when supporting their own points in writing and speaking, making their reasoning clear to the reader or listener, and they constructively evaluate others' use of evidence.~~

~~They use technology and digital media strategically and capably.~~

~~Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.~~

~~They come to understand other perspectives and cultures.~~

~~Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.~~

~~How to read this document~~

~~Overall Document Organization~~

~~The Standards comprise three main sections: a comprehensive K–5 section and two content area–specific sections for grades 6–12, one for ELA and one for history/social studies, science, and technical subjects. Three appendices accompany the main document.~~

~~Each section is divided into strands. K–5 and 6–12 ELA have Reading, Writing, Speaking and Listening, and Language strands; the 6–12 history/ social studies, science, and technical subjects section focuses on Reading and Writing. Each strand is headed by a strand-specific set of College and Career Readiness Anchor Standards that is identical across all grades and content areas.~~

~~Standards for each grade within K–8 and for grades 9–10 and 11–12 follow the CCR anchor standards in each strand. Each grade-specific standard (as these standards are collectively referred to) corresponds to the same-numbered CCR anchor standard. Put another way, each CCR anchor standard has an accompanying grade-specific standard translating the broader CCR statement into grade-appropriate end-of-year expectations.~~

~~Individual CCR anchor standards can be identified by their strand, CCR status, and number (R.CCR.6, for example). Individual grade-specific standards can be identified by their strand, grade, and number (or number and letter, where applicable), so that RI.4.3, for example, stands for Reading, Informational Text, grade 4, standard 3 and W.5.1a stands for Writing, grade 5, standard 1a. Strand designations can be found in brackets alongside the full strand title.~~

~~Who is responsible for which portion of the Standards~~

~~A single K–5 section lists standards for reading, writing, speaking, listening, and language across the curriculum, reflecting the fact that most or all of the instruction students in these grades receive comes from one teacher. Grades 6–12 are covered in two content area–specific sections, the first for the English language arts teacher and the second for teachers of history/social studies, science, and technical subjects. Each section uses the same CCR anchor standards but also includes grade-specific standards tuned to the literacy requirements of the particular discipline(s).~~

~~Key features of the Standards~~

~~Reading: Text complexity and the growth of comprehension~~

~~The Reading standards place equal emphasis on the sophistication of what students read and the skill with which they read. Standard 10 defines a grade by grade "staircase" of increasing text complexity that rises from beginning reading to the college and career readiness level. Whatever they are reading, students must also show a steadily growing ability to discern more from and make fuller use of text, including making an increasing number of connections among ideas and between texts, considering a wider range of textual evidence, and becoming more sensitive to inconsistencies, ambiguities, and poor reasoning in texts.~~

~~Writing: text types, responding to reading, and research~~

~~The Standards acknowledge the fact that whereas some writing skills, such as the ability to plan, revise, edit, and publish, are applicable to many types of writing, other skills are more properly defined in terms of specific writing types: arguments, informative/explanatory texts, and narratives. Standard 9 stresses the importance of the writing-reading connection by requiring students to draw and write about evidence from literary and informational texts. Because of the centrality of writing to most forms of inquiry, research standards are prominently included in this strand, though skills important to research are infused throughout the document.~~

~~Speaking and Listening: flexible communication and collaboration~~

~~Including but not limited to skills necessary for formal presentations, the Speaking and Listening standards require students to develop a range of broadly useful oral communication and interpersonal skills. Students must learn to work together, express and listen carefully to ideas, integrate information from oral, visual, quantitative, and media sources, evaluate what they hear, use media and visual displays strategically to help achieve communicative purposes, and adapt speech to context and task.~~

~~Language: Conventions, effective use, and vocabulary~~

~~The Language standards include the essential "rules" of standard written and spoken English, but they also approach language as a matter of craft and informed choice among alternatives. The vocabulary standards focus on understanding words and phrases, their relationships, and their nuances and on acquiring new vocabulary, particularly general academic and domain-specific words and phrases.~~

~~Appendices A, B, and C~~

~~Appendix A contains supplementary material on reading, writing, speaking and listening, and language as well as a glossary of key terms. Appendix B consists of text exemplars illustrating the complexity, quality, and range of reading appropriate for various grade levels with accompanying sample performance tasks. Appendix C includes annotated samples demonstrating at least adequate performance in student writing at various grade levels.~~

~~College and Career Readiness Anchor Standards for Reading~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Key Ideas and Details~~

1. ~~Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.~~
2. ~~Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.~~
3. ~~Analyze how and why individuals, events, and ideas develop and interact over the course of a text.~~

~~Craft and Structure~~

4. ~~Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.~~
5. ~~Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.~~
6. ~~Assess how point of view or purpose shapes the content and style of a text.~~

~~Integration of Knowledge and Ideas~~

7. ~~Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*~~
8. ~~Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.~~
9. ~~Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.~~

~~Range of Reading and Level of Text Complexity~~

10. ~~Read and comprehend complex literary and informational texts independently and proficiently.~~

~~*Please see “Research to Build Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.~~

~~Note on range and content of student reading~~

~~To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students’ own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts.~~

Reading Standards for Literature 6–12

RL

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2. Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.	2. Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.
3. Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.	3. Analyze how particular elements of a story or drama interact (e.g., how setting shapes the characters or plot).	3. Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.	5. Analyze how a drama's or poem's form or structure (e.g., soliloquy, sonnet) contributes to its meaning.	5. Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style.
6. Explain how an author develops the point of view of the narrator or speaker in a text.	6. Analyze how an author develops and contrasts the points of view of different characters or narrators in a text.	6. Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.

Reading Standards for Literature 6–12

Grade 6 students:	Grade 7 students:	Grade 8 students:
Integration of Knowledge and Ideas		
7. Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they "see" and "hear" when reading the text to what they perceive when they listen or watch.	7. Compare and contrast a written story, drama, or poem to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, or camera focus and angles in a film).	7. Analyze the extent to which a filmed or live production of a story or drama stays faithful to or departs from the text or script, evaluating the choices made by the director or actors.
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)
9. Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.	9. Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.	9. Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new.
Range of Reading and Level of Text Complexity		
10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6–8 text complexity band independently and proficiently.

Reading Standards for Informational Text 6–12

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.	2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.
3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).	3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
5. Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.	5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.	5. Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.
6. Determine an author's point of view or purpose in a text and explain how it is conveyed in the text.	6. Determine an author's point of view or purpose in a text and analyze how the author distinguishes his or her position from that of others.	6. Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.
Integration of Knowledge and Ideas		
7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	7. Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).	7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.	8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.	8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
9. Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).	9. Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.	9. Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.
Range of Reading and Level of Text Complexity		
10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.	10. By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.

~~College and Career Readiness Anchor Standards for Writing~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Text Types and Purposes*~~

1. ~~Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.~~
2. ~~Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.~~
3. ~~Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.~~

~~Production and Distribution of Writing~~

4. ~~Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.~~
5. ~~Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.~~
6. ~~Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.~~

~~Research to Build and Present Knowledge~~

7. ~~Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.~~
8. ~~Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.~~
9. ~~Draw evidence from literary or informational texts to support analysis, reflection, and research.~~

~~Range of Writing~~

10. ~~Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.~~

~~*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.~~

~~Note on range and content of student writing~~

~~For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within argument and explanation within narrative— to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.~~

Writing Standards 6–12

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Text Types and Purposes		
1. Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s) and organize the reasons and evidence clearly. b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from the argument presented.	1. Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	1. Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.
2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from the information or explanation presented.	2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.

Writing Standards 6–12

Grade 6 students:	Grade 7 students:	Grade 8 students:
Text Types and Purposes (continued)		
3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events. e. Provide a conclusion that follows from the narrated experiences or events.	3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.	3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.
Production and Distribution of Writing		
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 52.)	5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 7 on page 52.)	5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 8 on page 52.)
6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.	6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.	6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.

Writing Standards 6–12

Grade 6 students:	Grade 7 students:	Grade 8 students:
Research to Build and Present Knowledge		
7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.	7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.	7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.	8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 6 Reading standards to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics"). b. Apply grade 6 Reading standards to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").	9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 7 Reading standards to literature (e.g., "Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history"). b. Apply grade 7 Reading standards to literary nonfiction (e.g. "Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims").	9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 8 Reading standards to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new"). b. Apply grade 8 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").
Range of Writing		
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

~~College and Career Readiness Anchor Standards for Speaking and Listening~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Comprehension and Collaboration~~

1. ~~Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.~~
2. ~~Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.~~
3. ~~Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.~~

~~Presentation of Knowledge and Ideas~~

4. ~~Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.~~
5. ~~Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.~~
6. ~~Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.~~

~~Note on range and content of student speaking and listening~~

~~To become college and career ready, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains. They must be able to contribute appropriately to these conversations, to make comparisons and contrasts, and to analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline. Whatever their intended major or profession, high school graduates will depend heavily on their ability to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.~~

~~New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. The Internet has accelerated the speed at which connections between speaking, listening, reading, and writing can be made, requiring that students be ready to use these modalities nearly simultaneously. Technology itself is changing quickly, creating a new urgency for students to be adaptable in response to change.~~

Speaking and Listening Standards 6–12

The following standards for grades 6–12 offer a focus for instruction in each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Grade 6 students:	Grade 7 students:	Grade 8 students:
Comprehension and Collaboration		
1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 6 topics, texts, and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed. c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion. d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 7 topics, texts, and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed. d. Acknowledge new information expressed by others and, when warranted, modify their own views.	1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas. d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.	2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.	2. Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
3. Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.	3. Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.	3. Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
Presentation of Knowledge and Ideas		
4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.	4. Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.	5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 52 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 on page 52 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 52 for specific expectations.)

~~College and Career Readiness Anchor Standards for Language~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Conventions of Standard English~~

1. ~~Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.~~
2. ~~Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.~~

~~Knowledge of Language~~

3. ~~Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.~~

~~Vocabulary acquisition and Use~~

4. ~~Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.~~
5. ~~Demonstrate understanding of word relationships and nuances in word meanings.~~
6. ~~Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.~~

~~Note on range and content of student language use~~

~~To be college and career ready in language, students must have firm control over the conventions of standard English. At the same time, they must come to appreciate that language is as at least as much a matter of craft as of rules and be able to choose words, syntax, and punctuation to express themselves and achieve particular functions and rhetorical effects. They must also have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content. They need to become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them. They must learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.~~

Language Standards 6–12

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 56 for a complete listing and Appendix A for an example of how these skills develop in sophistication.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Conventions of Standard English		
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Ensure that pronouns are in the proper case (subjective, objective, possessive). b. Use intensive pronouns (e.g., *myself, ourselves*). c. Recognize and correct inappropriate shifts in pronoun number and person.* d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).* e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.*	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of phrases and clauses in general and their function in specific sentences. b. Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas. c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.*	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences. b. Form and use verbs in the active and passive voice. c. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood. d. Recognize and correct inappropriate shifts in verb voice and mood.*
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.* b. Spell correctly.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use a comma to separate coordinate adjectives (e.g., *It was a fascinating, enjoyable movie* but not *He wore an old[,] green shirt*). b. Spell correctly.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break. b. Use an ellipsis to indicate an omission. c. Spell correctly.
Knowledge of Language		
3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Vary sentence patterns for meaning, reader/listener interest, and style.* b. Maintain consistency in style and tone.*	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.*	3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact).

Language Standards 6–12

Grade 6 students:	Grade 7 students:	Grade 8 students:
Vocabulary Acquisition and Use		
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 6 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *audience, auditory, audible*). c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 7 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *belligerent, bellicose, rebel*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	4. Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *precede, recede, secede*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., personification) in context. b. Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words. c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *stingy, scrimping, economical, unwasteful, thrifty*).	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., literary, biblical, and mythological allusions) in context. b. Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words. c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *refined, respectful, polite, diplomatic, condescending*).	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g. verbal irony, puns) in context. b. Use the relationship between particular words to better understand each of the words. c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *bullheaded, willful, firm, persistent, resolute*).
6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

~~Language Progressive Skills, by Grade~~

~~The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.~~

Standard	Grade(s)							
	3	4	5	6	7	8	9–10	11–12
L.3.1f. Ensure subject-verb and pronoun-antecedent agreement.								
L.3.3a. Choose words and phrases for effect.								
L.4.1f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.								
L.4.1g. Correctly use frequently confused words (e.g., *to/too/two; there/their*).								
L.4.3a. Choose words and phrases to convey ideas precisely.*								
L.4.3b. Choose punctuation for effect.								
L.5.1d. Recognize and correct inappropriate shifts in verb tense.								
L.5.2a. Use punctuation to separate items in a series.†								
L.6.1c. Recognize and correct inappropriate shifts in pronoun number and person.								
L.6.1d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
L.6.1e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
L.6.2a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
L.6.3a. Vary sentence patterns for meaning, reader/listener interest, and style.‡								
L.6.3b. Maintain consistency in style and tone.								
L.7.1c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.								
L.8.1d. Recognize and correct inappropriate shifts in verb voice and mood.								
L.9–10.1a. Use parallel structure.								

~~* Subsumed by L.7.3a~~
~~† Subsumed by L.9–10.1a~~
~~‡ Subsumed by L.11–12.3a~~

~~Standard 10: Range, Quality, and Complexity of Student Reading 6–12~~
~~Measuring Text Complexity: Three Factors~~

~~**Qualitative evaluation of the text:** Levels of meaning, structure, language conventionality and clarity, and knowledge demands~~

~~**Quantitative evaluation of the text:** Readability measures and other scores of text complexity~~

~~**Matching reader to text and task**: Reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed)~~

~~**Note:** More detailed information on text complexity and how it is measured is contained in Appendix A.~~

	~~**Literature**~~		~~**Informational Text**~~
~~Stories~~	~~Drama~~	~~Poetry~~	~~Literary nonfiction~~
~~Includes the subgenres of adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, and graphic novels~~	~~Includes one-act and multi-act plays, both in written form and on film~~	~~Includes the subgenres of narrative poems, lyrical poems, free verse poems, sonnets, odes, ballads, and epics~~	~~Includes the subgenres of exposition, argument, and functional text in the form of personal essays, speeches, opinion pieces, essays about art or literature, biographies, memoirs, journalism, and historical, scientific, technical, or economic accounts (including digital sources) written for a broad audience~~

~~Texts Illustrating the Complexity, Quality, and Range of Student Reading 6–12~~

	Literature: Stories, Dramas, Poetry	Informational Texts: Literary Nonfiction
6-8	▪ *Little Women* by Louisa May Alcott (1869) ▪ *The Adventures of Tom Sawyer* by Mark Twain (1876) ▪ "The Road Not Taken" by Robert Frost (1915) ▪ *The Dark Is Rising* by Susan Cooper (1973) ▪ *Dragonwings* by Laurence Yep (1975) ▪ *Roll of Thunder, Hear My Cry* by Mildred Taylor (1976)	▪ "Letter on Thomas Jefferson" by John Adams (1776) ▪ *Narrative of the Life of Frederick Douglass, an American Slave* by Frederick Douglass (1845) ▪ "Blood, Toil, Tears and Sweat: Address to Parliament on May 13th, 1940" by Winston Churchill (1940) ▪ *Harriet Tubman: Conductor on the Underground Railroad* by Ann Petry (1955) ▪ *Travels with Charley: In Search of America* by John Steinbeck (1962)
9-10	▪ *The Tragedy of Macbeth* by William Shakespeare (1592) ▪ "Ozymandias" by Percy Bysshe Shelley (1817) ▪ "The Raven" by Edgar Allen Poe (1845) ▪ "The Gift of the Magi" by O. Henry (1906) ▪ *The Grapes of Wrath* by John Steinbeck (1939) ▪ *Fahrenheit 451* by Ray Bradbury (1953) ▪ *The Killer Angels* by Michael Shaara (1975)	▪ "Speech to the Second Virginia Convention" by Patrick Henry (1775) ▪ "Farewell Address" by George Washington (1796) ▪ "Gettysburg Address" by Abraham Lincoln (1863) ▪ "State of the Union Address" by Franklin Delano Roosevelt (1941) ▪ "Letter from Birmingham Jail" by Martin Luther King, Jr. (1964) ▪ "Hope, Despair and Memory" by Elie Wiesel (1997)
11-CCR	▪ "Ode on a Grecian Urn" by John Keats (1820) ▪ *Jane Eyre* by Charlotte Brontë (1848) ▪ "Because I Could Not Stop for Death" by Emily Dickinson (1890) ▪ *The Great Gatsby* by F. Scott Fitzgerald (1925) ▪ *Their Eyes Were Watching God* by Zora Neale Hurston (1937) ▪ *A Raisin in the Sun* by Lorraine Hansberry (1959) ▪ *The Namesake* by Jhumpa Lahiri (2003)	▪ *Common Sense* by Thomas Paine (1776) ▪ *Walden* by Henry David Thoreau (1854) ▪ "Society and Solitude" by Ralph Waldo Emerson (1857) ▪ "The Fallacy of Success" by G. K. Chesterton (1909) ▪ *Black Boy* by Richard Wright (1945) ▪ "Politics and the English Language" by George Orwell (1946) ▪ "Take the Tortillas Out of Your Poetry" by Rudolfo Anaya (1995)

~~**Note**: Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of grades 6–12 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth.~~

~~STANDARDS FOR~~
~~Literacy in History/Social Studies, Science, and Technical Subjects~~
~~6–8~~

~~College and Career Readiness Anchor Standards for Reading~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Key Ideas and Details~~

1. ~~Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.~~
2. ~~Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.~~
3. ~~Analyze how and why individuals, events, or ideas develop and interact over the course of a text.~~

~~Craft and Structure~~

4. ~~Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.~~
5. ~~Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.~~
6. ~~Assess how point of view or purpose shapes the content and style of a text.~~

~~Integration of Knowledge and Ideas~~

7. ~~Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*~~
8. ~~Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.~~
9. ~~Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.~~

~~Range of Reading and Level of Text Complexity~~

10. ~~Read and comprehend complex literary and informational texts independently and proficiently.~~

~~*Please see "Research to Build and Present Knowledge" in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.~~

~~Note on range and content of student reading~~

~~Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.~~

~~Reading Standards for Literacy in History/Social Studies 6–12~~

~~The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.~~

RH

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
~~1. Cite specific textual evidence to support analysis of primary and secondary sources.~~	~~1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.~~	~~1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.~~
~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.~~	~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.~~	~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.~~
~~3. Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).~~	~~3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.~~	~~3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.~~
~~Craft and Structure~~		
~~4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.~~	~~4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.~~	~~4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).~~
~~5. Describe how a text presents information (e.g., sequentially, comparatively, causally).~~	~~5. Analyze how a text uses structure to emphasize key points or advance an explanation or analysis~~	~~5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.~~
~~6. Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).~~	~~6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.~~	~~6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.~~
~~Integration of Knowledge and Ideas~~		
~~7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.~~	~~7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.~~	~~7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.~~
~~8. Distinguish among fact, opinion, and reasoned judgment in a text.~~	~~8. Assess the extent to which the reasoning and evidence in a text support the author's claims.~~	~~8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.~~
~~9. Analyze the relationship between a primary and secondary source on the same topic.~~	~~9. Compare and contrast treatments of the same topic in several primary and secondary sources.~~	~~9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.~~
~~Range of Reading and Level of Text Complexity~~		
~~10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.~~	~~10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.~~	~~10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–12 text complexity band independently and proficiently.~~

~~Reading Standards for Literacy in Science and Technical Subjects 6–12~~

RST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
~~1. Cite specific textual evidence to support analysis of science and technical texts.~~	~~1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.~~	~~1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.~~
~~2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.~~	~~2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.~~	~~2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.~~
~~3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.~~	~~3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.~~	~~3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.~~
~~Craft and Structure~~		
~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics.*~~	~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.~~	~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.~~
~~5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.~~	~~5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).~~	~~5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.~~
~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.~~	~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.~~	~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.~~
~~Integration of Knowledge and Ideas~~		
~~7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).~~	~~7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.~~	~~7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.~~
~~8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.~~	~~8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.~~	~~8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.~~
~~9. Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic.~~	~~9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.~~	~~9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.~~
~~Range of Reading and Level of Text Complexity~~		
~~10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.~~	~~10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.~~	~~10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.~~

~~College and Career Readiness Anchor Standards for Writing~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Text Types and Purposes*~~

1. ~~Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.~~
2. ~~Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.~~
3. ~~Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.~~

~~Production and Distribution of Writing~~

4. ~~Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.~~
5. ~~Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.~~
6. ~~Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.~~

~~Research to Build and Present Knowledge~~

7. ~~Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.~~
8. ~~Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.~~
9. ~~Draw evidence from literary or informational texts to support analysis, reflection, and research.~~

~~Range of Writing~~

10. ~~Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.~~

~~*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.~~

~~Note on range and content of student writing~~

~~For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.~~

~~Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12~~

~~The standards below begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.~~

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes		
1. Write arguments focused on *discipline-specific content*. a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	1. Write arguments focused on *discipline-specific content.* a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.	1. Write arguments focused on *discipline-specific content.* a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes (continued)		
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style and objective tone. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)

Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Production and Distribution of Writing		
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Research to Build and Present Knowledge		
7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
9. Draw evidence from informational texts to support analysis reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.
Range of Writing		
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

~~MIDDLE LEVEL MATHEMATICS~~

~~Kentucky Academic Standards~~
~~Mathematics~~
~~Grades 6-8~~

~~Mathematics Academic Standards for grade 4 contain several headings, each one the title of a single progression having significant presence in that particular grade level. Under each of these progression headings, there appear standards, divided into standards describing concepts student should understand and standards describing skills students should acquire.~~

~~Introduction~~

~~Toward greater focus and coherence~~

~~For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is "a mile wide and an inch deep." These Standards are a substantial answer to that challenge.~~

~~Understanding mathematics~~

~~These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity,~~ ~~*why*~~ ~~a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b+ c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.~~

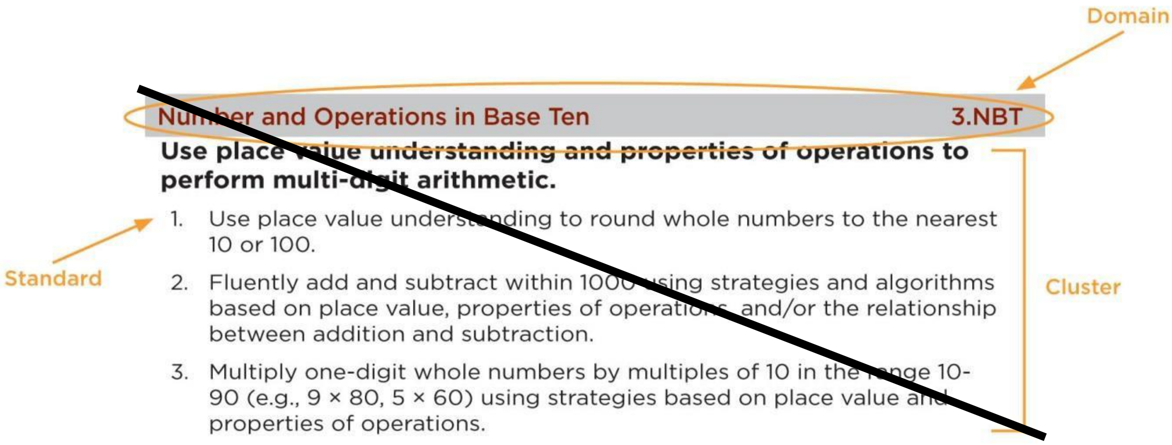
~~The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. For example, for students with disabilities reading should allow for use of Braille, screen reader technology, or other assistive devices, while writing should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and listening should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.~~

~~How to read the grade level standards~~

~~*Standards* define what students should understand and be able to do.~~

~~*Clusters* are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.~~

~~*Domains* are larger groups of related standards. Standards from different domains may sometimes be closely related.~~



~~These Standards do not dictate curriculum or teaching methods. For example, just because topic A appears before topic B in the standards for a given grade, it does not necessarily mean that topic A must be taught before topic B. A teacher might prefer to teach topic B before topic A, or might choose to highlight connections by teaching topic A and topic B at the same time. Or, a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B.~~

~~What students can learn at any particular grade level depends upon what they have learned before. Ideally then, each standard in this document might have been phrased in the form, "Students who already know ... should next come to learn ...." But at present this approach is unrealistic—not least because existing education research cannot specify all such learning pathways. Of necessity therefore, grade placements for specific topics have been made on the basis of state and international comparisons and the collective experience and collective professional judgment of educators, researchers and mathematicians. One promise of common state standards is that over time they will allow research on learning progressions to inform and improve the design of standards to a much greater extent than is possible today. Learning opportunities will continue to vary across schools and school systems, and educators should make every effort to meet the needs of individual students based on their current understanding.~~

~~These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.~~

~~**Mathematics | Standards for Mathematical Practice**~~

~~The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).~~

~~**1. Make sense of problems and persevere in solving them.**~~

~~Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.~~

~~**2. Reason abstractly and quantitatively.**~~

~~Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.~~

~~**3. Construct viable arguments and critique the reasoning of others.**~~

~~Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.~~

~~4. Model with mathematics.~~

~~Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.~~

~~5. Use appropriate tools strategically.~~

~~Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.~~

~~6. Attend to precision.~~

~~Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.~~

~~7. Look for and make use of structure.~~

~~Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression~~ $\cancel{x^2 + 9x + 14}$~~, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see~~ $\cancel{5 - 3(x - y)^2}$ ~~as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers~~ $\cancel{x}$ ~~and~~ $\cancel{y}$~~.~~

~~**8. Look for and express regularity in repeated reasoning.**~~

~~Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.~~

~~**Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content**~~

~~The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.~~

~~The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word “understand” are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.~~

~~In this respect, those content standards which set an expectation of understanding are potential “points of intersection” between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.~~

~~Mathematics | Grade 6~~

~~In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.~~

~~Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.~~

~~Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.~~

~~Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as 3x = y) to describe relationships between quantities.~~

~~Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.~~

~~Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.~~

~~Grade 6 Overview~~

~~Ratios and Proportional Relationships~~
~~Understand ratio concepts and use ratio reasoning to solve problems.~~

~~The Number System~~
~~Apply and extend previous understandings of multiplication and division to divide fractions by fractions.~~
~~Compute fluently with multi-digit numbers and find common factors and multiples.~~
~~Apply and extend previous understandings of numbers to the system of rational numbers.~~

~~Expressions and Equations~~
~~Apply and extend previous understandings of arithmetic to algebraic expressions.~~
~~Reason about and solve one-variable equations and inequalities.~~
~~Represent and analyze quantitative relationships between dependent and independent variables.~~

~~Geometry~~
~~Solve real-world and mathematical problems involving area, surface area, and volume.~~

~~Statistics and Probability~~
~~Develop understanding of statistical variability.~~
~~Summarize and describe distributions.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~Ratios and Proportional Relationships 6.RP~~

~~Understand ratio concepts and use ratio reasoning to solve problems.~~

~~Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”~~

~~Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.[1]~~

~~Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.~~

~~Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane.~~

~~Use tables to compare ratios.~~

~~Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?~~

~~Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.~~

~~Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.~~

~~The Number System 6.NS~~

~~Apply and extend previous understandings of multiplication and division to divide fractions by fractions.~~

~~Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.~~ ~~*For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area ½ square mi?*~~

~~Compute fluently with multi-digit numbers and find common factors and multiples.~~

~~Fluently divide multi-digit numbers using the standard algorithm.~~

~~Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.~~

~~Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For~~ ~~*example, express 36 + 8 as 4 (9 + 2).*~~

~~[1] Expectations for unit rates in this grade are limited to non-complex fractions.~~

~~Apply and extend previous understandings of numbers to the system of rational numbers.~~

~~Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.~~

~~Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.~~

~~Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.~~

~~Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.~~

~~Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.~~

~~Understand ordering and absolute value of rational numbers.~~

~~Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that – is located to the right of –7 on a number line oriented from left to right.~~

~~Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3 oC > –7 oC to express the fact that –3 oC is warmer than –7 oC.~~

~~Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.~~

~~Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.~~

~~Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.~~

~~Expressions and Equations~~	**~~6.EE~~**

~~Apply and extend previous understandings of arithmetic to algebraic expressions.~~

~~Write and evaluate numerical expressions involving whole-number exponents.~~

~~Write, read, and evaluate expressions in which letters stand for numbers.~~

~~Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y.~~

~~Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.~~

~~Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those~~

~~involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.~~

~~Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x +3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.~~

~~Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.~~

~~**Reason about and solve one-variable equations and inequalities.**~~

~~Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.~~

~~Use variables to represent numbers and write expressions when solving a real-world or~~

~~mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.~~

~~Solve real-world and mathematical problems by writing and solving equations of the form *x* + *p* =~~

~~*q* and *px* = *q* for cases in which *p*, *q* and *x* are all nonnegative rational numbers.~~

~~Write an inequality of the form *x* > *c* or *x* < *c* to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form *x* > *c* or *x* < *c* have infinitely many solutions; represent solutions of such inequalities on number line diagrams.~~

~~**Represent and analyze quantitative relationships between dependent and independent variables.**~~

~~Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For *example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*~~

~~**Geometry**~~ ~~**6.G**~~

~~**Solve real-world and mathematical problems involving area, surface area, and volume.**~~

~~Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.~~

~~Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.~~

~~Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.~~

~~Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.~~

~~**Statistics and Probability**~~ ~~**6.SP**~~

~~**Develop understanding of statistical variability.**~~

~~Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For *example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*~~

~~Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.~~

~~Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.~~

~~**Summarize and describe distributions.**~~

~~Display numerical data in plots on a number line, including dot plots, histograms, and box plots.~~

~~Summarize numerical data sets in relation to their context, such as by:~~

~~Reporting the number of observations.~~

~~Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.~~

~~Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.~~

~~Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.~~

~~Mathematics | Grade 7~~

~~In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.~~

~~Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and~~

~~proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.~~

~~Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percent's as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.~~

~~Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.~~

~~Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.~~

~~Grade 7 Overview~~

~~Ratios and Proportional Relationships~~

~~Analyze proportional relationships and use them to solve real-world and mathematical problems.~~

~~The Number System~~

~~Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.~~

~~Expressions and Equations~~

~~Use properties of operations to generate equivalent expressions.~~

~~Solve real-life and mathematical problems using numerical and algebraic expressions and equations.~~

~~Geometry~~

~~Draw, construct and describe geometrical figures and describe the relationships between them.~~

~~Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.~~

~~Statistics and Probability~~

~~Use random sampling to draw inferences about a population.~~

~~Draw informal comparative inferences about two populations.~~

~~Investigate chance processes and develop, use, and evaluate probability models.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~**Ratios and Proportional Relationships 7.RP**~~

~~**Analyze proportional relationships and use them to solve real-world and mathematical problems.**~~

~~Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each ¼ hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.~~

~~Recognize and represent proportional relationships between quantities.~~

~~Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.~~

~~Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.~~

~~Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.~~

~~Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.~~

~~Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups *and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*~~

~~**The Number System 7.NS**~~

~~**Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.**~~

~~Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.~~

~~Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.~~

~~Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.~~

~~Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (– q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.~~

~~Apply properties of operations as strategies to add and subtract rational numbers.~~

~~Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.~~

~~Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.~~

~~Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts.~~

~~Apply properties of operations as strategies to multiply and divide rational numbers.~~

~~Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.~~

~~Solve real-world and mathematical problems involving the four operations with rational numbers.[1]~~

~~**Expressions and Equations**~~	~~**7.EE**~~

~~**Use properties of operations to generate equivalent expressions.**~~

~~Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.~~

~~Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*~~

~~**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**~~

~~Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.~~

~~Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.~~

~~Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently.~~
~~Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?~~

~~Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.~~

~~**Expressions and Equations**~~	~~**7.EE**~~

~~**Draw, construct, and describe geometrical figures and describe the relationships between them.**~~

~~Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.~~

~~Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.~~

~~Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.~~

~~[1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.~~

~~Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.~~

~~Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.~~

~~Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.~~

~~Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.~~

~~Statistics and Probability~~	**~~7.SP~~**

~~Use random sampling to draw inferences about a population.~~

~~Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.~~

~~Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based~~ *~~on randomly sampled survey data. Gauge how far off the estimate or prediction might be.~~*

~~Draw informal comparative inferences about two populations.~~

~~Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.~~

~~Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.~~

~~Investigate chance processes and develop, use, and evaluate probability models.~~

~~Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.~~

~~Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For~~ *~~example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.~~*

~~Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.~~

~~Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.~~

~~Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?~~

~~Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.~~

~~Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.~~

~~Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.~~

~~Design and use a simulation to generate frequencies for compound events. For example, use random digits as *a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood*?~~

~~Mathematics | Grade 8~~

~~In Grade 8, instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.~~

~~Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions ($y/x = m$ or $y = mx$) as special linear equations ($y = mx + b$), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount $m \cdot A$. Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and y-intercept) in terms of the situation.~~

~~Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.~~

~~Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations.~~

~~Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.~~

~~Grade 8 Overview~~

~~the number System~~

~~Know that there are numbers that are not rational, and approximate them by rational numbers.~~

~~Expressions and Equations~~

~~Work with radicals and integer exponents.~~

~~Understand the connections between proportional relationships, lines, and linear equations.~~

~~Analyze and solve linear equations and pairs of simultaneous linear equations.~~

~~Functions~~

~~Define, evaluate, and compare functions.~~

~~Use functions to model relationships between quantities.~~

~~Geometry~~

~~Understand congruence and similarity using physical models, transparencies, or geometry software.~~

~~Understand and apply the Pythagorean Theorem.~~

~~Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.~~

~~Statistics and Probability~~

~~Investigate patterns of association in bivariate data.~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning.~~

~~The Number System 8.NS~~

~~Know that there are numbers that are not rational, and approximate them by rational numbers.~~

~~Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.~~

~~Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2). For example,~~ *~~by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.~~*

~~Expressions and Equations 8.EE~~

~~Work with radicals and integer exponents.~~

~~Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3–5 = 3–3 = 1/33 = 1/27.~~

~~Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.~~

~~Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.~~

~~Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.~~

~~Understand the connections between proportional relationships, lines, and linear equations.~~

~~Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.~~

~~Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.~~

~~Analyze and solve linear equations and pairs of simultaneous linear equations.~~

~~Solve linear equations in one variable.~~

~~Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).~~

~~Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.~~

~~Analyze and solve pairs of simultaneous linear equations.~~

~~Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.~~

~~Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.~~

~~Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.~~

~~Functions 8.F~~

~~Define, evaluate, and compare functions.~~

~~Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[27]~~

~~Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.~~

~~Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,*1), (2,4) and (3,9), which are not on a straight line.*~~

~~Use functions to model relationships between quantities.~~

~~Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.~~

~~Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.~~

~~Geometry 8.G~~

~~Understand congruence and similarity using physical models, transparencies, or geometry software.~~

~~Verify experimentally the properties of rotations, reflections, and translations:~~

~~Lines are taken to lines, and line segments to line segments of the same length.~~

~~Angles are taken to angles of the same measure.~~

~~Parallel lines are taken to parallel lines.~~

~~Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.~~

~~Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.~~

~~Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.~~

[27] ~~Function notation is not required in Grade 8.~~

~~Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.~~

~~Understand and apply the Pythagorean Theorem.~~

~~Explain a proof of the Pythagorean Theorem and its converse.~~

~~Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.~~

~~Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.~~

~~Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.~~

~~Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.~~

~~Statistics and Probability~~ **~~8.SP~~**

~~Investigate patterns of association in bivariate data.~~

~~Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.~~

~~Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.~~

~~Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.~~

~~For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.~~

~~Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For~~ *~~example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores~~*~~?~~

~~MIDDLE LEVEL PRACTICAL LIVING~~

~~(HEALTH AND PHYSICAL EDUCATION)~~

~~Kentucky Academic Standards – Practical Living – Sixth Grade~~

~~Individuals are required to make daily decisions regarding health issues that affect their immediate and long-term health. Maintaining a health way of living requires a balance of physical, mental, emotional and social well-being. The 6th grade Health Education program provides students with knowledge skills necessary to confront health related issues and make a smooth transition from puberty to adolescence. The sixth grade health education curriculum emphasizes development of decision-making skills related to the essential areas of self-esteem, peer pressure, physical wellness, nutrition, safety and first aid, disease prevention, exercise, fitness, human growth and development, stress management, conflict resolution, substance abuse, group membership, goal setting, mental and emotional wellness, community resources and services.~~

~~Literacy in physical education means competence in movement forms, the knowledge and application of concepts and principles related to motor skills and the adoption of a healthy, physically active lifestyle. Competence in movement forms makes possible the enjoyment of participation in physical activity and establishes the foundation for continued motor skill acquisition. Increased skill acquisition, in turn, affords the student the capacity for successful and advance levels of performance that further increase the likelihood of participation in physical activity.~~

~~Students in 6th grade combine fundamental skills into more complex movement forms in modified game, dance and recreational activities. Cooperative and competitive small-group games are appropriate with an emphasis being placed on developing skills and tactical understanding. Students use feedback to initiate and maintain practice to improve skill performance. Students assess their health-related fitness status and set reasonable and appropriate goals for development, maintenance and improvement. Social interaction becomes more complex as peer pressure becomes increasingly pronounced, impacting individual performance. Students solve problems and make responsible decisions as they work together. They exhibit a physically active lifestyle at school and outside the school environment.~~

~~The Health and Physical Education content standards at the 6th grade level are directly aligned with Kentucky's **Academic Expectations**. The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases, and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~**2.29** Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.32** Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~**3.2** Students demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.1** Students effectively use interpersonal skills.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 6 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~it is important to assume responsibility for personal health.~~
~~interactions with others are an integral part of the human life experience and contribute to healthy relationships.~~
~~the environment, lifestyle, family history, peers and other factors impact physical, social, mental and emotional health.~~
~~culture, values (e.g., individual, family, community) media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal behavioral choices games) can influence personal health.~~
~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
~~positive health habits can help prevent injuries and the spreading of diseases to self and others.~~
~~self-management and coping strategies can enhance mental and emotional health.~~
~~a variety of resources are available to inform, treat and counsel individuals with physical, mental, social and emotional health needs.~~

~~Grade 6 Skills and Concepts – Personal and Physical Health~~

~~Students will~~

~~understand the importance of assuming responsibility for personal health behaviors:~~
~~predict how decisions regarding health behaviors (e.g., hygiene, diet, exercise) have consequences for self and others~~
~~analyze personal decisions that impact an individual's emotional, sexual and reproductive health (e.g., abstinence)~~
~~explain how rights and responsibilities are interrelated~~
~~explore and analyze how an individual's behaviors and choices of diet, exercise and rest affect the body~~
~~analyze various communication methods and barriers for expressing health information and ideas~~

~~Grade 6 Skills and Concepts – Growth and Development~~

~~Students will~~

~~apply strategies and skills needed to obtain personal health goals during adolescence and~~
~~identify the physical, social and emotional changes (e.g., growth spurts, peer influence, self-confidence, mood swings) that occur during adolescence~~
~~explain basic structures and function of the reproductive system~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 6 Skills and Concepts – Social, Mental and Emotional Health~~
~~Students will~~
~~demonstrate social interaction skills by:~~
~~using appropriate means to express needs, wants and feelings~~
~~using and describe the importance of effective social interaction skills (e.g., respect, self-advocacy, cooperation, communication, identifying and being open to different perspectives and points of view, empathy, friendship)~~
~~recommending effective strategies for responding to stress, conflict, peer pressure and bullying~~
~~interpreting how individuals impact the effective functioning of groups~~
~~demonstrate the ability to apply a decision-making process to health issues and problems individually and collaboratively~~
~~identify common social and emotional problems (aggression, anxiety, depression, grief) and describe self-management and coping strategies (goal setting, refusal skills, decision making and time management) for addressing these problems~~

~~Grade 6 Skills and Concepts – Family and Community Health~~
~~Students will~~
~~analyze how personal health choices, individual well-being and use of health services can be influenced by:~~
~~family traditions/values~~
~~technology and media messages~~
~~cultural beliefs~~
~~physical, social and emotional environments~~
~~information from peers~~

~~Grade 6 Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~
~~Students will~~
~~demonstrate an understanding of diseases by:~~
~~describing symptoms, causes, patterns of transmission, prevention and treatments of communicable diseases (colds, flu, mononucleosis, hepatitis, HIV/STD, tuberculosis)~~
~~describing symptoms, causes, patterns of transmission, prevention and treatments of non-communicable diseases (cancer, cardiovascular disease, diabetes, obesity, asthma, emphysema)~~
~~investigate family history, environment, lifestyle and other risk factors related to the cause or prevention of disease and other health problems~~
~~demonstrate an understanding of how to maintain a healthy body by:~~
~~explaining how health is influenced by the interaction of body systems (e.g., reproductive, digestive, circulatory, skeletal, respiratory)~~
~~describing ways pathogens from the environment (e.g., air, food, people) enter the body and explaining how body defenses fight pathogens~~
~~explaining how personal hygiene practices affect physical, mental/emotional and social health; explaining how personal health habits (e.g., hand washing, care of teeth and eyes, sun protection) affect self and others in the prevention and spread of disease~~
~~identifying health care providers and describing reasons for preventive care~~

~~**Big Idea: Personal Wellness (Health Education) – Continued**~~
~~**Grade 6 Skills and Concepts – Alcohol, Tobacco and Other Drugs**~~ ~~*Students will*~~ ~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs by:~~ ~~distinguishing between legal (e.g., over the counter, prescription drugs) and illegal drugs (e.g., inhalants, marijuana, stimulants, depressants) and describing how their usage affects the body systems~~ ~~describing the immediate and long-term effects of alcohol and drug usage and the impact on physical, mental, emotional and social health (e.g., effects on family life)~~ ~~identifying resources available to individuals seeking treatment or counseling for negative behaviors or addictions~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~2.29~~ ~~Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.32~~ ~~Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~Grade 6 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~proper nutrition is essential to growth and development.~~
~~nutrients have a role in the development of an individual's health.~~
~~resources are available to assist in making nutritional choices.~~
~~individuals, families and community values influence nutritional choices.~~

~~Grade 6 Skills and Concepts~~

~~Students will~~

~~identify the role of nutrients and food sources which are important in the growth and development of healthy bodies~~
~~explain the role of nutrition on the body systems impacting growth and development~~
~~interpret, explain and apply the recommendations of national resources (e.g., Food Guide Pyramid (FGP), Dietary Guidelines for Americans, National Dairy Council) in making healthful food choices for a balanced diet~~
~~analyze factors (e.g., geography, convenience, cost, advertising) that influence healthy food choices~~
~~explain the role of nutrition on the body systems impacting the growth and development of healthy bodies~~
~~use the nutritional information provided on food labels to explain how it can impacts dietary choices~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.33** Students demonstrate the skills to evaluate and use services and resources available in their community.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.3** Students individually demonstrate consistent, responsive and caring behavior.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 6 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
~~community and state resources are available to assist in hazardous situations.~~
~~proper procedures must be used in emergency situations.~~

~~Grade 6 Skills and Concepts~~

~~Students will~~

~~explain reasons for safety practices (e.g., walking in opposite direction of violence, staying calm in dangerous situations) for dealing with a variety of health hazards (e.g., firearms, motorized vehicles or potentially unsafe or threatening situations) encountered by adolescents~~
~~describe potential hazards in and around the home and school explain how to prevent injuries~~
~~Identify and practice safety procedures needed for emergencies (e.g., tornado, fire, earthquake) at home and school~~
~~recognize life threatening emergencies and identify basic first-aid procedures for responding to a variety of life-threatening emergencies (e.g., choking, broken bones, shock, poisons, burns, allergic reactions, bleeding)~~
~~describe how to avoid dangerous situations involving strangers, fires and internet safety~~
~~identify local and state health/safety agencies (e.g., health department, fire department, state police, hospital transport services) and the services they provide~~
~~access and use reliable resources on safety guidelines for avoiding injuries and dangerous situations~~
~~identify and practice communications skills needed in emergency situations~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Grade 6 Enduring Knowledge – Understandings~~
~~Students will understand that~~
~~movement concepts, principles, strategies and tactics apply to the learning and performance of physical activities.~~
~~motor skills need to be refined, combined and varied in the development of specialized skills (e.g., serving, catching with a glove, dribbling, punting).~~

~~Grade 6 Skills and Concepts~~
~~Students will~~
~~identify and apply principles of motor skill refinement (e.g. accuracy, technique, movement) that are necessary for skill development~~
~~demonstrate a variety of locomotor and combination skills in a movement pattern~~
~~use non-locomotor, locomotor and combination skills to demonstrate movements in creative sequences and in simple patterned dances, games and other activities~~
~~demonstrate a variety of non-locomotor, locomotor and combination skills while participating in different games and sports~~
~~demonstrate refined manipulative skills of throwing, catching, kicking and striking while developing motor skills (e.g., sliding, running, jumping) for use in games and other activities that lead to more complex games and sports (e.g., long jump, hurdles, volleyball, soccer, softball)~~
~~demonstrate how transitional motor skills (e.g., punting, serving, dribbling) are influenced by space, force and time~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status, and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~**Academic Expectations**~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.34** Students perform physical movements skills effectively in a variety of settings.~~
~~**2.35** Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~**3.1** Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~**3.2** Students demonstrate the ability to maintain a healthy lifestyle.~~
~~**3.7** Students demonstrate the ability to learn on one's own.~~
~~**4.2** Students use productive team membership skills.~~

~~**Grade 6 Enduring Knowledge – Understandings**~~

~~*Students will understand that*~~
~~leisure/recreational or competitive physical activities provide opportunities for self-expression, social interactions and can be enjoyable and challenging.~~
~~intrinsic values and other benefits (physical, emotional/mental, social) are gained by regular participation in leisure/recreational or competitive activities.~~
~~techniques, strategies and practice are important for improving performance of sport skills.~~
~~rules impact effective participation in physical activities.~~
~~personal and social behavior that shows respect to self and others impacts enjoyment and safety in physical activity settings.~~
~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~
~~fitness principles and techniques are used to improve/maintain physical health.~~

~~Big Idea: Lifetime Physical Wellness (Physical Education) – Continued~~
~~**Grade 6 Skills and Concepts**~~ ~~*Students will*~~ ~~identify several moderate to vigorous physical activities that provide personal pleasure~~ ~~explain the physical, emotional/mental and social value in participating in physical activity~~ ~~describe the physical, emotional/mental and social benefits gained from regular participation in leisure/recreational or competitive physical activities~~ ~~recognize through participation in a variety of activities that personal skill development results from prior experiences, natural ability and practice~~ ~~describe the relationship between effort and improvement in skills gained from physical activities~~ ~~participate regularly in physical activity~~ ~~when participating in a variety of physical activities, sports and games:~~ ~~identify and apply rules of behavior and fair play (e.g., accepting authoritative decisions, assessing one's own performance level, accepting skills and abilities of others through verbal and nonverbal actions for spectators and/or participants)~~ ~~demonstrate sportsmanship, cooperation, teamwork and conflict resolution~~ ~~identify and use appropriate safety principles, rules, procedures and etiquette~~ ~~identify offensive and defensive strategies used in games and sports~~ ~~identify and assess activities that enhance the health related fitness components (muscular strength, muscular endurance, flexibility, body composition, cardio respiratory endurance)~~ ~~explain the meaning of the F.I.T.T. Principle (Frequency, Intensity, Type, Time) and examine their impact on improving personal fitness~~ ~~identify and assess lifetime activities (e.g., biking, hiking, horseback riding, swimming) that enhance the health-related fitness components (muscular strength, muscular endurance, flexibility, body composition, cardio respiratory endurance)~~ ~~investigate how the systems of the body affect an individual's personal fitness level~~

~~Kentucky Academic Standards – Practical Living – Seventh Grade~~

~~The purpose of health education is to help students acquire an understanding of health concepts and skills and to apply them in making healthy decisions to improve, sustain, and promote personal, family and community health.~~

~~Health education instruction for seventh grade emphasizes students generating and choosing positive alternatives to risky behaviors. They use skills to resist peer pressure and manage stress and anxiety. Students are able to relate health choices (e.g., nutrition, physical activity) to alertness, feelings and performance at school or during physical activity. Students exhibit a healthy lifestyle, interpret health information and promote good health.~~

~~Motor-skill acquisition and performance are enhanced by the application of movement concepts and principles in the 7th grade physical education program. Increased knowledge and practice promotes independent learning and more regular and effective participation in physical activity. Understanding not only how motor skills develop but the relationship between physical activity and its immediate and identifiable effects on the body contributes to and understanding of the benefits of a healthy lifestyle. In grade seven, students continue to develop competence in modified versions of game/sport, dance and recreational activities. They vary movement during dynamic and changing game situations. The ability to analyze skill performance through observing and understanding critical elements (isolated, small parts of the whole skill or movement) is increasingly apparent, as is the application of basic scientific principles of movement and personal fitness. Students relate the importance of physical activity to health, focusing particularly on obesity and stress. They create plans for improving personal fitness. Students continue to develop responsible personal and social behaviors by demonstrating decision-making skills, conflict-resolution skills, appropriate etiquette and respect for others. Students achieve and maintain personal fitness standards and set reasonable and appropriate goals for improvement or maintenance of health-related fitness.~~

~~The Health and Physical Education content standards at the 7th grade level are directly aligned with Kentucky's **Academic Expectations**. The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~2.29~~ ~~Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.32~~ ~~Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~Grade 7 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~individuals have a responsibility to advocate for personal, family and community health.~~
~~interactions with others are an integral part of the human life experience and contribute to healthy relationships.~~
~~physical, social, emotional and mental changes occur during adolescence and throughout life.~~
~~the environment, lifestyle, family history, peers and other factors impact physical, social, mental and emotional health.~~
~~culture, values (e.g., individual, family and community) media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal health.~~
~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
~~positive health habits can help prevent injuries and the spreading of diseases to self and others.~~
~~self-management and coping strategies can enhance mental and emotional health.~~
~~a variety of resources are available to inform, treat and counsel individuals with physical, mental, social and emotional health needs.~~

~~Grade 7 Skills and Concepts – Personal and Physical Health~~

~~Students will~~

~~identify ways to advocate for personal, family and community health~~
~~understand the importance of assuming responsibility for personal health behaviors:~~
~~predict how decisions regarding health behaviors have consequences for self and others~~
~~analyze decisions that impact an individual's emotional, sexual, and reproductive health (e.g., describing benefits of abstaining from sexual activity: preventing pregnancy, preventing STDs, maintaining self-esteem)~~
~~explain how rights and responsibilities are interrelated~~
~~evaluate how an individual's behaviors and choices of diet, exercise and rest affect the body~~

~~Grade 7 Skills and Concepts – Growth and Development~~

~~Students will~~

~~apply strategies and skills needed to obtain personal health goals during adolescence~~
~~describe the physical, social and emotional changes (e.g., growth spurts, peer influence, self-confidence, mood swings) that occur during adolescence~~
~~explain basic structures and functions of the reproductive system as it relates to the human life cycle~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 7 Skills and Concepts – Social, Mental and Emotional Health~~
~~Students will~~
~~demonstrate social interaction skills by:~~
~~using appropriate means to express needs, wants and feelings~~
~~using and explaining the importance of effective social interaction skills (e.g., respect, self-advocacy, cooperation, communication, identifying and being open to different perspectives and points of view, empathy, friendship)~~
~~recommending and justify effective strategies (e.g., problem solving, decision making, refusal skills, anger management, conflict resolution) for responding to stress, conflict, peer pressure and bullying~~
~~interpreting how individuals impact the effective functioning of groups~~
~~demonstrate the ability to apply a decision-making process to health issues and problems individually and collaboratively~~
~~identify common social and emotional problems (aggression, anxiety, depression, grief) and describe self-management and coping strategies (goal setting, refusal skills, decision making and time management) for addressing these problems~~

~~Grade 7 Skills and Concepts – Family and Community Health~~
~~Students will~~
~~analyze how personal health choices, individual well-being and use of health services can be influenced by:~~
~~family traditions/values~~
~~technology and media messages~~
~~cultural beliefs~~

~~Grade 7 Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~
~~Students will~~
~~demonstrate an understanding of diseases by:~~
~~describing symptoms, causes, patterns of transmission, prevention and treatments of communicable diseases (colds, flu, mononucleosis, hepatitis, HIV/STD, tuberculosis)~~
~~describing symptoms, causes, patterns of transmission, prevention and treatments of non-communicable diseases (cancer, cardiovascular disease, diabetes, obesity, asthma, emphysema)~~
~~investigate family history, environment, lifestyle and other risk factors related to the cause or prevention of disease and other health problems~~
~~demonstrate an understanding of how to maintain a healthy body by:~~
~~explaining how health is influenced by the interaction of body systems~~
~~describing ways pathogens from the environment (e.g., air, food, people) enter the body and explaining how body defenses fight pathogens~~
~~explaining how personal hygiene practices affect physical, mental/emotional and social health; explaining how personal health habits (e.g., hand washing, care of teeth and eyes, sun protection) affect self and others in the prevention and spread of disease~~
~~identifying health care providers and describing reasons for preventive care~~

~~**Big Idea: Personal Wellness (Health Education) – Continued**~~
~~**Grade 7 Skills and Concepts – Alcohol, Tobacco and Other Drugs**~~ ~~*Students will*~~ ~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs by:~~ ~~distinguishing between legal (e.g., over the counter, prescription drugs) and illegal drugs (e.g., inhalants, marijuana, stimulants, depressants)and describing how their usage affects the body systems~~ ~~describing the immediate/long-term effects of alcohol, tobacco and illegal drug usage and analyzing their impact on health~~ ~~describing resources available to individuals seeking treatment or counseling for negative behaviors or addictions~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

- **~~2.30~~** ~~Students evaluate consumer products and services and make effective consumer decisions.~~
- **~~2.31~~** ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
- **~~3.2~~** ~~Students will demonstrate the ability to maintain a healthy lifestyle.~~
- **~~3.5~~** ~~Students will demonstrate self-control and self-discipline.~~
- **~~5.1~~** ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
- **~~5.4~~** ~~Students use decision-making process to make informed decisions among options.~~

~~Grade 7 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~proper nutrition is essential to growth and development.~~

~~nutrients have a role in the development of an individual's health.~~

~~resources are available to assist in making nutritional choices.~~

~~individuals, families and community values influence nutritional choices.~~

~~Grade 7 Skills and Concepts~~

~~Students will~~

~~analyze factors (e.g., geography, cultural background, convenience, advertising) that influence healthy food choices~~

~~identify organs and body systems and explain how they are affected by nutrients~~

~~apply the decision-making process when analyzing resources needed in making dietary choices~~

~~describe the role of nutrients and food sources which are important in the growth and development of healthy bodies~~

~~use print and non-print resources (e.g., Food Guide Pyramid (FGP), *Dietary Guidelines for Americans*, United States Department of Agriculture (USDA), National Dairy council), to make healthful food choices in real-life situations~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.33~~ ~~Students demonstrate the skills to evaluate and use services and resources available in their community.~~
~~3.2~~ ~~Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~4.3~~ ~~Students individually demonstrate consistent, responsive and caring behavior.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to~~ solve ~~a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~Grade 7 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
~~community, state and federal resources are available to assist in hazardous situations.~~
~~proper procedures must be used in emergency situations.~~

~~Grade 7 Skills and Concepts~~

~~Students will~~

~~explain how health hazards (e.g., firearms, motorized vehicles or potentially unsafe or threatening situations) and safety practices (e.g., walking in opposite direction of violence, staying calm in dangerous situations, wearing protective gear, notifying appropriate authority) can influence their personal health~~
~~identify and describe potential hazards in and around the home and school explain how to prevent injuries~~
~~explain and practice safety procedures needed for emergencies (e.g., weather, fire, tornado, lock down) at home or school~~
~~identify life threatening emergencies and describe basic first-aid procedures for responding to a variety of life-threatening emergencies (e.g., choking, broken bones, shock, poisons, burns, allergic reactions, bleeding)~~
~~identify and access the available local, state and federal health and safety agencies (e.g., health departments, Center for Disease Control and Prevention (CDC), National Guard) and explain the services they provide~~
~~use reliable safety resources and guidelines to help in avoiding injuries and dangerous situations (e.g., internet use, vehicles, firearms, watercraft)~~
~~identify and practice (e.g., role play, simulation) communications skills needed in emergency situations~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Grade 7 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~movement concepts, principles, strategies and tactics apply to the learning and performance of physical activities.~~

~~motor skills need to be refined, combined and varied in the development of specialized skills (e.g., serving, catching with a glove, dribbling, punting.~~

~~Grade 7 Skills and Concepts~~

~~Students will~~

~~interpret the role that principles of motor skill refinements (e.g. accuracy, technique, movement) have in skill development~~

~~demonstrate increased competence in motor skills for individual, dual and team activities~~

~~use non-locomotor, locomotor and combination skills to demonstrate movements in creative sequences and in simple patterned dances, games and other activities~~

~~improve techniques to achieve consistency in performance of fundamental manipulative skills (e.g., throwing, catching, kicking, dribbling, striking) for participation in games and activities~~

~~demonstrate and explain how transitional motor skills (e.g., punting, serving, dribbling) are impacted by space, force and time~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical Education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~**Academic Expectations**~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.34** Students perform physical movements skills effectively in a variety of settings.~~
~~**2.35** Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~**3.1** Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~**3.2** Students demonstrate the ability to maintain a healthy lifestyle.~~
~~**3.7** Students demonstrate the ability to learn on one's own.~~
~~**4.2** Students use productive team membership skills.~~

~~**Grade 7 Enduring Knowledge – Understandings**~~

~~*Students will understand that*~~

~~leisure/recreational or competitive physical activities provide opportunities for self-expression, social interactions and can be enjoyable and challenging.~~
~~intrinsic values and other benefits (physical, emotional/mental, social) are gained by regular participation in leisure/recreational or competitive activities.~~
~~techniques, strategies and practice are important for improving performance of sport skills.~~
~~rules impact effective participation in physical activities.~~
~~personal and social behavior that shows respect to self and others impacts enjoyment and safety in physical activity settings.~~
~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~
~~fitness principles and techniques are used to improve/maintain physical health.~~

~~**Big Idea: Lifetime Physical Wellness (Physical Education) – Continued**~~
~~**Grade 7 Skills and Concepts**~~ ~~*Students will*~~ ~~identify moderate to vigorous physical activities that will provide for personal enjoyment and health benefits~~ ~~examine and analyze the personal benefits derived from regular participation in leisure/recreational or competitive physical activities~~ ~~evaluate the relationship between effort and skill improvement~~ ~~demonstrate and apply the technique of practice progression to personal skill development~~ ~~access and describe techniques (e.g., practice, lessons, videos, drills, peer/teacher review, self-evaluation)~~ ~~for improving performance in games and sports~~ ~~participate regularly in physical activity~~ ~~when participating in a variety of physical activities, sports and games:~~ ~~identify and apply rules of behavior and fair play (e.g., accepting authoritative decisions, assessing one's own performance level, accepting skills and abilities of others through verbal and nonverbal actions for spectators and/or participants)~~ ~~demonstrate sportsmanship, cooperation, teamwork and conflict resolution~~ ~~recognize and use safety principles, rules, procedures and etiquette~~ ~~describe how offensive and defensive strategies are used in games and sports; create, explore and devise strategies for games or physical activities~~ ~~explain the components of fitness (muscular strength, muscular endurance, flexibility, body composition, cardio-respiratory endurance) and how the FITT Principle (Frequency, Intensity, Type, Time) can be used to maintain and improve fitness~~ ~~identify and assess lifetime activities (e.g., bowling, tennis, swimming, walking) that enhance the health-related fitness~~ ~~investigate how the systems of the body affect an individual's personal fitness level~~ ~~explain the relationship of nutrition and exercise to physical fitness~~

~~Kentucky Academic Standards – Practical Living – Eighth Grade~~

~~The purpose of health education is to help students acquire an understanding of health concepts and skills and to apply them in making healthy decisions to improve, sustain and promote personal, family and community health.~~

~~Students in 8th grade have an understanding of the origins and causes of diseases, including the relationship between family history and certain health risks. They begin to relate short- and long-term consequences of health choices and apply health skills to specific personal, family and community health concerns. Students discern relationships among all components of health and wellness and knowledgeably use consumer information.~~

~~The 8th grade physical education program assists in the continuing physical, mental, social and emotional development of students as they make the transition from puberty to adolescence. There is a focus on fitness activities, techniques, strategies and rule of games and sports. Participation in lifetime activities such as golf, tennis, bowling, archery, running, hiking, swimming and cycling are also emphasized. Students in 8th grade demonstrate competence in skillful movement in modified, dynamic game situations and in a variety of dance and recreational activities. They transition from modified versions of movement forms to more complex applications across all types of activities — game/sport, dance and recreational pursuits. Students demonstrate the ability to assume responsibility for guiding their own learning as they apply their knowledge and abilities to create a practice plan to improve performance in a selected game/sport, dance or recreational pursuit. They demonstrate mature responsibility as they show respect for others, make reasoned and appropriate choices, resist negative peer pressure and exhibit fair play. They have a repertoire of abilities across a variety of game/sport, dance and recreational pursuits and begin to develop competence in specialized versions of lifetime game/sport activities.~~

~~The Health and Physical Education content standards at the 8th grade level are directly aligned with Kentucky's **Academic Expectations.** The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~**2.29** Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.32** Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~**3.2** Students demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.1** Students effectively use interpersonal skills.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 8 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~individuals have a responsibility to advocate for personal, family and community health.~~
~~physical, social, emotional and mental changes occur during adolescence and throughout life.~~
~~interactions with others are an integral part of the human life experience and contribute to healthy relationships.~~
~~the environment, lifestyle, family history, peers and other factors impact physical, social, mental and emotional health.~~
~~culture, values (e.g., individual, family and community) media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal behavioral choices.~~
~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
~~positive health habits can help prevent injuries and spreading of diseases to self and others.~~
~~self-management and coping strategies can enhance mental and emotional health.~~
~~a variety of resources are available to inform, treat and counsel individuals with physical, mental, social and emotional health needs.~~

~~Grade 8 Skills and Concepts – Personal and Physical Health~~

~~Students will~~

~~evaluate communication methods used in advocating for personal, family and community health~~
~~understand the importance of assuming responsibility for personal health behaviors:~~
~~predict how decisions regarding health behaviors have consequences for self and others~~
~~explain the benefits (preventing pregnancy, preventing HIV/STDs, maintaining self-esteem) and strategies (e.g., using refusal skills, talking with parents, doctors, counselors) of abstaining from sexual activity~~
~~evaluate how an individual's behaviors and choices of diet, exercise and rest affect the body~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 8 Skills and Concepts – Growth and Development~~
~~Students will~~
~~apply strategies and skills needed to obtain personal health goals during adolescence and describe the physical, social and emotional changes (e.g., growth spurts, peer influence, self-confidence, mood swings) that occur during adolescence~~
~~explain basic structures and functions of the reproductive system as it relates to the human life cycle~~

~~Grade 8 Skills and Concepts – Social, Mental and Emotional Health~~
~~Students will~~
~~demonstrate social interaction skills by:~~
~~using appropriate means to express needs, wants and feelings~~
~~using and explaining the importance of effective social interaction skills (e.g., respect, self-advocacy, cooperation, communication, identifying and being open to different perspectives and points of view, empathy, friendship)~~
~~recommending and justifying effective strategies (e.g., problem solving, decision making, refusal skills, anger management, conflict resolution) for responding to stress, conflict, peer pressure and bullying~~
~~interpreting how individuals impact the effective functioning of groups~~
~~demonstrate the ability to apply a decision-making process to health issues and problems individually and collaboratively~~
~~identify common social and emotional problems (aggression, anxiety, depression, grief) and describe self-management and coping strategies (goal setting, refusal skills, decision making and time management) for addressing these problems~~

~~Grade 8 Skills and Concepts – Family and Community Health~~
~~Students will~~
~~analyze how personal health, health behaviors and use of health services can be influenced by:~~
~~family traditions/values~~
~~technology and media messages~~
~~cultural beliefs~~
~~physical, social and emotional environments~~
~~information from peers~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~Grade 8 Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~

~~Students will~~

~~demonstrate an understanding of diseases by:~~

~~describing symptoms, causes, patterns of transmission, prevention and treatments of communicable diseases (colds, flu, mononucleosis, hepatitis, HIV/STD, tuberculosis)~~

~~describing symptoms, causes, patterns of transmission, prevention and treatments of non-communicable diseases (cancer, cardiovascular disease, diabetes, obesity, asthma, emphysema)~~

~~investigate family history, environment, lifestyle and other risk factors related to the cause or prevention of disease and other health problems~~

~~demonstrate an understanding of how to maintain a healthy body by:~~

~~analyzing how health is influenced by the interaction of body systems~~

~~describing ways pathogens from the environment (e.g., air, food, people) enter the body and explaining how body defenses fight pathogens~~

~~explaining how personal hygiene practices affect physical, mental/emotional and social health;~~

~~explaining how personal health habits (e.g., hand washing, care of teeth and eyes, sun protection) affect self and others in the prevention and spread of disease~~

~~identifying health care providers and describing reasons for preventive care~~

~~Grade 8 Skills and Concepts – Alcohol, Tobacco and Other Drugs~~

~~Students will~~

~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs by:~~

~~distinguishing between legal (e.g., over the counter, prescription drugs) and illegal drugs (e.g., inhalants, marijuana, stimulants, depressants) and describing how their usage affects the body systems~~

~~describing the immediate/long-term effects of alcohol, tobacco and illegal drug usage and analyzing their impact on health~~

~~describing resources available to individuals seeking treatment or counseling for negative behaviors or addictions~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~**2.30** Students evaluate consumer products and services and make effective consumer decisions.~~
~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**3.5** Students will demonstrate self-control and self-discipline.~~
~~**5.1** Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~**5.4** Students use decision-making process to make informed decisions among options.~~

~~Grade 8 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~proper nutrition is essential to growth and development.~~
~~nutrients have a role in the development of an individual's health.~~
~~resources are available to assist in making nutritional choices.~~
~~individuals, families and community values influence nutritional choices.~~

~~Grade 8 Skills and Concepts~~

~~Students will~~

~~evaluate the role of nutrients and food sources in the growth and development of healthy bodies~~
~~identify problems that occur from extreme eating behaviors (overeating, obesity, anorexia, bulimia)~~
~~analyze factors (e.g., geography, family, cultural background, convenience, cost, advertising, friends, personal taste) that influence healthy food choices~~
~~apply the decision-making process when analyzing resources needed in making dietary choices~~
~~use print and non-print resources (e.g., Food Guide Pyramid (FGP), *Dietary Guidelines for Americans*, United States Department of Agriculture (USDA), National Dairy council), to make healthful food choices in real-life situations~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~**2.33** Students demonstrate the skills to evaluate and use services and resources available in their community.~~
~~**3.2** Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~**4.3** Students individually demonstrate consistent, responsive and caring behavior.~~
~~**4.4** Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~**5.1** Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to~~ solve ~~a variety of problems in real-life situations.~~
~~**5.4** Students use a decision-making process to make informed decisions among options.~~

~~Grade 8 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
~~community, state and federal resources are available to assist in hazardous situations.~~
~~proper procedures must be used in emergency situations.~~

~~Grade 8 Skills and Concepts~~

~~Students will~~

~~explain how health hazards (e.g., firearms, motorized vehicles, all-terrain vehicles, personal water craft, potentially unsafe or threatening situations) and safety practices (e.g., walking in opposite direction of violence, staying calm in dangerous situations, wearing protective gear, notifying appropriate authority) may influence their personal health~~
~~identify and describe potential hazards in and around the home and school explain how to prevent injuries~~
~~demonstrate safety procedures needed for emergencies (e.g., weather, fire, tornado, lock down) at home or school~~
~~recognize life threatening emergencies and explain how basic first-aid procedures for responding to a variety of life-threatening emergencies (e.g., falls, drowning, choking, bleeding, shock, poisons, burns, temperature-related emergencies, allergic reactions, broken bones) can help reduce the severity of injuries and save lives~~
~~identify and access the available local, state and federal health and safety agencies (e.g., health departments, Center for Disease Control and Prevention (CDC), National Guard) and explain the services they provide~~
~~use reliable safety resources and guidelines to help in avoiding injuries and dangerous situations (e.g., internet use, vehicles, firearms, watercraft)~~
~~demonstrate communications skills needed in emergency situations~~
~~explain safety practices needed when assuming responsibilities (babysitting, house-sitting, elderly care, pet care) in caring for animals, property and other individuals~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~

~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~

~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~

~~4.1~~ ~~Students effectively use interpersonal skills.~~

~~Grade 8 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~movement concepts, principles, strategies and tactics apply to the learning and performance of physical activities.~~

~~motor skills need to be refined, combined and varied in the development of specialized skills (e.g., serving, catching with a glove, dribbling, punting).~~

~~Grade 8 Skills and Concepts~~

~~Students will~~

~~critique transitional motor skills and patterns to make recommendations for improvement~~

~~selects appropriate practice procedures to learn and master skills and movement patterns~~

~~analyze the principles of motor skill refinements (e.g. accuracy, technique, movement) have in skill development~~

~~demonstrate increased competence in motor skills for individual, dual and team activities~~

~~explore the use of non-locomotor, locomotor and combination skills in movement sequences, patterned dances, games and other activities~~

~~refine techniques to achieve consistency in performance of fundamental manipulative skills (e.g., throwing, catching, kicking, dribbling, striking) for participation in games and activities~~

~~demonstrate and explain how transitional motor skills are needed for participation in games, activities and rhythmic movements (e.g., baseball, soccer, dance, golf, basketball)~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~Academic Expectations~~

- **~~2.31~~** ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
- **~~2.34~~** ~~Students perform physical movements skills effectively in a variety of settings.~~
- **~~2.35~~** ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
- **~~3.1~~** ~~Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
- **~~3.2~~** ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
- **~~3.7~~** ~~Students demonstrate the ability to learn on one's own.~~
- **~~4.2~~** ~~Students use productive team membership skills.~~

~~Grade 8 Enduring Knowledge – Understandings~~

~~Students will understand that~~

~~leisure/recreational or competitive physical activities provide opportunities for self-expression, social interactions and can be enjoyable and challenging.~~

~~intrinsic values can be gained by regular participation in leisure/recreational or competitive activities.~~

~~techniques, strategies and practice are important for improving performance of sport skills.~~

~~adhering to rules and procedures, etiquette, cooperation and team work, ethical behavior and positive social interaction impacts the effective participation in sports and physical activities.~~

~~regular participation in health-related, physical activity supports the goals of fitness and a healthier lifestyle throughout life.~~

~~fitness principles and techniques are used to improve/maintain physical health.~~

~~Big Idea: Lifetime Physical Wellness (Physical Education) – Continued~~

~~Grade 8 Skills and Concepts~~
~~Students will~~
~~design and implement a personal lifetime leisure/recreational plan that includes challenging and enjoyable physical activities~~
~~examine and analyze the personal benefits derived from regular participation in leisure/recreational or competitive physical activities~~
~~develop and implement an appropriate practice plan for skill proficiency in games and sports~~
~~examine the relationship between and among effort, persistence, practice and improvement as they relate to skill development~~
~~access and describe techniques (e.g., practice, lessons, videos, drills, peer/teacher review, self-evaluation) for improving performance in games and sports~~
~~participate regularly in physical activity~~
~~when participating in a variety of physical activities, sports and games:~~
~~identify and apply rules of behavior and fair play (e.g., accepting authoritative decisions, assessing one's own performance level, accepting skills and abilities of others through verbal and nonverbal actions for spectators and/or participants)~~
~~demonstrate sportsmanship, cooperation, teamwork and conflict resolution~~
~~identify and use safety principles, rules, procedures and etiquette~~
~~describe how offensive and defensive strategies are used in games and sports~~
~~conduct a self-assessment which includes the elements and of the FITT Principle (Frequency, Intensity, Type, Time) and design a fitness plan based on assessment results~~
~~compare and contrast lifetime activities (e.g., biking, dance, tennis, horseback riding, walking, golf) that improve or maintain the components of fitness (muscular strength, muscular endurance, flexibility, body composition, cardio-respiratory endurance)~~
~~explain how the systems of the body (e.g., muscular, skeletal, nervous, respiratory, circulatory) affect an individual's personal fitness level~~
~~explain the relationship of nutrition and exercise to physical fitness~~

MIDDLE LEVEL SCIENCE

The Kentucky Academic Standards for Science are written as a set of performance expectations that are assessable statements of what students should know and be able to do. An underlying assumption of these standards is that all students should be held accountable for demonstrating their achievement of all performance expectations. A coherent and complete view of what students should be able to do comes when the performance expectations are viewed in tandem with the contents of the foundation boxes that lie just below the performance expectations. These three boxes include the practices, core disciplinary ideas, and crosscutting concepts, derived from the National Research Council's *Framework for K12 Science Education* that were used to construct this set of performance expectations.

Science and Engineering Practices
The blue box on the left includes just the science and engineering practices used to construct the performance expectations in the box above. These statements are derived from and grouped by the eight categories detailed in the *Framework* to further explain the science and engineering practices important to emphasize in each grade band. Most sets of performance expectations emphasize only a few of the practice categories; however, all practices are emphasized within a grade band.

Disciplinary Core Ideas (DCIs)
The orange box in the middle includes statements that are taken from the *Framework* about the most essential ideas in the major science disciplines that all students should understand during 13 years of school. Including these detailed statements was very helpful to the writing team as they analyzed and "unpacked" the disciplinary core ideas and sub-ideas to reach a level that is helpful in describing what each student should understand about each sub-idea at the end of grades 2, 5, 8, and 12. Although they appear in paragraph form in the *Framework*, here they are bulleted to be certain that each statement is distinct.

Crosscutting Concepts
The green box on the right includes statements derived from the *Framework's* list of crosscutting concepts, which apply to one or more of the performance expectations in the box above. Most sets of performance expectations limit the number of crosscutting concepts so as focus on those that are readily apparent when considering the DCIs; however, all are emphasized within a grade band. Aspects of the Nature of Science relevant to the standard are also listed in this box, as are the interdependence of science and engineering, and the influence of engineering, technology, and science on society and the natural world.

Connection Boxes
Two [~~Three]~~ Connection Boxes, below the Foundation Boxes, are designed to support a coherent vision of the standards by showing how the performance expectations in each standard connect to other performance expectations in science~~,] as well as to the KAS standards in Mathematics and English/Language Arts]~~. The ***two [***~~three]~~ boxes include:

- Connections to other DCIs in this grade level or band. This box contains the names of science topics in other disciplines that have related disciplinary core ideas at the same grade level. For example, both Physical Science and Life Science performance expectations contain core ideas related to Photosynthesis, and could be taught in relation to one another.

- Articulation of DCIs across grade levels. This box contains the names of other science topics that either 1) provide a foundation for student understanding of the core ideas in this set of performance expectations (usually at prior grade levels) or 2) build on the foundation provided by the core ideas in this set of performance expectations (usually at subsequent grade levels).

- ~~[Connections to the Kentucky Academic Standards in mathematics and English/Language Arts. This box contains the coding and names of pre-requisite or co-requisite Kentucky Academic Standards in English Language Arts & and Literacy and Mathematics that align to the performance expectations. An effort has been made to ensure that the mathematical skills that students need for science were taught in a previous year where possible.]~~

MS. Structure and Properties of Matter

MS. Structure and Properties of Matter

Students who demonstrate understanding can:

06-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures or computer representations showing different molecules with different types of atoms.] [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete depiction of all individual atoms in a complex molecule or extended structure.]

06-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]

06-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems. Develop a model to predict and/or describe phenomena. (06-PS1-1),(06-PS1-4) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods. Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (06-PS1-3)	**PS1.A: Structure and Properties of Matter** Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (06-PS1-1) Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (06-PS1-3) *(Note: This Disciplinary Core Idea is also addressed by 07-PS1-2.)* Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (06-PS1-4) In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (06-PS1-4) Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (06-PS1-1) The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (06-PS1-4) **PS1.B: Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (06-PS1-3) *(Note: This Disciplinary Core Idea is also addressed by 07-PS1-2 and 07-PS1-5.)* **PS3.A: Definitions of Energy** The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. *(secondary to 06-PS1-4)* The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. *(secondary to 06-PS1-4)*	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (06-PS1-4) **Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (06-PS1-1) **Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (06-PS1-3) -- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (06-PS1-3) **Influence of Science, Engineering and Technology on Society and the Natural World** The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (06-PS1-3)

Connections to other DCIs in this grade-band: **MS.LS2.A** (06-PS1-3); **MS.LS4.D** (06-PS1-3); **MS.ESS2.C** (06-PS1-1),(06-PS1-4); **MS.ESS3.A** (06-PS1-3); **MS.ESS3.C** (06-PS1-3)

Articulation across grade-bands: **5.PS1.A** (06-PS1-1); **HS.PS1.A** (06-PS1-1),(06-PS1-3),(06-PS1-4); **HS.PS1.B** (06-PS1-4); **HS.PS3.A** (06-PS1-4); **HS.LS2.A** (06-PS1-3); **HS.LS4.D** (06-PS1-3); **HS.ESS1.A** (06-PS1-1); **HS.ESS3.A** (06-PS1-3)

~~*[Kentucky Academic Standards Connections:*~~
~~ELA/Literacy –~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (06-PS1-3)~~
~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). *(06-PS1-1),(06-PS1-4)*~~
~~**WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (06-PS1-3)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (06-PS1-1)~~

MS. Structure and Properties of Matter - Continued

~~**MP.4**~~	~~Model with mathematics. *(06-PS1-1)*~~
~~**6.RP.A.3**~~	~~Use ratio and rate reasoning to solve real-world and mathematical problems. *(06-PS1-1)*~~
~~**6.NS.C.5**~~	~~Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below~~
~~zero,~~	~~elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world~~
~~contexts,~~	~~explaining the meaning of 0 in each situation. (06-PS1-4)~~
~~**8.EE.A.3**~~	~~Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times~~
~~as~~	~~much one is than the other. *(06-PS1-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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MS. Chemical Reactions

MS. Chemical Reactions

Students who demonstrate understanding can:

07-PS1-2. **Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.** [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with HCl.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]

07-PS1-5. **Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.** [Clarification Statement: Emphasis is on law of conservation of matter, and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]

07-PS1-6. **Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.*** [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems. Develop a model to describe unobservable mechanisms. (07-PS1-5) **Analyzing and Interpreting Data** Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (07-PS1-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. (07-PS1-6) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (07-PS1-2) **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** Laws are regularities or mathematical descriptions of natural phenomena. (07-PS1-5)	**PS1.A: Structure and Properties of Matter** Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (07-PS1-2) *(Note: This Disciplinary Core Idea is also addressed by 06-PS1-3.)* **PS1.B: Chemical Reactions** Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (07-PS1-2),(07-PS1-5) *(Note: This Disciplinary Core Idea is also addressed by 06-PS1-3.)* The total number of each type of atom is conserved, and thus the mass does not change. (07-PS1-5) Some chemical reactions release energy, others store energy. (07-PS1-6) **ETS1.B: Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. *(secondary to 07-PS1-6)* **ETS1.C: Optimizing the Design Solution** Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. *(secondary to 07-PS1-6)* The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. *(secondary to 07-PS1-6)*	**Patterns** Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (07-PS1-2) **Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes. (07-PS1-5) The transfer of energy can be tracked as energy flows through a designed or natural system. (07-PS1-6)

Connections to other DCIs in this grade-band: **MS.PS3.D** (07-PS1-2),(07-PS1-6); **MS.LS1.C** (07-PS1-2),(07-PS1-5); **MS.LS2.B** (07-PS1-5); **MS.ESS2.A** (07-PS1-2),(07-PS1-5)

Articulation across grade-bands: **5.PS1.B** (07-PS1-2),(07-PS1-5); **HS.PS1.A** (07-PS1-6); **HS.PS1.B** (07-PS1-2)(07-PS1-5),(07-PS1-6); **HS.PS3.A** (07-PS1-6); **HS.PS3.B** (07-PS1-6); **HS.PS3.D** (07-PS1-6)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions *(07-PS1-2)*~~
~~**RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (07-PS1-6)~~
~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (07-PS1-2),*(07-PS1-5)*~~
~~**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (07-PS1-6)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (07-PS1-2),(07-PS1-5)~~
~~**MP.4** Model with mathematics. (07-PS1-5)~~
~~**6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems. *(07-PS1-2)*,(07-PS1-5)~~
~~**6.SP.B.4** Display numerical data in plots on a number line, including dot plots, histograms, and box plots. *(07-PS1-2)*~~
~~**6.SP.B.5** Summarize numerical data sets in relation to their context(07-PS1-2)]~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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MS. Forces and Interactions

MS. Forces and Interactions

Students who demonstrate understanding can:

06-PS2-1. **Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*** [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]

6- PS2-2. **Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.** [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame, and to change in one variable at a time. Assessment does not include the use of trigonometry.]

7- PS2-3. **Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.** [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]

07-PS2-4. **Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.** [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]

07-PS2-5. **Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.** [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields. Assessment is limited to qualitative evidence for the existence of fields.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models. Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. (07-PS2-3) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions. Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (06-PS2-2) Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. (07-PS2-5) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Apply scientific ideas or principles to design an object, tool, process or system. (06-PS2-1) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds from K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (07-PS2-4) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (06-PS2-2),(07-PS2-4)	**PS2.A: Forces and Motion** For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (06-PS2-1) The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (06-PS2-2) All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. (06-PS2-2) **PS2.B: Types of Interactions** Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (07-PS2-3) Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun. (07-PS2-4) Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively). (07-PS2-5)	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (07-PS2-3),(07-PS2-5) **Systems and System Models** Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (06-PS2-1),(07-PS2-4), **Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (06-PS2-2) -- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (06-PS2-1)

Connections to other DCIs in this grade-band: **MS.PS3.A** (06-PS2-2); **MS.PS3.B** (06-PS2-2); **MS.PS3.C** (06-PS2-1); **MS.ESS1.A** (07-PS2-4); **MS.ESS1.B** (06-PS2-2),(07-PS2-4); **MS.ESS2.C** (06-PS2-2),(07-PS2-4)

Articulation across grade-bands: **3.PS2.A** (06-PS2-1),(06-PS2-2); **3.PS2.B** (07-PS2-3),(07-PS2-5); **5.PS2.B** (07-PS2-4); **HS.PS2.A** (06-PS2-1),(06-PS2-2); **HS.PS2.B** (07-PS2-3),(07-PS2-4),(07-PS2-5); **HS.PS3.A** (07-PS2-5); **HS.PS3.B** (06-PS2-2),(07-PS2-5); **HS.PS3.C** (07-PS2-5); **HS.ESS1.B** (07-PS2-4)

MS. Forces and Interactions - Continued

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions *(06-PS2-1),(07-PS2-3)*~~
~~**RST.6-8.3** Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. *(06-PS2-1)*,(06-PS2-2),*(07-PS2-5)*~~
~~**WHST.6-8.1** Write arguments focused on discipline-specific content. (07-PS2-4)~~
~~**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. *(06-PS2-1)*,(06-PS2-2),*(07-PS2-5)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (06-PS2-1),(06-PS2-2),(07-PS2-3)~~
~~**6.NS.C.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (06-PS2-1)~~
~~***6*.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers. *(06-PS2-1),(06-PS2-2)*~~
~~***7*.EE.B.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *(06-PS2-1),(06-PS2-2)*~~
~~**7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(06-PS2-1),(06-PS2-2)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled “Disciplinary Core Ideas” is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

MS. Energy

MS. Energy

Students who demonstrate understanding can:

08-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. [Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.]

07-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. [Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.] [Assessment Boundary: Assessment is limited to two objects and electric, magnetic, and gravitational interactions.]

07-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

07-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

07-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.] [Assessment Boundary: Assessment does not include calculations of energy.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems. Develop a model to describe unobservable mechanisms. (07-PS3-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions. Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (07-PS3-4) **Analyzing and Interpreting Data** Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Construct and interpret graphical displays of data to identify linear and nonlinear relationships. (08-PS3-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (07-PS3-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds. Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (07-PS3-5) **---** ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations (07-PS3-4),(07-PS3-5)	**PS3.A: Definitions of Energy** Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. (08-PS3-1) A system of objects may also contain stored (potential) energy, depending on their relative positions. (07-PS3-2) Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (07-PS3-3),(07-PS3-4) **PS3.B: Conservation of Energy and Energy Transfer** When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (07-PS3-5) The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. (07-PS3-4) Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (07-PS3-3) **PS3.C: Relationship Between Energy and Forces** When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. (07-PS3-2) **ETS1.A: Defining and Delimiting an Engineering Problem** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. *(secondary to 07-PS3-3)* **ETS1.B: Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. *(secondary to 07-PS3-3)*	**Scale, Proportion, and Quantity** Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. (08-PS3-1),(07-PS3-4) **Systems and System Models** Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems. (07-PS3-2) **Energy and Matter** Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion). (07-PS3-5) The transfer of energy can be tracked as energy flows through a designed or natural system. (07-PS3-3)

Connections to other DCIs in this grade-band: **MS.PS1.A** (07-PS3-4); **MS.PS1.B** (07-PS3-3); **MS.PS2.A** (08-PS3-1),(07-PS3-4),(07-PS3-5); **MS.ESS2.A** (07-PS3-3); **MS.ESS2.C** (07-PS3-3),(07-PS3-4); **MS.ESS2.D** (07-PS3-3),(07-PS3-4); **MS.ESS3.D** (07-PS3-4)

Articulation across grade-bands: **4.PS3.B** (08-PS3-1),(07-PS3-3); **4.PS3.C** (07-PS3-4),(07-PS3-5); **HS.PS1.B** (07-PS3-4); **HS.PS2.B** (07-PS3-2); **HS.PS3.A** (08-PS3-1),(07-PS3-4),(07-PS3-5); **HS.PS3.B** (08-PS3-1),(07-PS3-2),(07-PS3-3),(07-PS3-4),(07-PS3-5); **HS.PS3.C** (07-PS3-2)

MS. Energy - Continued

~~*[Kentucky Academic Standards Connections:*~~
~~*ELA/Literacy –*~~

~~**RST.6-8.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions *(08-PS3-1),(07-PS3-5)*~~
~~**RST.6-8.3**~~	~~Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. *(07-PS3-3)*,(07-PS3-4)~~
~~**RST.6-8.7**~~	~~Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (08-PS3-1)~~
~~**WHST.6-8.1**~~	~~Write arguments focused on discipline content. *(07-PS3-5)*~~
~~**WHST.6-8.7**~~	~~Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (07-PS3-3),*(07-PS3-4)*~~
~~**SL.8.5**~~	~~Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(07-PS3-2)*~~

~~*Mathematics –*~~

~~**MP.2**~~	~~Reason abstractly and quantitatively. (08-PS3-1),(07-PS3-4),(07-PS3-5)~~
~~**6.RP.A.1**~~	~~Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities. (08-PS3-1),*(07-PS3-5)*~~
~~**6.RP.A.2**~~	~~Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *(08-PS3-1)*~~
~~**7.RP.A.2**~~	~~Recognize and represent proportional relationships between quantities. (08-PS3-1),*(07-PS3-5)*~~
~~**8.EE.A.1**~~	~~Know and apply the properties of integer exponents to generate equivalent numerical expressions. (08-PS3-1)~~
~~**8.EE.A.2**~~	~~Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. *(08-PS3-1)*~~
~~**8.F.A.3**~~	~~Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. (08-PS3-1),*(07-PS3-5)*~~
~~**6.SP.B.5**~~	~~Summarize numerical data sets in relation to their context. *(07-PS3-4)]*~~

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MS. Waves and Electromagnetic Radiation

MS. Waves and Electromagnetic Radiation

Students who demonstrate understanding can:

07-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]

07-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]

07-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Develop and use a model to describe phenomena. (07-PS4-2)

Using Mathematics and Computational Thinking
Mathematical and computational thinking at the 6–8 level builds on K–5 and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.
Use mathematical representations to describe and/or support scientific conclusions and design solutions. (07-PS4-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods.
Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings. (07-PS4-3)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
Science knowledge is based upon logical and conceptual connections between evidence and explanations. (07-PS4-1)

Disciplinary Core Ideas

PS4.A: Wave Properties
A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. (07-PS4-1)
A sound wave needs a medium through which it is transmitted. (07-PS4-2)

PS4.B: Electromagnetic Radiation
When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. (07-PS4-2)
The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. (07-PS4-2)
A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. (07-PS4-2)
However, because light can travel through space, it cannot be a matter wave, like sound or water waves. (07-PS4-2)

PS4.C: Information Technologies and Instrumentation
Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. (07-PS4-3)

Crosscutting Concepts

Patterns
Graphs and charts can be used to identify patterns in data. (07-PS4-1)

Structure and Function
Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (07-PS4-2)
Structures can be designed to serve particular functions. (07-PS4-3)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World
Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations. (07-PS4-3)

Connections to Nature of Science

Science is a Human Endeavor
Advances in technology influence the progress of science and science has influenced advances in technology. (07-PS4-3)

Connections to other DCIs in this grade-band: **MS.LS1.D** (07-PS4-2)

Articulation across grade-bands: **4.PS3.A** (07-PS4-1); **4.PS3.B** (07-PS4-1); **4.PS4.A** (07-PS4-1); **4.PS4.B** (07-PS4-2); **4.PS4.C** (07-PS4-3); **HS.PS4.A** (07-PS4-1),(07-PS4-2),(07-PS4-3); **HS.PS4.B** (07-PS4-1),(07-PS4-2); **HS.PS4.C** (07-PS4-3); **HS.ESS1.A** (07-PS4-2); **HS.ESS2.A** (07-PS4-2); **HS.ESS2.C** (07-PS4-2); **HS.ESS2.D** (07-PS4-2)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (07-PS4-3)~~
~~**RST.6-8.2** Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. *(07-PS4-3)*~~
~~**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (07-PS4-3)~~
~~**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research. (07-PS4-3)~~
~~**SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(07-PS4-1),(07-PS4-2)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (07-PS4-1)~~
~~**MP.4** Model with mathematics. (07-PS4-1)~~
~~**6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (07-PS4-1)~~
~~**6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems. (07-PS4-1)~~
~~**7.RP.A.2** Recognize and represent proportional relationships between quantities. (07-PS4-1)~~
~~**8.F.A.3** Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *(07-PS4-1)]*~~

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MS. Structure, Function, and Information Processing

MS. Structure, Function, and Information Processing

Students who demonstrate understanding can:

07-LS1-1. Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living cells, and understanding that living things may be made of one cell or many and varied cells.]

07-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]

7- LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]

8- LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (07-LS1-2) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use <u>multiple variables</u> and provide evidence to support explanations or solutions. Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (07-LS1-1) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (07-LS1-3) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods. Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (08-LS1-8)	**LS1.A: Structure and Function** All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (07-LS1-1) Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (07-LS1-2) In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (07-LS1-3) **LS1.D: Information Processing** Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (08-LS1-8)	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems. (08-LS1-8) **Scale, Proportion, and Quantity** Phenomena that can be observed at one scale may not be observable at another scale. (07-LS1-1) **Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (07-LS1-3) **Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function. (07-LS1-2) --- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (07-LS1-1) --- ***Connections to Nature of Science*** **Science is a Human Endeavor** Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (07-LS1-3)

Connections to other DCIs in this grade-band: **MS.LS3.A** (07-LS1-2)

Articulation to DCIs across grade-bands: **4.LS1.A** (07-LS1-2); **4.LS1.D** (08-LS1-8); **HS.LS1.A** (07-LS1-1),(07-LS1-2),(07-LS1-3),(08-LS1-8)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (07-LS1-3)~~
~~**RI.6.8** Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (07-LS1-3)~~
~~**WHST.6-8.1** Write arguments focused on discipline content. (07-LS1-3)~~
~~**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (07-LS1-1)~~
~~**WHST.6-8.8** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (08-LS1-8)~~
~~**SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(07-LS1-2)*~~
~~*Mathematics –*~~
~~**6.EE.C.9** Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *(07-LS1-1),(07-LS1-2),(07-LS1-3)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

MS. Matter and Energy in Organisms and Ecosystems

MS. Matter and Energy in Organisms and Ecosystems

Students who demonstrate understanding can:

07-LS1-6. **Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.** [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]

07-LS1-7. growth **Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support and/or release energy as this matter moves through an organism.** [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]

06-LS2-1. **Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.** [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

06-LS2-3. **Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

08-LS2-4. ecosystem **Construct an argument supported by empirical evidence that changes to physical or biological components of an affect populations.** [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Develop a model to describe phenomena. (06-LS2-3)
Develop a model to describe unobservable mechanisms. (07-LS1-7)

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
Analyze and interpret data to provide evidence for phenomena. (06-LS2-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.
Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (07-LS1-6)

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (08-LS2-4)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
Science knowledge is based upon logical connections between evidence and explanations. (07-LS1-6)
Science disciplines share common rules of obtaining and evaluating empirical evidence. (08-LS2-4)

Disciplinary Core Ideas

PS3.D: Energy in Chemical Processes and Everyday Life
The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to 07-LS1-6)
Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to 07-LS1-7)

LS1.C: Organization for Matter and Energy Flow in Organisms
Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (07-LS1-6)
Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (07-LS1-7)

LS2.A: Interdependent Relationships in Ecosystems
Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (06-LS2-1)
In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (06-LS2-1)
Growth of organisms and population increases are limited by access to resources. (06-LS2-1)

LS2.B: Cycle of Matter and Energy Transfer in Ecosystems
Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (06-LS2-3)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience
Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (08-LS2-4)

Crosscutting Concepts

Cause and Effect
Cause and effect relationships may be used to predict phenomena in natural or designed systems. (06-LS2-1)

Energy and Matter
Matter is conserved because atoms are conserved in physical and chemical processes. (07-LS1-7)
Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (07-LS1-6)
The transfer of energy can be tracked as energy flows through a natural system. (06-LS2-3)

Stability and Change
Small changes in one part of a system might cause large changes in another part. (08-LS2-4)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (06-LS2-3)

Connections to other DCIs in this grade-band: **MS.PS1.B** (07-LS1-6),(07-LS1-7),(06-LS2-3); **MS.LS4.C** (08-LS2-4); **MS.LS4.D** (08-LS2-4); **MS.ESS2.A** (07-LS1-6),(06-LS2-3),(08-LS2-4); **MS.ESS3.A** (06-LS2-1),(08-LS2-4); **MS.ESS3.C** (06-LS2-1),(08-LS2-4)

Articulation across grade-bands: **3.LS2.C** (06-LS2-1),(08-LS2-4); **3.LS4.D** (06-LS2-1),(08-LS2-4); **5.PS3.D** (07-LS1-6),(07-LS1-7); **5.LS1.C** (07-LS1-6),(07-LS1-7); **5.LS2.A** (07-LS1-6),(06-LS2-1),(06-LS2-3); **5.LS2.B** (07-LS1-6),(07-LS1-7),(06-LS2-3); **HS.PS1.B** (07-LS1-6),(07-LS1-7); **HS.PS3.B** (06-LS2-3); **HS.LS1.C** (07-LS1-6),(07-LS1-7),(06-LS2-3); **HS.LS2.A** (06-LS2-1); **HS.LS2.B** (07-LS1-6),(07-LS1-7),(06-LS2-3); **HS.LS2.C** (08-LS2-4); **HS.LS4.C** (06-LS2-1),(08-LS2-4) ; **HS.LS4.D** (06-LS2-1),(08-LS2-4); **HS.ESS2.A** (06-LS2-3); **HS.ESS2.D** (07-LS1-6); **HS.ESS2.E** (08-LS2-4); **HS.ESS3.A** (06-LS2-1); **HS.ESS3.B** (08-LS2-4); **HS.ESS3.C** (08-LS2-4)

MS. Matter and Energy in Organisms and Ecosystems - Continued

~~*[Kentucky Academic Standards Connections:*~~
~~*ELA/Literacy –*~~

~~**RST.6-8.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts. (07-LS1-6),(06-LS2-1),(08-LS2-4)~~
~~**RST.6-8.2**~~	~~Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. *(07-LS1-6)*~~
~~**RST.6-8.7**~~	~~Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (06-LS2-1)~~
~~**RI.8.8**~~	~~Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (08-LS2-4)~~
~~**WHST.6-8.1**~~	~~Write arguments to support claims with clear reasons and relevant evidence. (08-LS2-4)~~
~~**WHST.6-8.2**~~	~~Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (07-LS1-6)~~
~~**WHST.6-8.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. (07-LS1-6),(08-LS2-4)~~
~~**SL.8.5**~~	~~Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. *(07-LS1-7),(06-LS2-3)*~~

~~*Mathematics –*~~

~~**6.EE.C.9**~~	~~Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *(07-LS1-6),(06-LS2-3)]*~~

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MS. Interdependent Relationships in Ecosystems

MS. Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

06-LS2-2. **Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.** [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]

08-LS2-5. **Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*** [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (06-LS2-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (08-LS2-5)	**LS2.A: Interdependent Relationships in Ecosystems** Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (06-LS2-2) **LS2.C: Ecosystem Dynamics, Functioning, and Resilience** Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (08-LS2-5) **LS4.D: Biodiversity and Humans** Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. *(secondary to 08-LS2-5)* **ETS1.B: Developing Possible Solutions** There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. *(secondary to 08-LS2-5)*	**Patterns** Patterns can be used to identify cause and effect relationships. (06-LS2-2) **Stability and Change** Small changes in one part of a system might cause large changes in another part. (08-LS2-5) --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (08-LS2-5) --- ***Connections to Nature of Science*** **Science Addresses Questions About the Natural and Material World** Scientific knowledge can describe the consequence of actions but does not necessarily prescribe the decisions that society takes. (08-LS2-5)

Connections to other DCIs in this grade-band: **MS.LS1.B** (06-LS2-2); **MS.ESS3.C** (08-LS2-5)

Articulation across grade-band: **1.LS1.B** (06-LS2-2); **HS.LS2.A** (06-LS2-2),(08-LS2-5); **HS.LS2.B** (06-LS2-2); **HS.LS2.C** (08-LS2-5); **HS.LS2.D** (06-LS2-2);**.LS4.D** (08-LS2-5); **HS.ESS3.A** (08-LS2-5); **HS.ESS3.C** (08-LS2-5); **HS.ESS3.D** (08-LS2-5)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (06-LS2-2)~~
~~**RST.6-8.8** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. (08-LS2-5)~~
~~**RI.8.8** Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (08-LS2-5)~~
~~**WHST.6-8.2** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (06-LS2-2)~~
~~**WHST.6-8.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (06-LS2-2)~~
~~**SL.8.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. *(06-LS2-2)*~~
~~**SL.8.4** Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. *(06-LS2-2)*~~
~~*Mathematics –*~~
~~**MP.4** Model with mathematics. *(08-LS2-5)*~~
~~**6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems. *(08-LS2-5)*~~
~~**6.SP.B.5** Summarize numerical data sets in relation to their context. *(06-LS2-2)]*~~

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MS. Growth, Development, and Reproduction of Organisms

MS. Growth, Development, and Reproduction of Organisms

Students who demonstrate understanding can:

07-LS1-4. **Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.** [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]

7- LS1-5. **Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.** [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]

8- LS3-1. **Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.** [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]

08-LS3-2. **Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.** [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]

08-LS4-5. **Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.** [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
Develop and use a model to describe phenomena. (08-LS3-1),(08-LS3-2)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.
Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (07-LS1-5)

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (07-LS1-4)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (08-LS4-5)

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms
Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to 08-LS3-2)
Animals engage in characteristic behaviors that increase the odds of reproduction. (07-LS1-4)
Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (07-LS1-4)
Genetic factors as well as local conditions affect the growth of the adult plant. (07-LS1-5)

LS3.A: Inheritance of Traits
Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (08-LS3-1)
Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (08-LS3-2)

LS3.B: Variation of Traits
In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (08-LS3-2)
In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations.
Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (08-LS3-1)

LS4.B: Natural Selection
In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring. (08-LS4-5)

Crosscutting Concepts

Cause and Effect
Cause and effect relationships may be used to predict phenomena in natural systems. (08-LS3-2)
Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (07-LS1-4),(07-LS1-5),(08-LS4-5)

Structure and Function
Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function. (08-LS3-1)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (08-LS4-5)

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World
Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (08-LS4-5)

Connections to other DCIs in this grade-band: **MS.LS1.A** (08-LS3-1); **MS.LS2.A** (07-LS1-4),(07-LS1-5); **MS.LS4.A** (08-LS3-1)

Articulation to DCIs across grade-bands: **3.LS1.B** (07-LS1-4),(07-LS1-5); **3.LS3.A** (07-LS1-5),(08-LS3-1),(08-LS3-2); **3.LS3.B** (08-LS3-1),(08-LS3-2); **HS.LS1.A** (08-LS3-1); **HS.LS1.B** (08-LS3-1),(08-LS3-2); **HS.LS2.A** (07-LS1-4),(07-LS1-5); **HS.LS2.D** (07-LS1-4); **HS.LS3.A** (08-LS3-1),(08-LS3-2); **HS.LS3.B** (08-LS3-1),(08-LS3-2),(08-LS4-5); **HS.LS4.C** (08-LS4-5)

MS. Growth, Development, and Reproduction of Organisms - Continued

~~*[Kentucky Academic Standards Connections:*~~
~~*ELA/Literacy –*~~

~~**RST.6-8.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts. (07-LS1-4),(07-LS1-5),*(08-LS3-1),(08-LS3-2)*,(08-LS4-5)~~
~~**RST.6-8.2**~~	~~Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. *(07-LS1-5)*~~
~~**RST.6-8.4**~~	~~Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. *(08-LS3-1),(08-LS3-2)*~~
~~**RST.6-8.7**~~	~~Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (08-LS3-1),(08-LS3-2)~~
~~**RI.6.8**~~	~~Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (07-LS1-4)~~
~~**WHST.6-8.1**~~	~~Write arguments focused on discipline content. (07-LS1-4)~~
~~**WHST.6-8.2**~~	~~Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. *(07-LS1-5)*~~
~~**WHST.6-8.8**~~	~~Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. *(08-LS4-5)*~~
~~**WHST.6-8.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. (07-LS1-5)~~
~~**SL.8.5**~~	~~Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(08-LS3-1),(08-LS3-2)*~~
~~*Mathematics –*~~	
~~**MP.4**~~	~~Model with mathematics. *(08-LS3-2)*~~
~~**6.SP.A.2**~~	~~Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. *(07-LS1-4), (07-LS1-5)*~~
~~**6.SP.B.4**~~	~~Summarize numerical data sets in relation to their context. *(07-LS1-4),(07-LS1-5)*~~
~~**6.SP.B.5**~~	~~Summarize numerical data sets in relation to their context. *(08-LS3-2)]*~~

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MS. Natural Selection and Adaptations

MS. Natural Selection and Adaptations

Students who demonstrate understanding can:

08-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]

08-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]

08-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. [Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.]

08-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations

08-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze displays of data to identify linear and nonlinear relationships. (08-LS4-3) Analyze and interpret data to determine similarities and differences in findings. (08-LS4-1) **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments. Use mathematical representations to support scientific conclusions and design solutions. (08-LS4-6) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. (08-LS4-2) Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena. (08-LS4-4) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** Science knowledge is based upon logical and conceptual connections between evidence and explanations. (08-LS4-1)	**LS4.A: Evidence of Common Ancestry and Diversity** The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. (08-LS4-1) Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. (08-LS4-2) Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy. (08-LS4-3) **LS4.B: Natural Selection** Natural selection leads to the predominance of certain traits in a population, and the suppression of others. (08-LS4-4) **LS4.C: Adaptation** Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. (08-LS4-6)	**Patterns** Patterns can be used to identify cause and effect relationships. (08-LS4-2) Graphs, charts, and images can be used to identify patterns in data. (08-LS4-1), (08-LS4-3) **Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (08-LS4-4),(08-LS4-6) -- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (08-LS4-1),(08-LS4-2)

Connections to other DCIs in this grade-band: **MS.LS2.A** (08-LS4-4),(08-LS4-6); **MS.LS2.C** (08-LS4-6); **MS.LS3.A** (08-LS4-2),(08-LS4-4); **MS.LS3.B** (08-LS4-2),(08-LS4-4),(08-LS4-6); **MS.ESS1.C** (08-LS4-1),(08-LS4-2),(08-LS4-6); **MS.ESS2.B** (08-LS4-1)

Articulation across grade-bands: **3.LS3.B** (08-LS4-4); **3.LS4.A** (08-LS4-1),(08-LS4-2); **3. LS4.B** (08-LS4-4); **3.LS4.C** (08-LS4-6); **HS.LS2.A** (08-LS4-4),(08-LS4-6); **HS.LS2.C** (08-LS4-6); **HS.LS3.B** (08-LS4-4),(08-LS4-6); **HS.LS4.A** (08-LS4-1),(08-LS4-2),(08-LS4-3); **HS.LS4.B** (08-LS4-4),(08-LS4-6); **HS.LS4.C** (08-LS4-4),(08-LS4-6); **HS.ESS1.C** (08-LS4-1),(08-LS4-2)

MS. Natural Selection and Adaptations - Continued

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~

~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions *(08-LS4- 1)*,(08-LS4-2), *(08-LS4-3),(08-LS4-4)*~~

~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (08-LS4-1),(08-LS4-3)~~

~~**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (08-LS4-3),(08-LS4-4)~~

~~**WHST.6-8.2** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (08-LS4-2),(08-LS4-4)~~

~~**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research. *(08-LS4-2),(08-LS4-4)*~~

~~**SL.8.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. *(08-LS4-2),(08-LS4-4)*~~

~~**SL.8.4** Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. *(08-LS4-2),(08-LS4-4)*~~

~~*Mathematics –*~~

~~**MP.4** Model with mathematics. (08-LS4-6)~~

~~**6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *(08-LS4-4),(08-LS4-6)*~~

~~**6.SP.B.5** Summarize numerical data sets in relation to their context. *(08-LS4-4),(08-LS4-6)*~~

~~***6*.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(08-LS4-1),(08-LS4-2)*~~

~~***7*.RP.A.2** Recognize and represent proportional relationships between quantities. *(08-LS4-4),(08-LS4-6)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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MS. Space Systems

MS. Space Systems

Students who demonstrate understanding can:

06-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]

06-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as their school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]

06-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (06-ESS1-1),(06-ESS1-2) **Analyzing and Interpreting Data** Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (06-ESS1-3)	**ESS1.A: The Universe and Its Stars** Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (06-ESS1-1) Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (06-ESS1-2) **ESS1.B: Earth and the Solar System** The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (06-ESS1-2),(06-ESS1-3) This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. (06-ESS1-1) The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (06-ESS1-2)	**Patterns** Patterns can be used to identify cause and effect relationships. (06-ESS1-1) **Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (06-ESS1-3) **Systems and System Models** Models can be used to represent systems and their interactions. (06-ESS1-2) --- **Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (06-ESS1-3) --- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (06-ESS1-1),(06-ESS1-2)

Connections to other DCIs in this grade-band: **MS.PS2.A** (06-ESS1-1),(06-ESS1-2); **MS.PS2.B** (06-ESS1-1),(06-ESS1-2); **MS.ESS2.A** (06-ESS1-3)

Articulation of DCIs across grade-bands: **3.PS2.A** (06-ESS1-1),(06-ESS1-2); **5.PS2.B** (06-ESS1-1),(06-ESS1-2); **5.ESS1.A** (06-ESS1-2); **5.ESS1.B** (06-ESS1-1),(06-ESS1-2),(06-ESS1-3); **HS.PS2.A** (06-ESS1-1),(06-ESS1-2); **HS.PS2.B** (06-ESS1-1),(06-ESS1-2); **HS.ESS1.A** (06-ESS1-2); **HS.ESS1.B** (06-ESS1-1),(06-ESS1-2),(06-ESS1-3); **HS.ESS2.A** (06-ESS1-3)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (06-ESS1-3)~~

~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (06-ESS1-3)~~

~~**SL.8.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(06-ESS1-1),(06-ESS1-2)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. (06-ESS1-3)~~

~~**MP.4** Model with mathematics. *(06-ESS1-1),(06-ESS1-2)*~~

~~**6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *(06-ESS1-1),(06-ESS1-2),*(06-ESS1-3)~~

~~**7.RP.A.2** Recognize and represent proportional relationships between quantities. *(06-ESS1-1),(06-ESS1-2),*(06-ESS1-3)~~

~~**6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(06-ESS1-2)*~~

~~**7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(06-ESS1-2)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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MS. History of Earth

MS. History of Earth

Students who demonstrate understanding can:

08-ESS1-4. **Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.** [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]

06-ESS2-2. **Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.** [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

06-ESS2-3. **Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.** [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to provide evidence for phenomena. (06-ESS2-3) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (08-ESS1-4), (06-ESS2-2) -- **Connections to Nature of Science** **Scientific Knowledge is Open to Revision in Light of New Evidence** Science findings are frequently revised and/or reinterpreted based on new evidence. (06-ESS2-3)	**ESS1.C: The History of Planet Earth** The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (08-ESS1-4) Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. *(HS.ESS1.C GBE) (secondary to 06-ESS2-3)* **ESS2.A: Earth's Materials and Systems** The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (06-ESS2-2) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (06-ESS2-3) **ESS2.C: The Roles of Water in Earth's Surface Processes** Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (06-ESS2-2)	**Patterns** Patterns in rates of change and other numerical relationships can provide information about natural systems. (06-ESS2-3) **Scale Proportion and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (08-ESS1-4),(06-ESS2-2)

Connections to other DCIs in this grade-band: **MS.PS1.B** (06-ESS2-2); **MS.LS2.B** (06-ESS2-2); **MS.LS4.A** (08-ESS1-4),(06-ESS2-3); **MS.LS4.C** (08-ESS1-4)

Articulation of DCIs across grade-bands: **3.LS4.A** (08-ESS1-4),(06-ESS2-3); **3.LS4.C** (08-ESS1-4); **3.ESS3.B** (06-ESS2-3); **4.ESS1.C** (08-ESS1-4),(06-ESS2-2),(06-ESS2-3); **4.ESS2.A** (06-ESS2-2); **4.ESS2.B** (06-ESS2-3); **4.ESS2.E** (06-ESS2-2); **4.ESS3.B** (06-ESS2-3); **5.ESS2.A** (06-ESS2-2); **HS.PS1.C** (08-ESS1-4); **HS.PS3.D** (06-ESS2-2); **HS.LS2.B** (06-ESS2-2); **HS.LS4.A** (08-ESS1-4),(06-ESS2-3); **HS.LS4.C** (08-ESS1-4),(06-ESS2-3); **HS.ESS1.C** (08-ESS1-4),(06-ESS2-2),(06-ESS2-3); **HS.ESS2.A** (08-ESS1-4),(06-ESS2-2),(06-ESS2-3); **HS.ESS2.B** (06-ESS2-2),(06-ESS2-3); **HS.ESS2.C** (06-ESS2-2); **HS.ESS2.D** (06-ESS2-2); **HS.ESS2.E** (06-ESS2-2); **HS.ESS3.D** (06-ESS2-2)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (08-ESS1-4),(06-ESS2-2),*(06-ESS2-3)*~~
~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (06-ESS2-3)~~
~~**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (06-ESS2-3)~~
~~**WHST.6-8.2** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (08-ESS1-4),(06-ESS2-2)~~
~~**SL.8.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(06-ESS2-2)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (06-ESS2-2),(06-ESS2-3)~~
~~**6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(08-ESS1-4),(06-ESS2-2),(06-ESS2-3)*~~
~~**7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(08-ESS1-4),(06-ESS2-2),(06-ESS2-3)]*~~

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MS. Earth's Systems

MS. Earth's Systems

Students who demonstrate understanding can:

06-ESS2-1. **Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.** [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]

06-ESS2-4. **Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.** [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

08-ESS3-1. **Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.** [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (06-ESS2-1) Develop a model to describe unobservable mechanisms. (06-ESS2-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (08-ESS3-1)	**ESS2.A: Earth's Materials and Systems** All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (06-ESS2-1) **ESS2.C: The Roles of Water in Earth's Surface Processes** Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (06-ESS2-4) Global movements of water and its changes in form are propelled by sunlight and gravity. (06-ESS2-4) **ESS3.A: Natural Resources** Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (08-ESS3-1)	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (08-ESS3-1) **Energy and Matter** Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (06-ESS2-4) **Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (06-ESS2-1) --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (08-ESS3-1)

Connections to other DCIs in this grade-band: **MS.PS1.A** (06-ESS2-1),(06-ESS2-4),(08-ESS3-1); **MS.PS1.B** (06-ESS2-1),(08-ESS3-1); **MS.PS2.B** (06-ESS2-4); **MS.PS3.A** (06-ESS2-4); **MS.PS3.B** (06-ESS2-1); **MS.PS3.D** (06-ESS2-4); **MS.LS2.B** (06-ESS2-1); **MS.LS2.C** (06-ESS2-1); **MS.ESS1.B** (06-ESS2-1); **MS.ESS2.D** (08-ESS3-1); **MS.ESS3.C** (06-ESS2-1)

Articulation of DCIs across grade-bands: **3.PS2.A** (06-ESS2-4); **4.PS3.B** (06-ESS2-1),(06-ESS2-4); **4.PS3.D** (08-ESS3-1); **4.ESS2.A** (06-ESS2-1); **4.ESS3.A** (08-ESS3-1); **5.PS2.B** (06-ESS2-4); **5.ESS2.A** (06-ESS2-1); **5.ESS2.C** (06-ESS2-4); **HS.PS1.B** (06-ESS2-1); **HS.PS2.B** (06-ESS2-4); **HS.PS3.B** (06-ESS2-1),(06-ESS2-4),(08-ESS3-1); **HS.PS4.B** (06-ESS2-4); **HS.LS1.C** (06-ESS2-1),(08-ESS3-1); **HS.LS2.B** (06-ESS2-1); **HS.ESS2.A** (06-ESS2-1),(06-ESS2-4),(08-ESS3-1); **HS.ESS2.B** (08-ESS3-1); **HS.ESS2.C** (06-ESS2-1),(06-ESS2-4),(08-ESS3-1); **HS.ESS2.D** (06-ESS2-4); **HS.ESS2.E** (06-ESS2-1); **HS.ESS3.A** (08-ESS3-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (08-ESS3-1)~~

~~**WHST.6-8.2** Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (08-ESS3-1)~~

~~**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research. (08-ESS3-1)~~

~~**SL.8.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(06-ESS2-1)*~~

~~*Mathematics –*~~

~~**6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(08-ESS3-1)*~~

~~**7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(08-ESS3-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

MS. Weather and Climate

MS. Weather and Climate

Students who demonstrate understanding can:

06-ESS2-5. **Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.** [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]

06-ESS2-6. **Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.** [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

08-ESS3-5. **Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.** [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in 6–8 builds on K–5 experiences and progresses to specifying relationships between variables, clarify arguments and models. Ask questions to identify and clarify evidence of an argument. (08-ESS3-5) **Developing and Using Models** Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop and use a model to describe phenomena. (06-ESS2-6) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (06-ESS2-5)	**ESS2.C: The Roles of Water in Earth's Surface Processes** The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (06-ESS2-5) Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (06-ESS2-6) **ESS2.D: Weather and Climate** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (06-ESS2-6) Because these patterns are so complex, weather can only be predicted probabilistically. (06-ESS2-5) The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (06-ESS2-6) **ESS3.D: Global Climate Change** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (08-ESS3-5)	**Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems. (06-ESS2-5) **Systems and System Models** Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (06-ESS2-6) **Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (08-ESS3-5)

Connections to other DCIs in this grade-band: **MS.PS1.A** (06-ESS2-5); **MS.PS2.A** (06-ESS2-5),(06-ESS2-6); **MS.PS3.A** (06-ESS2-5),(08-ESS3-5); **MS.PS3.B** (06-ESS2-5),(06-ESS2-6); **MS.PS4.B** (06-ESS2-6)

Articulation of DCIs across grade-bands: **3.PS2.A** (06-ESS2-6); **3.ESS2.D** (06-ESS2-5),(06-ESS2-6); **5.ESS2.A** (06-ESS2-5),(06-ESS2-6); **HS.PS2.B** (06-ESS2-6); **HS.PS3.B** (06-ESS2-6),(08-ESS3-5); **HS.PS3.D** (06-ESS2-6); **HS.PS4.B** (08-ESS3-5); **HS.ESS1.B** (06-ESS2-6); **HS.ESS2.A** (06-ESS2-6),(08-ESS3-5); **HS.ESS2.C** (06-ESS2-5); **HS.ESS2.D** (06-ESS2-5),(06-ESS2-6),(08-ESS3-5); **HS.ESS3.C** (08-ESS3-5); **HS.ESS3.D** (08-ESS3-5)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (06-ESS2-5),(08-ESS3-5)~~

~~**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video or multimedia sources with that gained from reading a text on the same topic. (06-ESS2-5)~~

~~**WHST.6-8.8** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. *(06-ESS2-5)*~~

~~**SL.8.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(06-ESS2-6)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. (06-ESS2-5),*(08-ESS3-5)*~~

~~**6.NS.C.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (06-ESS2-5)~~

~~**6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(08-ESS3-5)*~~

~~**7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(08-ESS3-5)]*~~

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MS. Human Impacts

MS. Human Impacts

Students who demonstrate understanding can:

08-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

08-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

08-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (08-ESS3-2) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Apply scientific principles to design an object, tool, process or system. (08-ESS3-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (08-ESS3-4)	**ESS3.B: Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (08-ESS3-2) **ESS3.C: Human Impacts on Earth Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (08-ESS3-3) Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (08-ESS3-3),(08-ESS3-4)	**Patterns** Graphs, charts, and images can be used to identify patterns in data. (08-ESS3-2) **Cause and Effect** Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (08-ESS3-3) Cause and effect relationships may be used to predict phenomena in natural or designed systems. (08-ESS3-4) --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Science, Engineering, and Technology on Society and the Natural World** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (08-ESS3-4) The uses of technologies and limitations on their use are driven by people's needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (08-ESS3-2),(08-ESS3-3) --- ***Connections to Nature of Science*** **Science Addresses Questions About the Natural and Material World** Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (08-ESS3-4)

Connections to other DCIs in this grade-band: **MS.PS3.C** (08-ESS3-2); **MS.LS2.A** (08-ESS3-3),(08-ESS3-4); **MS.LS2.C** (08-ESS3-3),(08-ESS3-4); **MS.LS4.D** (08-ESS3-3),(08-ESS3-4)

Articulation of DCIs across grade-bands: **3.LS2.C** (08-ESS3-3),(08-ESS3-4); **3.LS4.D** (08-ESS3-3),(08-ESS3-4); **3.ESS3.B** (08-ESS3-2); **4.ESS3.B** (08-ESS3-2); **5.ESS3.C** (08-ESS3-3),(08-ESS3-4); **HS.LS2.A** (08-ESS3-4); **HS.LS2.C** (08-ESS3-3),(08-ESS3-4); **HS.LS4.C** (08-ESS3-3),(08-ESS3-4); **HS.LS4.D** (08-ESS3-3),(08-ESS3-4); **HS.ESS2.B** (08-ESS3-2); **HS.ESS2.C** (08-ESS3-3); **HS.ESS2.D** (08-ESS3-2),(08-ESS3-3); **HS.ESS2.E** (08-ESS3-3),(08-ESS3-4); **HS.ESS3.A** (08-ESS3-4); **HS.ESS3.B** (08-ESS3-2); **HS.ESS3.C** (08-ESS3-3),(08-ESS3-4); **HS.ESS3.D** (08-ESS3-2),(08-ESS3-3)

MS. Human Impacts - Continued

~~*[Kentucky Academic Standards Connections:*~~
~~*ELA/Literacy –*~~

~~**RST.6-8.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts. *(08-ESS3-2)*,(08-ESS3-4)~~
~~**RST.6-8.7**~~	~~Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (08-ESS3-2)~~
~~**WHST.6-8.1**~~	~~Write arguments focused on discipline content. (08-ESS3-4)~~
~~**WHST.6-8.7**~~	~~Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (08-ESS3-3)~~
~~**WHST.6-8.8**~~	~~Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (08-ESS3-3)~~
~~**WHST.6-8.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. (08-ESS3-4)~~
~~*Mathematics –*~~	
~~**MP.2**~~	~~Reason abstractly and quantitatively. (08-ESS3-2)~~
~~**6.RP.A.1**~~	~~Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *(08-ESS3-3),(08-ESS3-4)*~~
~~**7.RP.A.2**~~	~~Recognize and represent proportional relationships between quantities. *(08-ESS3-3),(08-ESS3-4)*~~
~~**6.EE.B.6**~~	~~Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *(08-ESS3-2),(08-ESS3-3),(08-ESS3-4)*~~
~~**7.EE.B.4**~~	~~Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *(08-ESS3-2),(08-ESS3-3),(08-ESS3-4]*)~~

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MS. Engineering Design

MS. Engineering Design

Students who demonstrate understanding can:

MS-ETS1-1. **Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.**

MS-ETS1-2. **Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.**

MS-ETS1-3. **Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.**

MS-ETS1-4. **Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarify arguments and models. Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) **Developing and Using Models** Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. (MSETS1-4) **Analyzing and Interpreting Data** Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2)	**ETS1.A: Defining and Delimiting Engineering Problems** The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) **ETS1.B: Developing Possible Solutions** A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4) There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) Models of all kinds are important for testing solutions. (MSETS1-4) **ETS1.C: Optimizing the Design Solution** Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4)	**Influence of Science, Engineering, and Technology on Society and the Natural World** All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MSETS1-1) The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)

Connections to MS-ETS1.A: Defining and Delimiting Engineering Problems include:
Physical Science: MS-PS3-3
Connections to MS-ETS1.B: Developing Possible Solutions Problems include:
Physical Science: MS-PS1-6, MS-PS3-3, **Life Science:** MS-LS2-5
Connections to MS-ETS1.C: Optimizing the Design Solution include:
Physical Science: MS-PS1-6

Articulation of DCIs across grade-bands: **3-5.ETS1.A** (MS-ETS1-1),(MS-ETS1-2),(MS-ETS1-3); **3-5.ETS1.B** (MS-ETS1-2),(MS-ETS1-3),(MS-ETS1-4); **3-5.ETS1.C** (MS-ETS1-1),(MSETS1-2),(MS-ETS1-3),(MS-ETS1-4); **HS.ETS1.A** (MS-ETS1-1),(MS-ETS1-2); **HS.ETS1.B** (MS-ETS1-1),(MS-ETS1-2),(MS-ETS1-3),(MS-ETS1-4); **HS.ETS1.C** (MS-ETS1-3),(MS-ETS1-4)

MS. Engineering Design - Continued

~~*[Kentucky Academic Standards Connections:*~~
~~*ELA/Literacy –*~~

~~**RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. (MS-ETS1-1),*(MS-ETS1-2),(MS-ETS1-3)*~~

~~**RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). *(MS-ETS1-3)*~~

~~**RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ETS1-2),(MS-ETS1-3)~~

~~**WHST.6-8.7** Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-ETS1-2)~~

~~**WHST.6-8.8** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-ETS1-1)~~

~~**WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research. (MS-ETS1-2)~~

~~**SL.8.5** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. *(MS-ETS1-4)*~~

~~Mathematics –~~

~~**MP.2** Reason abstractly and quantitatively. *(MS-ETS1-1),(MS-ETS1-2),(MS-ETS1-3),(MS-ETS1-4)*~~

~~**7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *(MS-ETS1-1),(MS-ETS1-2),(MS-ETS1-3)*~~

7.~~SP~~ ~~Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. *(MS-ETS1-4)]*~~

MIDDLE LEVEL SOCIAL STUDIES

Kentucky Academic Standards – Social Studies – Sixth Grade

Social studies at the middle level has a different level/grade context each year. For example, grade six includes world geography through an integrated social studies perspective. Grade seven focuses on an integrated study of world history from the earliest civilizations to 1500 A.D. Grade eight covers the history of the United States from the early inhabitants to Reconstruction. Regardless of the level/grade context, students incorporate each of the five areas of social studies in an integrated fashion to explore the content.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the middle level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five "Big Ideas" that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

the purposes and sources of power in present day governments vary, each reflecting and impacting the culture(s) of the people governed.

individual rights of people vary under different forms of government.

democratic governments of the present day function to protect the rights, liberty and property of their citizens while promoting the common good.

the United States does not exist in isolation; its democratic form of government has played and continues to play a role in our interconnected society.

Grade 6 Skills and Concepts

Students will

demonstrate an understanding (e.g., speak, draw, write, projects, present) of the nature of government:

describe different forms of government in the present day

compare purposes and sources of power in the most common forms of government (e.g., monarchy, democracy, republic, dictatorship) in the present day

explain how democratic governments of the present day function to preserve and protect the rights (e.g., voting), liberty, and property of their citizens by making, enacting and enforcing appropriate rules and laws

analyze information found in current events/news (e.g., TV, radio, Internet, articles) about different present day governments and how they may reflect/impact culture

describe/give examples of similarities and differences between rights and responsibilities of individuals living in countries with different forms of government

analyze information from a variety of print and non-print sources (e.g., books, documents, articles, observations, interviews) to investigate, explain and answer questions about different forms of government in the present day

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals (e.g., food, clothing, shelter, communication) connecting all cultures. Culture influences viewpoints, rules and institutions in a global society. Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many diverse ethnic and cultural groups of our nation and world.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.

cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior and respond to human needs.

interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.

culture affects how people in a society behave in relation to groups and their environment.

an appreciation of the diverse complexity of cultures is essential in our global society.

Grade 6 Skills and Concepts

Students will

demonstrate an understanding (e.g., speak, draw, write, sing, create) of the complexity of culture by exploring cultural elements (e.g., beliefs, customs/traditions, languages, skills, literature, the arts) of diverse groups and explaining how culture serves to define present day groups and may result in unique perspectives

investigate social institutions (e.g., family, religion, education, government, economy) in relation to how they respond to human needs, structure society and influence behavior in the present day

explain how communications between groups can be influenced by cultural differences; explain how interactions (e.g., political, economic, religious, ethnic) can lead to conflict and competition among individuals and groups in the present day

describe conflicts between individuals or groups and explain how compromise and cooperation are possible choices to resolve conflict among individuals and groups in the United States and across regions of the world in the present day

compare examples of cultural elements (e.g., language, the arts, customs/traditions, beliefs, skills and literature) of diverse groups in the present day, including non-western cultures within the United States, in current events/news using information from a variety of print and non-print sources (e.g., media, literature, interviews, observations, documentaries, artifacts)

Big Idea: Economics

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

the basic economic problem confronting individuals, societies and governments across present day geographic regions is scarcity: as a result of scarcity, economic choices and decisions must be made.

economic systems (e.g., traditional, command, market, mixed) and a variety of fundamental economic concepts (e.g., supply and demand, opportunity cost) affect individuals, societies and governments of the present day.

individuals, businesses and governments must make economic decisions about the use of resources in the production, distribution and consumption of goods and services.

markets are institutional arrangements that enable buyers and sellers to exchange goods and services.

our global economy provides for a level of interdependence among individuals, regions and nations of the present day.

Grade 6 Skills and Concepts

Students will

demonstrate an understanding of the nature of limited resources and scarcity, using a variety of print and non-print sources (e.g., news media, news magazines, textbook, Internet) to investigate present day economic problems within the U.S. and in world regions:

explain how scarcity requires individuals, groups and governments to make decisions about the use of productive resources (e.g., natural resources, human resources and capital goods)

compare economic systems (e.g., traditional, command, market, mixed)

explain how the prices of goods and services are determined by supply and demand in market economies

demonstrate an understanding of markets by providing scenarios to illustrate how goods and services are exchanged; explain how money can be used to express the market value of goods and services; describe the relationship between money and ease of trading, borrowing, investing and saving; analyze the connections between economic conditions and current events of the present day

investigate the production and distribution of goods and services in present day societies:

describe how competition among buyers and sellers impacts the price of goods and services

explain ways in which societies (within the U.S. and in world regions) address basic economic questions (e.g., how resources are used to produce goods and services, how regions increase productivity) about the production, distribution and consumption of goods and services

analyze examples that demonstrate interdependence of international economic activities

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

the use of geographic tools (e.g., maps, globes, photographs, models, charts, graphs, databases, and satellite images) and mental maps helps interpret information, analyze patterns and spatial data, and solve geographic issues in the present day.

patterns emerge as humans move, settle, and interact on Earth's surface and can be identified by examining the location of physical and human characteristics, how they are arranged, and why they are in particular locations. Economic, political, cultural and social processes interact to shape patterns of human populations, interdependence, cooperation and conflict.

regions help us to see Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups.

people depend on, adapt to, or modify the environment to meet basic needs. Human actions modify the physical environment and in turn, the physical environment limits or promotes human activities in the present day.

citizens in an interdependent global community change their environment through the use of land and other resources. Many of the important issues facing societies and nations involve the consequences of interactions between human and physical systems.

Big Idea: Geography – Continued
Grade 6 Skills and Concepts *Students will* demonstrate an understanding of patterns on the Earth's surface, using a variety of geographic tools (e.g., maps, globes, charts, graphs, satellite images): locate, in absolute and relative terms, landforms and bodies of water locate and interpret patterns on Earth's surface (e.g., how different factors, such as rivers, mountains and plains affect where human activities are located) investigate regions of the Earth's surface using information from print and non-print sources (e.g., books, films, magazines, Internet, geographic tools): explain relationships between and among physical characteristics (e.g., mountains, bodies of water, valleys) of present day regions and how they are made distinctive by human characteristics (e.g., dams, roads, urban centers); describe advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement) that resulted describe patterns of human settlement in the present day; explain relationships between these patterns and human needs; analyze how factors (e.g., war, famine, disease, economic opportunity, technology) impact human migration today evaluate how availability of technology, resources and knowledge causes places and regions in the present day to change interpret current events in the world from a geographic perspective investigate interactions among human activities and the physical environment in the present day: explain how people modify the physical environment (e.g., dams, roads, bridges) to meet their needs in different regions describe how the physical environment can promote or restrict human activities (e.g., exploration, migration, trade, settlement, development) in the present day explain cause and effect relationships between the natural resources of a place or region and its political, social and economic development describe how individual and group perspectives impact the use (e.g., urban development, recycling) of natural resources using current events

Big Idea: Historical Perspective

History is an account of events, people, ideas, and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

interactions among countries and people are complex because of cultural, political, economic, geographic and historical differences.

people and groups react and adapt to change over time in a variety of ways based on their needs, goals and experiences.

Grade 6 Skills and Concepts

Students will

demonstrate an understanding of the interpretative nature of history using a variety of tools and resources (e.g., primary and secondary sources, Internet, timelines, maps):

investigate and chronologically describe (e.g., using timelines, charts, fictional and report writing, role playing) major events in present day regions of the world and draw inferences about their importance

examine potential causes of recent historical events and show connections among causes and effects;

use cause-effect relationships to identify patterns of historical change influenced by government, culture, economics and/or geography

analyze historical events, conditions and perspectives of different individuals and groups (e.g., by gender, race, region, ethnic group, age, economic status, religion, political group) in present day regions of the world

analyze major historical events and people in present day regions of the world using information from print and non-print sources (e.g., biographies, autobiographies, films, magazines, Internet)

Kentucky Academic Standards – Social Studies – Seventh Grade

Social studies at the middle level has a different level/grade context each year. For example, grade six includes world geography through an integrated social studies perspective. Grade seven focuses on an integrated study of world history from the earliest civilizations to 1500 A.D. Grade eight covers the history of the United States from the early inhabitants to Reconstruction. Regardless of the level/grade context, students incorporate each of the five areas of social studies in an integrated fashion to explore the content.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the middle level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five "Big Ideas" that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

forms of government in world civilizations prior to 1500 A.D. had similarities and differences in their purposes and sources of power.

the key ideals (e.g., citizenship, justice, equality, and rule of law) of a democratic form of government were practiced in some world civilizations prior to 1500 A.D.

individual rights in world civilizations prior to 1500 A.D. varied under different forms of government.

Grade 7 Skills and Concepts

Students will

demonstrate an understanding (e.g., speak, draw, write, projects, present) of the nature of government:

explain the role of government (e.g., establishing order, providing security, achieving common goals) in world civilizations prior to 1500 A.D. and make connections to how government influences culture, society and the economy

compare different forms of government, and the purposes and sources of power in the most common forms of government (e.g., monarchy, democracy, republic, dictatorship) in world civilizations prior to 1500 A.D.

analyze how some world civilizations prior to 1500 A.D. (e.g. Greece, Rome) demonstrated the use of democratic principles (e.g., justice, equality, responsibility, freedom)

compare rights and responsibilities of individuals in world civilizations prior to 1500 A.D. to the rights and responsibilities of U.S. citizens today

analyze information from a variety of print and non-print sources (e.g., books, documents, articles, observations, interviews, Internet sources) to research, explain and answer questions about governments and people of world civilizations prior to 1500 A.D.

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals (e.g., food, clothing, shelter, communication) connecting all cultures. Culture influences viewpoints, rules and institutions in a global society. Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.

cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior and respond to human needs.

interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.

culture affects how people in a society behave in relation to groups and their environment.

Grade 7 Skills and Concepts

Students will

demonstrate an understanding (e.g., speak, draw, write, sing, create) of the complexity of culture by exploring cultural elements (e.g., beliefs, customs/traditions, languages, skills, literature, the arts) of diverse groups and explaining how culture served to define groups in world civilizations prior to 1500 A.D. and resulted in unique perspectives

investigate social institutions (e.g., family, religion, education, government, economy) in relation to how they responded to human needs, structured society and influenced behavior in world civilizations prior to 1500 A.D.

explain how communications between groups can be influenced by cultural differences; explain how interactions lead to conflict and competition (e.g., political, economic, religious, ethnic) among individuals and groups in world civilizations prior to 1500 A.D.

describe conflicts between individuals or groups and explain how compromise and cooperation were possible choices to resolve conflict among individuals and groups in world civilizations prior to 1500 A.D.

compare examples of cultural elements (e.g., beliefs, customs/traditions, language, skills, the arts, literature) using information from a variety of print and non-print sources (e.g., media, literature, interviews, observations, documentaries, artifacts) to analyze how cultures in world civilizations prior to 1500 A.D. have influenced cultures of today

Big Idea: Economics

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world.

The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Grade 7 Enduring Knowledge – Understandings

Students understand that

the basic economic problem confronting individuals, societies and governments in world civilizations prior to 1500 A.D. was scarcity: as a result of scarcity, economic choices and decisions had to be made.

the study of economics includes a variety of fundamental economic concepts (e.g., supply and demand, opportunity cost) that apply to individuals, societies and governments in world civilizations prior to 1500 A.D.

individuals, groups and governments in world civilizations prior to 1500 A.D. made economic decisions about the use of resources in the production, distribution and consumption of goods and services.

Grade 7 Skills and Concepts

Students will

demonstrate an understanding of the nature of limited resources and scarcity, using information from a variety of print and non-print sources (e.g., textbook, Internet, resource materials) to investigate world civilizations prior to 1500 A.D.:

explain how scarcity requires individuals, groups and governments to make decisions about use of productive resources (e.g., natural resources, human resources and capital goods)

compare economic systems and explain the concept of supply and demand in world civilizations prior to 1500 A.D.

describe how goods and services were exchanged in world civilizations prior to 1500 A.D.

investigate the production and distribution of goods and services in world civilizations prior to 1500 A.D.

explaining ways in which societies addressed basic economic questions (e.g., how resources were used to produce goods and services; how new knowledge, technology/tools, and specialization increased productivity) about the production, distribution and consumption of goods and services

Big Idea: Geography
Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future. **Academic Expectations** **2.19** Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.
Grade 7 Enduring Knowledge – Understandings *Students will understand that* the use of geographic tools (e.g., maps, globes, photographs, models, charts, graphs) and mental maps helps interpret information, analyze patterns and spatial data, and better understand geographic issues in world civilizations prior to 1500 A.D. patterns emerge as humans move, settle, and interact on Earth's surface, and can be identified by examining the location of physical and human characteristics, how they are arranged, and why they are in particular locations. Economic, political, cultural and social processes interacted to shape patterns of human populations, interdependence, cooperation and conflict in world civilizations prior to 1500 A.D. regions help us to see Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups. people depended on, adapted to, or modified the environment to meet basic needs. Human actions modified the physical environment and in turn, the physical environment limited or promoted human activities in world civilizations prior to 1500 A.D.

Big Idea: Geography – Continued

Grade 7 Skills and Concepts
Students will
demonstrate an understanding of patterns on the Earth's surface, using a variety of geographic tools (e.g., maps, globes, charts, graphs):
locate, in absolute or relative terms, landforms and bodies of water
locate and interpret patterns on Earth's surface, explaining how different factors (e.g., rivers, mountains, seacoasts, deserts) impacted where human activities were located in world civilizations prior to 1500 A.D.
investigate regions of the Earth's surface in world civilizations prior to 1500 A.D. using information from print and non-print sources (e.g., books, films, magazines, Internet, geographic tools):
explain relationships between and among physical characteristics of regions during the time of world civilizations prior to 1500 A.D., and explain how regions were made distinctive (e.g., dams, irrigation, roads) by human characteristics; describe advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement) that resulted
describe patterns of human settlement in world civilizations prior to 1500 A.D.; explain relationships between these patterns and human needs; analyze how factors (e.g., war, famine, disease, economic opportunity and technology) impacted human migration
evaluate how availability of technology, resources and knowledge caused places and regions to evolve and change
analyze current events to compare geographic perspectives of today with those of world civilizations prior to 1500 A.D.
investigate interactions among human activities and the physical environment:
explain how people of world civilizations prior to 1500 A.D. used technology (e.g., dams, roads, bridges) to modify the physical environment to meet their needs
describe how the physical environment promoted or restricted human activities (e.g., exploration, migration, trade, settlement, development) of world civilizations prior to 1500 A.D.
analyze cause and effect relationships between the natural resources of world civilizations prior to 1500 A.D. and their political, social and economic development

Big Idea: Historical Perspective

History is an account of events, people, ideas and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

history is an account of human activities that is interpretive in nature, and a variety of tools (e.g., primary and secondary sources, timelines, Internet, maps) are needed to analyze historical events in world civilizations prior to 1500 A.D.

world civilizations prior to 1500 A.D. can be examined in order to develop chronological understanding, recognize cause-effect relationships, and interpret historical events.

geography and natural resources had a significant impact on world historical perspectives and events prior to 1500 A.D.

advances in science and technology had a significant impact on historical events in world civilizations prior to 1500 A.D.

each era (e.g., Beginnings to Human Society, Early Civilizations, Classical Civilizations, Major Civilizations, States and Empires, Medieval Europe and the Rise of Western Civilizations, and Exploration as it relates to world civilizations prior to 1500 A.D.) in the history of world civilizations had social, political, economic and/or cultural characteristics.

Big Idea: Historical Perspective – Continued

Grade 7 Skills and Concepts
Students will
demonstrate an understanding of the interpretative nature of history using a variety of tools and resources (e.g., primary and secondary sources, Internet, timelines, maps):
investigate and chronologically describe (e.g., using timelines, charts, fictional and report writing, role playing) significant events in world civilizations prior to 1500 A.D. and draw inferences about their importance
examine multiple cause and effect relationships that have shaped history throughout world civilizations prior to 1500 A.D.
analyze historical events, conditions and perspectives of different individuals and groups (e.g., by gender, race, region, ethnic group, age, economic status, religion, political group) in world civilizations prior to 1500 A.D.
investigate, using primary and secondary sources (e.g., biographies, films, magazines, Internet resources, textbooks, artifacts), to answer questions about, locate examples of, or interpret factual and fictional accounts of major historical events and people:
explain how early hunters and gatherers (Paleolithic and Neolithic) developed new technologies
describe the contributions made by world civilizations prior to 1500 A.D. (e.g., Egypt, Mesopotamia, the Indus River Valley, the Middle East, India, China) to society and analyze the impact these contributions made to future generations
examine the rise of classical civilizations and empires (e.g., Greece and Rome) and analyze their lasting impacts on the world in the areas of government, philosophy, architecture, art, drama and literature
describe the rise of western civilizations (e.g., Mayan, Incan, Aztec) and non-western civilizations (e.g., Egyptian, Chinese, Indian, Persian) and analyze ways in which these cultures influenced government, philosophy, art, drama and literature in the present day
explain how the movement of goods affected settlement patterns in and relations between early civilizations, empires, nations and states (e.g., Asia, Africa, and the Americas)
examine developments during the Middle Ages (e.g., feudalism, nation states, monarchies, religious institutions, limited government, trade) and describe resulting influences on modern societies
describe how the Age of Exploration (world civilizations prior to 1500 A.D.) caused diverse cultures to interact in various forms (e.g., compromise, cooperation, conflict, competition); explain how governments expanded their territories and developed new technologies

Kentucky Academic Standards – Social Studies – Eighth Grade

Social studies at the middle level has a different level/grade context each year. For example, grade six includes world geography through an integrated social studies perspective. Grade seven focuses on an integrated study of world history from the earliest civilizations to 1500 A.D. Grade eight covers the history of the United States from the early inhabitants to Reconstruction. Regardless of the level/grade context, students incorporate each of the five areas of social studies in an integrated fashion to explore the content.

The primary purpose of social studies is to help students develop the ability to make informed decisions as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of social studies content. They must also be able to apply the content perspectives of several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that prepares students to become productive citizens.

The social studies content standards at the middle level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five "Big Ideas" that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

the American political system developed from a colonial base of representative democracy by the actions of people who envisioned an independent country and new purposes for the government.

the United States government was formed to establish order, provide security and accomplish common goals.

the fundamental values and principles (e.g., liberty, justice, individual human dignity, the rule of law) of American representative democracy as expressed in historical documents (e.g., the Declaration of Independence, the Constitution of the United States) are enduring and remain significant today.

the Constitution of the United States establishes a government of limited powers that are shared among different levels and branches. The Constitution is a document that can be changed from time to time through both formal and informal processes (e.g., amendments, court cases, executive actions) to meet the needs of its citizens.

as members of a democratic society, all citizens of the United States have certain rights and responsibilities, including civic participation.

Big Idea: Government and Civics – Continued
Grade 8 Skills and Concepts *Students will* demonstrate an understanding (e.g., illustrate, write, model, projects, present) of the nature of government: explain the role of government (e.g., establishing order, providing security, achieving common goals) in the United States prior to Reconstruction and make connections to how government influences culture, society and the economy describe how democratic governments in the United States prior to Reconstruction functioned to preserve and protect the rights (e.g., voting), liberty and property of their citizens by making, enacting and enforcing rules and laws (e.g., constitutions, laws, statutes) compare purposes and sources of power in the most common forms of government (e.g., monarchy, democracy, republic) investigate the Constitution of the United States: examine ways the Constitution is a document that can be changed from time to time through both formal and informal processes (e.g., amendments, court cases, executive actions) to meet the needs of its citizens explain the political process established by the U.S. Constitution and ways the Constitution separates power among the legislative, executive and judicial branches to prevent the concentration of political power and to establish a system of checks and balances analyze why the powers of the state and federal governments are sometimes shared and sometimes separated (federalism) make inferences about and among significant historical events and historical documents (e.g., the Declaration of Independence, the Constitution of the United States) to illustrate connections to democratic principles and guaranteed rights for all citizens explain pros and cons of how citizen responsibilities (e.g., participate in community activities, vote in elections) and duties (e.g., obey the law, pay taxes, serve on a jury, register for the military) impact the U.S. government's ability to function as a democracy analyze information from a variety of print and non-print sources (e.g., books, documents, articles, interviews, Internet) to research answers to questions and explore issues

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals (e.g., food, clothing, shelter, communication) connecting all cultures. Culture influences viewpoints, rules and institutions in a global society. Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many diverse ethnic and cultural groups of our nation and world.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group of people. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.

cultures develop social institutions (e.g., government, economy, education, religion, family) to structure society, influence behavior, and respond to human needs.

interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.

multiple factors contributed to the cultural diversity of the United States prior to Reconstruction; an understanding and appreciation of the diverse complexity of cultures is essential in our society.

Grade 8 Skills and Concepts

Students will

demonstrate an understanding (e.g., speak, draw, write, sing, create) of the nature of culture by exploring cultural elements (e.g., beliefs, customs/traditions, languages, skills, literature, the arts) of diverse groups in the United States prior to Reconstruction and explain how culture served to define specific groups and resulted in unique perspectives

investigate social institutions (e.g., family, religion, education, government, economy) in relation to how they responded to human needs, structured society and influenced behavior in the United States prior to Reconstruction

explain how communications between groups were influenced by cultural differences; explain how interactions influenced conflict and competition (e.g., political, economic, religious, ethnic) among individuals and groups in the United States prior to Reconstruction

describe conflicts between individuals or groups and explain how compromise and cooperation were possible choices to resolve conflict among individuals and groups in the United States prior to Reconstruction

compare examples of cultural elements of today to those in the United States prior to Reconstruction, using information from a variety of print and non-print sources (e.g., media, literature, interviews, observations, documentaries, artifacts)

Big Idea: Economics

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

the basic economic problem confronting individuals, societies and government in the development of the United States prior to Reconstruction was scarcity; as a result of scarcity, economic choices and decisions were made.

the development of the American economic system, institutions and markets prior to Reconstruction helped individuals, groups and governments achieve their goals and impacted life in the United States.

the United States government and its policies played a major role in determining how the U.S. economy functioned prior to Reconstruction.

individuals, businesses and the government of the U.S. prior to Reconstruction made economic decisions about the use of resources in the production, distribution and consumption of goods and services.

Grade 8 Skills and Concepts

Students will

demonstrate an understanding of the nature of limited resources and scarcity in the United States prior to Reconstruction, using information from a variety of print and non-print sources (e.g., news media, news magazines, textbook, Internet):

explain how scarcity required individuals, groups and governments to make decisions about use of productive resources (e.g., natural resources, human resources and capital goods)

describe how goods and services were exchanged and how supply and demand and competition determined prices

analyze cause-effect relationships among financial decisions by individuals and groups and historical events

investigate the production and distribution of goods and services in the United States prior to Reconstruction:

examine ways in which basic economic questions about the production, distribution and consumption of goods and services were addressed

explain how resources were used to produce goods and services and how profit motivated individuals and groups to take risks in producing goods and services

analyze how new knowledge, technology/tools and specialization influenced productivity of goods and services

analyze interdependence of economic activities among individuals and groups in the United States prior to Reconstruction

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

use of geographic tools (e.g., maps, globes, photographs, models, charts, graphs, databases) and mental maps helps to interpret information, analyze patterns and spatial data, and understand geographic issues encountered in the United States prior to Reconstruction.

patterns emerge as humans move, settle, and interact on Earth's surface and can be identified by examining the location of physical and human characteristics, how they are arranged, and why they are in particular locations. Economic, political, cultural and social processes interact to shape patterns of human populations, interdependence, cooperation and conflict in the United States prior to Reconstruction.

regions help us to see Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups.

people depended on, adapted to, or modified the environment to meet basic needs. Human actions modified the physical environment and in turn, the physical environment limited or promoted human activities in the United States prior to Reconstruction.

Big Idea: Geography – Continued
Grade 8 Skills and Concepts *Students will* demonstrate an understanding of patterns on Earth's surface using a variety of geographic tools (e.g., maps, globes, charts, graphs, photographs, models): locate, in absolute or relative terms, landforms and bodies of water locate, interpret patterns on Earth's surface, and explain how different physical factors (e.g., rivers, mountains, seacoasts) impacted where human activities were located in the United States prior to Reconstruction investigate regions of the Earth's surface in the United States prior to Reconstruction using information from print and non-print sources (e.g., books, films, magazines, Internet, geographic tools): explain relationships between and among physical characteristics of regions and how they were made distinctive by human characteristics (e.g., dams, roads, urban centers); describe advantages and disadvantages for human activities (e.g., exploration, migration, trade, settlement) that resulted describe patterns of human settlement; explain relationships between these patterns and human needs; analyze how factors (e.g., war, famine, disease, economic opportunity, and technology) affected human migration evaluate how availability of technology, resources and knowledge caused places and regions to evolve and change analyze current events to compare geographic perspectives of today with those prior to Reconstruction investigate interactions among human activities and the physical environment in the United States prior to Reconstruction: explain how people used technology to modify the physical environment to meet their needs describe how the physical environment and different viewpoints promoted or restricted human activities (e.g., exploration, migration, trade, settlement, development) and land use analyze cause-effect relationships between and among natural resources and political, social and economic development

Big Idea: Historical Perspective

History is an account of events, people, ideas, and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

history is an account of human activities that is interpretive in nature, and a variety of tools (e.g., primary and secondary sources, data, artifacts) are needed to analyze and understand historical events.

U.S. History can be analyzed by examining significant eras (Exploration as it relates to the settlement of America, The Great Convergence, Colonization and Settlement, Revolution and the New Nation, Expansion and Reform, Civil War) to develop chronological understanding and recognize cause-and-effect relationships and multiple causation.

U.S. History (prior to Reconstruction) has been impacted by significant individuals and groups.

geography, culture and economics have a significant impact on historical perspectives and events.

advances in science and technology have a significant impact on historical events.

Big Idea: Historical Perspective – Continued

Grade 8 Skills and Concepts
Students will
demonstrate an understanding of the interpretative nature of history using a variety of tools and resources (e.g., primary and secondary sources, Internet, timelines, maps):
investigate, describe and analyze significant historical events and conditions in the U.S prior to Reconstruction, drawing inferences about perspectives of different individuals and groups (e.g., gender, race, region, ethnic group, age, economic status, religion, political group)
examine multiple cause-effect relationships that have shaped history (e.g., showing how a series of events are connected)
investigate, using primary and secondary sources (e.g., biographies, films, magazines, Internet resources, textbooks, artifacts) to answer questions about, locate examples of, or interpret factual and fictional accounts of major historical events and people:
analyze how exploration and the settlement of America caused diverse cultures to interact in various forms (e.g., compromise, cooperation, conflict, competition); explain how governments expanded their territories and the impact this had on the United States prior to Reconstruction
describe events and conditions that led to the "Great Convergence" of European, African and Native American people beginning in the late 15th century; analyze how America's diverse society developed as a result of these events
explain how the ideals of equality and personal liberty (e.g., rise of individual rights, economic freedom, religious diversity) that developed during the colonial period were motivations for the American Revolution and proved instrumental in forging a new nation
describe how the growth of democracy and geographic expansion occurred and were significant to the development of the United States prior to Reconstruction
compare the political, social, economic and cultural differences (e.g., slavery, tariffs, industrialism vs. agrarianism, federal vs. states' rights) between and among regions of the U.S. and explain how these differences contributed to the American Civil War
evaluate how advances in science and technology contributed to the changing American society in the United States prior to Reconstruction

MIDDLE LEVEL TECHNOLOGY

Kentucky Academic Standards – Technology – Middle School

Technology use in the 21st century has become a vital component of all aspects of life. For students in Kentucky to be contributing citizens, they must receive an education that incorporates technology literacy at all levels. Technology literacy is the ability of students to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century. The Technology Kentucky Academic Standards provides a framework for integrating technology into all content areas. It reflects the basic skills required for each student to be competitive in the global economy.

For students to gain the technology competencies, it is essential that they have access to technology during the school day in all grade levels. Instruction should provide opportunities for students to gain and demonstrate technology skills that build primary through grade 12.

The technology content standards should be integrated into each curricular discipline. The purpose of integrating technology is to help students make useful connections between what they learn in each content area and the real world. Technology knowledge, concepts and skills should be interwoven into lessons or units and taught in partnership with other content areas. Technology lends itself to curriculum integration and team teaching. Technology can enhance learning for all students, and for some it is essential for access to learning.

The technology content standards are organized by grade spans: primary, intermediate, middle, and high. The technology Kentucky Academic Standards at the middle level builds upon primary and intermediate experiences and includes students demonstrating competencies in technology literacy. Students use word processing, database, spreadsheet, browser, presentation and other tools. Students know the purpose and function of technology to enable them to select the appropriate tools to create original innovative work. By the end of middle school, students apply and demonstrate technology competencies across all curriculum areas. This experience will prepare them in meeting the minimum technology requirements needed for high school graduation.

The technology content standards at the middle grade span are directly aligned with Kentucky's Academic Expectations. Technology standards are organized around three Big Ideas that are important to the discipline of technology. The three Big Ideas in technology are: 1) Information, Communication and Productivity; 2) Safety and Ethical/Social Issues; and 3) Research, Inquiry/Problem-Solving and Innovation. The Big Ideas are conceptual organizers for technology. Each grade level span ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of Technology. The understandings represent the desired results--what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and Concepts describe ways that students demonstrate their learning and are specific to each grade level span. The skills and concepts for technology are fundamental to technology literacy, safe use and inquiry. The skills and concepts build on prior learning.

Big Idea: Information, Communication and Productivity

Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Academic Expectations

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.
3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.
6.1 Students connect knowledge and experiences from different subject areas.
6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences.

Middle Enduring Knowledge – Understandings
Students will understand that
appropriate terminology, proper keyboarding, computer operations and applications assist to gain confidence in the use of technology.
technology (e.g. keyboarding, word processing, spreadsheets, databases, hardware, scanners, digital and video cameras) is used effectively and efficiently to accomplish a task.
technology is used to communicate in a variety of ways.
productivity tools are used effectively and efficiently to accomplish a task.

Middle Skills and Concepts – Information
Students will
use a variety of technology (e.g., probeware, handhelds, digital and video cameras, scanners) to collect, analyze and present in all content areas
recognize, discuss and use terms/concepts related to the protection of computers, networks and information (e.g., virus protection, network security, passwords, firewalls, privacy laws)
use proper keyboarding techniques, optimal posture and correct hand placement (e.g., continue appropriate finger reaches and building speed)

Middle Skills and Concepts – Communication
Students will
use technology to communicate in a variety of modes (e.g., audio, speech to text, print, media)
select and use appropriate technology to collect, analyze and share information
use online collaboration and interactive projects (e.g., email, videoconferencing) to communicate with others (e.g., experts, mentors)
use a variety of electronic formats (e.g., web publishing, oral presentations, journals and multimedia presentations) to summarize and communicate results

Middle Skills and Concepts – Productivity
Students will
use productivity tools to complete content assignments and projects
construct and publish information in printed and digital formats (e.g., printed reports, resumes, brochures, charts, multimedia presentations, videos and websites) for authentic audiences
use technology to develop innovative and creative products

Big Idea: Safety and Ethical/Social Issues

Students understand safety and ethical/social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

Academic Expectations

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.
3.6 Students demonstrate the ability to make decisions based on ethical values.
4.3 Students individually demonstrate consistent, responsive and caring behavior.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
4.5 Students demonstrate an understanding of, appreciation for and sensitivity to a multi-cultural and world view.

Middle Enduring Knowledge – Understandings
Students will understand that
collaborative and interactive projects use technology to enhance learning.
acceptable technology etiquette is essential to respectful social interactions and good citizenship.
ethical use of technology is necessary to ensure safety, privacy and legal issues.
technology is used in occupations as a basic skill to be successful and productive in a global society.
assistive technology supports learning to ensure equitable access to a productive life.

Middle Skills and Concepts – Safety
Students will
explain the importance of safe Internet use (e.g., iSafe skills)
apply safe behavior when using technology

Middle Skills and Concepts – Ethical Issues
Students will
describe intellectual property issues related to technology
practice responsible (e.g., virus protection, passwords) use of technology adhering to the Acceptable Use Policy (AUP) as well as other state and federal laws
model ethical behavior relating to security, privacy, passwords and personal information and recognize possible consequences of misuse
use legal and ethical practices when completing digital projects/school work and credit all participants for their contribution to the work
investigate basic issues related to responsible use of technology and describe personal consequences of inappropriate use
investigate software piracy, its impact on the technology industry and possible repercussions to individuals and/or the school district

Middle Skills and Concepts – Human Issues
Students will
use appropriate behavior related to computers, networks, digital information (e.g., security, privacy, passwords, personal information)
use proper social etiquette with any technology (e.g., email, blogs, IM, telephone, help desk) while collaborating with peers, experts and others
use technology to engage in interactive projects in the classroom
describe how societal expectations drive the acceptance and use of new products and systems
investigate how the use of technology affects humans in various ways (e.g., safety, comfort, choices and attitudes)
explore how technology is used in different occupations
engage technology to support learning (e.g., online courses, online assessments)
conclude that assistive technology supports learning to ensure equitable access to a productive life

Big Idea: Research, Inquiry/Problem-Solving and Innovation

Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Academic Expectations

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.
2.3 Students identify and analyze systems and the ways their components work together or affect each other.
5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.
5.2 Students use creative thinking skills to develop or invent novel, constructive ideas or products.
5.4 Students use a decision-making process to make informed decisions among options.
5.5 Students use problem-solving processes to develop solutions to relatively complex problems.
6.1 Students connect knowledge and experiences from different subject areas.

Middle Enduring Knowledge – Understandings

Students will understand that

technology supports creative thinking and implementation of new ideas to reach goals.
technology supports critical thinking skills used in inquiry/problem solving to make informed decisions.
technology assists in researching, analyzing and evaluating information obtained from a variety of sources to answer an essential question across all content areas.
technology is used to analyze real world data through inquiry/problem solving in order to produce results.
technology problem solving strategies is applied to innovative design for authentic, creative and real-world applications.

Big Idea: Research, Inquiry/Problem-Solving and Innovation – Continued
Middle Skills and Concepts - Research *Students will* demonstrate an understanding of the strengths and limitations of the Internet apply a research process model (e.g., Big6, Research Cycle) to conduct online research locate and collect information from a variety of electronic resources (e.g. search engines, CDROM, online periodical databases, Virtual library/online catalogs, interactive video conferencing) and correctly cite sources evaluate the accuracy and appropriateness of electronic information organize information that is collected using a variety of tools (e.g., spreadsheet, database, saved files) communicate results of research and learning with others using the most appropriate tools (e.g., desktop-published or word-processed report, multimedia presentation) manipulate data using charting tools and graphic organizers (e.g., concept mapping, flow charting and outlining software) to connect ideas and organize information **Middle Skills and Concepts – Inquiry/Problem-solving** *Students will* use appropriate technology and strategies to solve content-specific problems in the real-world determine which technology is useful and select the appropriate tool(s) (e.g., calculators, data collection probes, videos, educational software) to inquire/problem- solve in self-directed and extended learning apply strategies for identifying and solving minor hardware and software problems use technology to solve problems using critical thinking and problem-solving strategies explore how inquiry/problem-solving impact science, technology, engineering and mathematics (STEM) (e.g., design, programming, robotics) **Middle Skills and Concepts – Innovation** *Students will* use technology to express creativity in all content areas design, develop, publish and present original, innovative products (e.g., Web pages, video, robotics, online content) collaborate with peers, experts and others to develop solutions and innovative products (e.g., design/CAD, troubleshooting, helpdesk, models, systems) describe how technological innovation often results when ideas, knowledge or skills are shared within a technology

MIDDLE LEVEL VOCATIONAL STUDIES

Kentucky Academic Standards – Vocational Studies – Sixth Grade

The vocational studies program at the sixth grade develops an exploration of careers. This exploration includes the purpose of having a job, concepts of consumer-decision-making, saving money, and connections between learning and working. All content teachers are responsible for providing instruction in the vocational studies area. The vocational program provides opportunities for students to investigate career options and study the relationship between careers and life roles. Students will connect educational achievement to career opportunities and set clear directions and goals for high school and beyond.

Students in the sixth grade vocational studies area develop an understanding of career planning, consumer decision-making and financial literacy that will foster life-long learning. The curriculum relates to consumer decisions, financial literacy, employability and use resources impacting the community and environment. Vocational studies addresses strategies for choosing and preparing a career, skills and work habits needed in future schooling and work. Opportunities are provided for skill development such as: interviewing, writing résumés, and completing applications that are needed for acceptance into college, other post-secondary training or to get a job. The challenge is for students to make a successful transition from school to the world of work, from job to job, across the career life span, and to be productive citizens.

The vocational studies content standards at the sixth grade are directly aligned with Kentucky's **Academic Expectations**. Consumerism and the vocational studies standards are organized around six "Big Ideas" that are important to the discipline of vocational studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness, Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways students demonstrate their learning and are specific to each grade level. The skills and concepts for vocational studies are fundamental to career exploration and builds on prior learning.

Academic Expectations 2.36, 2.37 and 2.38 bring forward the career exploration in Vocational Studies. Vocational Studies provide a connection to Kentucky's Learning Goals 3 (become self-sufficient individuals) and Learning Goal 4 (become responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

economic and social factors affect consumer decisions.
culture, media and technology can influence consumer decisions.
consumer advocacy groups impact consumer’s rights and responsibilities.
consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.
advocacy is important for personal, family and community health and safety issues.

Big Idea: Consumer Decisions – Continued
Grade 6 Skills and Concepts *Students will* evaluate economic and social concepts and why they are important for consumer decisions by: analyzing the differences between needs and wants and how individuals and families make choices determining ways in which goods and services used by families impact the environment applying decision-making strategies when buying products comparing and evaluating products and services based on major factors (e.g., price, quality, features) when making consumer decisions comparing the relationship between supply and demand and their role in meeting consumer needs investigate how culture, media and technology can influence consumer decisions by: explaining how culture, media and technology impact the family and consumer decision-making identifying and explaining ways consumer's buying practices are influenced by peer pressure, desire for status and advertising techniques (e.g., bandwagon, facts and figures, emotional appeal, endorsement/testimonials) exploring the positive and negative effects of advertising and explain the impact they have on consumer decisions explain ways consumer rights and responsibilities are protected (e.g., government agencies, consumer protection agencies, consumer action groups) evaluate ways consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment by: using resources from home, school, and community that provide accurate and relevant health information describing the influence of environmental factors that positively and negatively affect health researching and describing services provided by environmental agencies (e.g., Soil Conversation, Environmental Protection Agency, KY Department of Natural Resources) investigating conservation issues related to consumption and waste management practices use a variety of sources to find examples of jobs carried out by people at school and in the community that support job success examine individual, family, and community roles and responsibilities by: investigating a variety of resources and explain ways in which consumers are addressing the effects of renewable resources on the environment describing jobs carried out by people at school and in the community that support success in school

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 6 Enduring Knowledge – Understandings

Students will understand that
management of financial resources is needed to meet goals of individuals and families.
savings plans and budgets are a basic component in making financial decisions.
various services are provided by financial institutions (e.g., banks, credit unions).
career choice and lifestyle impact an individual's financial future.

Grade 6 Skills and Concepts

Students will
evaluate financial management resources and how they are needed to meet goals of individuals and families by:
prioritizing financial goals that might affect individuals, families and community
explaining various types of expenses (e.g., food, clothing, entertainment) and savings (e.g., piggy bank, bank account, savings bonds)
investigate savings plans and budgets in making financial decisions by:
developing a savings plan that would achieve a specific goal
describing basic components of a budget (e.g., income, fixed and flexible expenses, and savings)
explaining when and why borrowing is used for the purchase of goods and services
describe how basic services (e.g., deposits, checking account, savings account) are provided by financial institutions (e.g., banks, credit unions)
explain how financial goals affect future lifestyle expectations and career choices

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers. The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
5.4 Students use a decision-making process to make informed decision among options.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

an individual's work/career encompasses more factors than providing for basic needs.
jobs/careers reflect both individual and societal needs and vary within communities and regions.
career choices are available in planning for job/careers in a variety of career clusters.
the connection between work and academic achievement can influence one's future job/career.
an Individual Learning Plan (ILP) is an academic and career planning tool.
self-knowledge is an important part of the career planning process.

Grade 6 Skills and Concepts

Students will

evaluate why people need to work (e.g., earn money, contribute to community, enhance self-esteem) to meet basic needs (e.g., food, clothing, shelter), provide self-satisfaction, and enjoyment
investigate how jobs/careers reflect both individual and societal needs and vary within communities and regions by:
comparing different job opportunities in the home, school, and community (e.g., home business, flexible schedule)
recognizing that the roles of individuals at home, in the workplace, and in the community are constantly changing
describe a range of academic skills acquired in school (e.g., verbal and nonverbal communication, computer/technical, mathematical) and explain how these skills impact job success and future career opportunities by:
researching career choices through the use of technology
identifying jobs in career clusters (e.g., Business and Marketing, Communications, Human Services, Social Services, Information Technology, Education, Social Sciences) that vary within and among regions
identifying resources (e.g., Internet, newspapers, magazines, counselors) and experiences (e.g., shadowing, mentoring) that can be used for locating job and career information
develop an educational plan that can impact their future career opportunities by:
creating an Individual Learning Plan (ILP) as a tool to explore self-knowledge and academic aptitude and understand that career paths should relate to interests, aptitude, and abilities
identifying available postsecondary options (e.g., community and technical colleges, 4-year colleges, military service) used when developing career goals that are included in the Individual Learning Plan (ILP)
recognize how self-knowledge (e.g., interests, abilities) is helpful when selecting and preparing for a career path and that unique interests may lead to career choices

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing résumé and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
3.8 Students demonstrate the ability to make decisions based on ethical values.

Grade 6 Enduring Knowledge – Understandings

Students will understand that
interpersonal skills impact individual's career choice and success in the workplace.
attitudes and work habits contribute to success at home, school and work.
employability skills are important to achieve success in the workplace.
academic and technical skills contribute to obtaining and succeeding in employment.

Grade 6 Skills and Concepts

Students will
evaluate how interpersonal skills impact individual's career choice and success in the workplace by:
explaining ways to cooperate at home, school and work
identifying available resources to locate job openings in the community
identifying effective group interaction strategies (e.g., communicating effectively, conflict resolution, compromise) to develop team skills
demonstrating how working cooperatively with people of diverse backgrounds and abilities is important to achieve success in the workplace
explaining the importance of working cooperatively with others by contributing ideas, suggestions and efforts to complete a task

• explain how attitudes and work habits contribute to success at home, school and work by:
describing leadership skills needed in the school, community and the workplace
explaining how attitudes and work habits transfer from the home and school to the workplace
identifying consequences for actions when disobeying rules and routines when employed
explaining the role of authority in school and the workplace
identifying the importance of developing good work habits (e.g., attendance, time management, problem-solving)
describe how employability skills are important to achieve success in the workplace by:
explaining the components and complete a job application
examining potential job/careers in the community
explaining how success in an academic course of study could contribute to the ability to achieve and succeed in employment (e.g., Science/Medicine, Language Arts/Librarian)
explain how academic and technical skills contribute to obtaining and succeeding in employment by:
explaining how effective communication skills (e.g., reading, writing, speaking, and listening) impacts work-related situations and give examples for success at home, school and work
explaining how success in a technical course of study could contribute to the achievement in employment (e.g., Computer and Technology Concepts/Web Design, Life Skills/Child Care)

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.

Grade 6 Enduring Knowledge – Understandings

Students will understand that

scientific and technological changes can impact a variety of careers.

technology skills can enhance learning and be used in developing a career plan.

communication skills are essential in seeking and maintaining jobs/careers.

Grade 6 Skills and Concepts

Students will

explain how scientific and technological changes impact specific careers (e.g., Nursing, Meteorologist, Radio and Television Broadcaster, Journalist)

evaluate how technology tools (e.g., computer programs, Internet, email, cell phones) are used in homes, schools and jobs by:

explaining how technology provides access to information and resources at home, school and the workplace

developing components of an on-line Individual Learning Plan (ILP) to provide a focus for academic and career planning

demonstrate how communication skills are essential in seeking and maintaining jobs/careers by:

describing the role of technology within a community in maintaining safe and healthy living environment

demonstrating how nonverbal communication skills (e.g., body language, facial expression, posture, dress) can impact relationships at home, school and the workplace

explaining how written communication skills are used at school and in the workplace

Kentucky Academic Standards – Vocational Studies – Seventh Grade

The vocational studies program at the seventh grade develops an exploration of careers. This exploration includes the purpose of having a job, concepts of consumer-decision-making, saving money, and connections between learning and working. All content teachers are responsible for providing instruction in the vocational studies area. The vocational studies program provides opportunities for students to investigate career options and study the relationship between careers and life roles. Students will connect educational achievement to career opportunities and set clear directions and goals for high school and beyond.

Students in the seventh grade vocational studies area develop an understanding of career planning, consumer decision-making and financial literacy that will foster life-long learning. The curriculum relates to consumer decisions, financial literacy, employability and use resources impacting the community and environment. Vocational studies addresses strategies for choosing and preparing a career, skills and work habits needed in future schooling and work. Opportunities are provided for skill development such as: interviewing, writing résumés, and completing applications that are needed for acceptance into college, other post-secondary training or to get a job. The challenge is for students to make a successful transition from school to the world of work, from job to job, across the career life span, and to be productive citizens.

The vocational studies content standards at the seventh grade are directly aligned with Kentucky's **Academic Expectations**. The vocational studies standards are organized around five "Big Ideas" that are important to the discipline of vocational studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school career to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways students demonstrate their learning and are specific to each grade level. The skills and concepts for vocational studies are fundamental to career exploration and builds on prior learning.

Academic Expectations 2.36, 2.37 and 2.38 bring forward the career exploration in Vocational Studies. Vocational Studies provide a connection to Kentucky's Learning Goals 3 (become self-sufficient individuals) and Learning Goal 4 (become responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

economic and social factors affect consumer decisions.
culture, media and technology can influence consumer decisions.
consumer advocacy groups impact consumer's rights and responsibilities.
consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.
a variety of print and electronic resources are available in the home, school, and community that provide health and safety information.
advocacy is important for personal, family and community health and safety issues.

Grade 7 Skills and Concepts

Students will

evaluate economic and social concepts and why they are important for consumer decisions by:
examining the use of economic principles and resources when making choices to satisfy needs and wants of individuals and families
comparing and evaluating products and services based on major factors (e.g., brand name, price, quality, features, availability) when making consumer decisions
comparing the relationship between supply and demand and their role in meeting consumer needs
applying decision-making strategies when buying products
determining ways in which goods and services used by families impact the environment
investigate how culture, media and technology impact the family and consumer decision making by:
explaining ways consumer's buying practices are influenced by peer pressure, desire for status and advertising techniques (e.g., bandwagon, facts and figures, emotional appeal, endorsement/testimonials)
exploring the positive and negative effects of advertising techniques (e.g., free samples, coupons, use of gimmicks, misleading or false information) and explain the impact they have on consumer decisions
explain ways consumer rights and responsibilities are protected (e.g., government agencies, consumer protection agencies, consumer action groups)
evaluate ways consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment by:
describing the influence of environmental factors that positively and negatively affect health
researching local and state environmental issues that address consumption for conservation and waste management practices
use print and electronic resources from home, school, and community that provide accurate and relevant health and safety information
use a variety of sources to find examples of jobs carried out by people at school and in the community that support job success

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

management of financial resource practices is needed to meet goals of individuals and families.
saving plans (e.g., investments, savings accounts, stocks, bonds) and budgets are economic practices in making financial decisions.
financial institutions (e.g., banks, brokerage firms, credit unions) provide consumer services that help in achieving financial goals.
career choice and lifestyle impacts an individual's financial future.

Grade 7 Skills and Concepts

Students will

evaluate financial management practices including budgeting, savings, banking services (e.g., purpose of checking and savings accounts, debit/credit), and investing (e.g., general types and purpose of investing) and explain why these practices are important in achieving personal financial goals by:
constructing and using a personal spending/savings plan and evaluate according to short- and long-term goals
explaining the difference between credit and debit cards
investigate savings plans and budgets in making financial decisions by:
describing basic components of a budget (e.g., income, fixed and flexible expenses, and savings)
explain how financial institutions (e.g., banks, brokerage firms, credit unions) provide consumer services that help in achieving financial goals by:
analyzing the steps in opening and using a checking and savings account
develop financial goals for the future based on one's lifestyle expectations and career choices

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers. The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
5.4 Students use a decision-making process to make informed decision among options.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

an individual’s work encompasses more factors than providing for basic needs.
jobs/careers reflect both individual and societal needs and vary within communities and regions.
career choices are available in planning for job/careers in a variety of career clusters.
the connection between work and academic achievement can influence one’s future job/career.
an Individual Learning Plan (ILP) is an academic and career planning tool.
self-knowledge is an important part of the career planning process.

Big Idea: Career Awareness, Exploration, Planning - Continued

Grade 7 Skills and Concepts
Students will
explain why people need to work (e.g., social contacts, make purchases for necessities, expand knowledge, develop skills to meet basic needs (food, clothing, shelter) and for personal satisfaction and enjoyment
evaluate how jobs/careers reflect both individual and societal needs and vary within communities and regions by:
comparing and contrasting the many factors that must be considered when selecting and preparing for employment or a career path
recognizing that the roles of individuals at home, in the workplace, and in the community are constantly changing
describe why attaining academic skills are important in both school and the workplace by:
researching career choices through the use of technology
describing how job and career opportunities (e.g., veterinarian, sales associate, interior designer, meteorologist, physical therapist) are grouped within career clusters (e.g., Agriculture, Arts & Humanities, Business & Marketing, Communications, Construction, Education, Health Science, Human Services, Information Technology, Manufacturing, Public Services, Science & Mathematics, Social Sciences, Transportation) that vary within and among communities and regions
develop an educational plan that can impact their future career opportunities by:
accessing and using resources for locating job/career information career paths related to interests, aptitude (e.g., academic skills), and abilities
updating the Individual Learning Plan (ILP) as a tool to explore self-knowledge and academic aptitude and understand that career paths should relate to your individual traits (e.g., interests, abilities, learning styles)
exploring and describing available postsecondary options (e.g., community technical colleges, 4-year colleges, military service) to develop career goals that are included in the Individual Learning Plan (ILP)
recognize how self-knowledge (e.g., interests, abilities) is helpful when selecting and preparing for a career path and that unique interests may lead to career choices

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing résumé and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
3.9 Students demonstrate the ability to make decisions based on ethical values.

Grade 7 Enduring Knowledge – Understandings

Students will understand that
interpersonal skills impact individual's career choice and success in the workplace.
attitudes and work habits contribute to success at home, school and work.
employability skills are important to achieve success in the workplace.
academic and technical skills contribute to obtaining and succeeding in employment.

Grade 7 Skills and Concepts

Students will
evaluate how interpersonal skills impact individual's career choice and success in the workplace by:
identifying effective group interaction strategies (e.g., communicating effectively, conflict resolution, compromise) to develop team skills
evaluating the importance of working cooperatively with people of diverse backgrounds and abilities to achieve success in the workplace
designing a plan for working cooperatively with others by contributing ideas, suggestions and efforts to complete a task
explaining how effective verbal and nonverbal communication skills impacts work-related situations
explain how attitudes and work habits contribute to success at home, school and work by:
demonstrating leadership skills by participating in co/extra-curricular activities, home, school and community
explaining how attitudes and work habits transfer from the home and school to the workplace
describing consequences for actions when disobeying rules and routines at the workplace
explaining the role of authority in school and the workplace
explaining the importance of developing good work habits (e.g., loyalty, initiative, assuming responsibility, time management, problem-solving)
describe how employability skills are important to achieve success in the workplace by:
using available resources for locating job openings
using established criteria to evaluate a completed job application
using technology to research job/careers in the community
examine academic and technical skills and how they contribute to obtaining and succeeding in employment by:
explaining how success in an academic course of study could contribute to the achievement and success in employment (e.g., Math/Teacher, Social Studies/Politician)
explaining how success in a technical course of study could contribute to the achievement and success in employment (e.g., AgriScience/Game Warden, Survey of Technology/Engineering)

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.

Grade 7 Enduring Knowledge – Understandings

Students will understand that

scientific and technological changes can impact a variety of careers.

technology skills can enhance learning and be used in developing a career plan.

communication skills are essential in seeking and maintaining jobs/careers.

Grade 7 Skills and Concepts

Students will

explain how scientific and technological changes impact specific careers (e.g., Construction Worker, Automotive Technician, Food Service industry)

evaluate the purposes of technology tools (e.g., word processing, databases, spreadsheets, scanners, robots, personal electronic devices, Internet, email) and analyze how these impact productivity in homes, schools and jobs by:

explaining how technology provides access to information and resources at home, school and the workplace

continuing the development of the on-line Individual Learning Plan (ILP) to provide a focus for academic and career planning

examine how communication skills are essential in seeking and maintaining jobs/careers by:

explaining skills used in classroom and workplace: letter writing, nonverbal/verbal communication skills and interview skills

using different formats to summarize and communicate orally and in written form for use in the classroom and the workplace

Kentucky Academic Standards –Vocational Studies – Eighth Grade

The vocational studies program at the eighth grade develops an exploration of careers. This exploration includes the purpose of having a job, concepts of consumer-decision-making, saving money, and connections between learning and working. All content teachers are responsible for providing instruction in the vocational studies area. The vocational studies program provides opportunities for students to investigate career options and study the relationship between careers and life roles. Students will connect educational achievement to career opportunities and set clear directions and goals for high school and beyond.

Students in the eighth grade vocational studies area develop an understanding of career planning, consumer decision-making and financial literacy that will foster life-long learning. The curriculum relates to consumer decisions, financial literacy, employability and use resources impacting the community and environment. Vocational studies addresses strategies for choosing and preparing a career, skills and work habits needed in future schooling and work. Opportunities are provided for skill development such as: interviewing, writing résumés, and completing applications that are needed for acceptance into college, other post-secondary training or to get a job. The challenge is for students to make a successful transition from school to the world of work, from job to job, across the career life span, and to be productive citizens.

The vocational studies content standards at the eighth grade are directly aligned with Kentucky's **Academic Expectations**. The vocational studies standards are organized around five "Big Ideas" that are important to the discipline of vocational studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways students demonstrate their learning and are specific to each grade level. The skills and concepts for Vocational Studies are fundamental to career exploration and builds on prior learning.

Academic Expectations 2.36, 2.37 and 2.38 bring forward the career exploration in Vocational Studies. Vocational Studies provide a connection to Kentucky's Learning Goals 3 (become self-sufficient individuals) and Learning Goal 4 (become responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

social factors and economic principles affect consumer decisions.
culture, media and technology can influence consumer decisions.
consumer management practices relating to the human, economic, and environmental resources are needed to meet the goals of individual and families.
consumer advocacy groups impact consumer's rights and responsibilities.
consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment.
a variety of print and electronic resources are available in the home, school, and community that provide health and safety information.
advocacy is important for personal, family and community health and safety issues.

Big Idea: Consumer Decisions – Continued
Grade 8 Skills and Concepts *Students will* evaluate social factors and economic principles and their affect on consumer decisions by: examining the use of economic principles and resources in making choices to satisfy needs and wants of individuals and families comparing and evaluating products and services based on major factors (e.g., brand name, price, quality, features, availability) when making consumer decisions comparing the relationship between supply and demand and their role in meeting consumer needs analyzing the interrelationship between the economic system and consumer actions apply decision-making strategies when buying products based on price, features, and quality identifying practices that allow families to maintain economic self-sufficiency investigate how culture, media and technology impact the family and consumer decision making by: exploring and using technology to access consumer information (e.g., products, services, and resources) developing criteria to evaluate consumer's buying practices that are influenced by peer pressure, desire for status and advertising techniques (e.g., bandwagon, facts and figures, emotional appeal, endorsement/testimonials) investigate consumer advocacy groups and the impact of consumer's rights and responsibilities by: examining economic impacts of laws and regulations that pertain to consumers and providers of services identifying and explaining how consumer rights and responsibilities are protected (e.g., government agencies, consumer protection agencies, consumer action groups) evaluate ways consumer actions (e.g., reusing, reducing, recycling) influence the use of resources and impact the environment by: describing the influence of environmental factors that positively and negatively affect health researching local and state environmental issues that address consumption for conservation and waste management practices use print and electronic resources from home, school, and community that provide accurate and relevant health information locate and interpret career information and job opportunities in the community that support job success

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic wellbeing. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

management of financial resource practices is needed to meet goals of individuals and families.
saving plans (e.g., investments, savings accounts, stocks, bonds) and budgets are economic practices in making financial decisions.
saving plans (e.g., investments, savings accounts, stocks, bonds) and budgets are economic practices in making financial decisions.
financial institutions (e.g., banks, brokerage firms, credit unions) provide consumer services that help in achieving financial goals.
career choice and lifestyle impacts an individual's financial future.

Grade 8 Skills and Concepts

Students will

evaluate financial management practices including budgeting, savings, banking services (e.g., purpose of checking and savings accounts, debit/credit), and investing (e.g., general types and purpose of investing) and explain why these practices are important in achieving personal financial goals by:
describing the risks and responsibilities associated with using credit
investigate savings plans and budgets in making financial decisions by:
constructing and using a personal spending/savings plan and evaluate according to short- and long-term goals
analyzing basic components of a budget (e.g., income, fixed and flexible expenses, and savings)
explain how financial institutions (e.g., banks, brokerage firms, credit unions) provide consumer services that help in achieving financial goals by:
analyzing the steps in opening and using a checking and savings account
develop financial goals for the future based on one's lifestyle expectations and career choices

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education and learn how to plan for careers. The relationship between academics and jobs/careers will enable students to make vital connections that will give meaning to their learning.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
5.4 Students use a decision-making process to make informed decision among options.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

an individual's work encompasses more factors than providing for basic needs.
jobs/careers reflect both individual and societal needs and vary within communities and regions.
career choices are available in planning for job/careers in a variety of career clusters.
the connection between work and academic achievement can influence one's future job/career.
an Individual Learning Plan (ILP) is an academic and career planning tool.

Grade 8 Skills and Concepts

Students will

analyze why people need to work (e.g., earn money, contribute to society, develop identity as a worker, enhance self-esteem) to meet basic needs (food, clothing, shelter) and for personal satisfaction and enjoyment by:
comparing and contrasting the many factors that must be considered when selecting and preparing for employment or a career path
explain how jobs/careers reflect both individual and societal needs
analyze the direct relationship of academic/technical skills, extracurricular activities, and community experiences to career preparation by:
researching career choice through the use of technology
create an educational plan that will can impact their future career opportunities by:
describing how job and career opportunities (e.g., veterinarian, sales associate, interior designer, meteorologist, physical therapist) are grouped together in career clusters (e.g., Agriculture, Arts & Humanities, Business & Marketing, Communications, Construction, Education, Health Science, Human Services, Information Technology, Manufacturing, Public Services, Science & Mathematics, Social Sciences, Transportation) that vary within and among communities and regions
accessing and evaluating resources for locating job/career information career paths related to interests, aptitude (e.g., academic skills), and abilities
creating and updating an Individual Learning Plan (ILP) as a tool to explore self-knowledge and academic aptitude and understand that career paths should relate to your individual traits (e.g., interests, abilities, learning styles)
explaining with examples postsecondary options (e.g., community technical colleges, 4-year colleges, military service) used when developing career goals that are included in the Individual Learning Plan (ILP)
analyze how self-knowledge (e.g., interests, abilities) is helpful when selecting and preparing for a career path and that unique interests may lead to career choices

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing résumé and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
3.6 Students demonstrate the ability to make decisions based on ethical values.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

interpersonal skills impact individual's career choice and success in the workplace.
attitudes and work habits contribute to success at home, school and work.
employability skills are important to achieve success in the workplace.
academic and technical skills contribute to obtaining and succeeding in employment.

Grade 8 Skills and Concepts

Students will

evaluate how interpersonal skills impact individual's career choice and success in the workplace by:
analyzing and evaluating the role of each participant's contribution in a team setting
evaluating the importance of working cooperatively with people of diverse backgrounds and abilities to achieve success in the workplace
designing a plan for working cooperatively with others by contributing ideas, suggestions and efforts to complete a task
explaining how effective verbal and nonverbal communication skills impacts work-related situations
examine how attitudes and work habits contribute to success at home, school and work by:
identifying effective group interaction strategies (e.g., communicating effectively, conflict resolution, compromise) to develop team skills (e.g., goal-setting, questioning, dividing work)
demonstrating leadership skills by participating in co/extra-curricular activities, home, school and community
explaining how attitudes and work habits transfer from the home and school to the workplace
demonstrating and explaining how various forms of etiquette are used in the home, school, community, and workplace
describing consequences for actions when disobeying rules and routines at the workplace
explaining the role of authority in school and the workplace
explaining the importance of developing good work ethics/habits (e.g., initiative, time management, respect, self-discipline, problem-solving) that support career retention and advancement
explain how employability skills are important to achieve success in the workplace by:
using available resources for locating job openings
using established criteria to evaluate a completed job application
explain how academic and technical skills contribute to obtaining and succeeding in employment by:
using technology to research job/careers in the community
explaining how success in an academic course of study could contribute to the achievement and success in employment (e.g., ~~Arts and Humanities~~ Visual and Performing Arts/Museum Curator, Health Education/Personal Trainer) explaining how success in a technical course of study could contribute to the achievement and success in employment (e.g., Career Choices/Nurse, Business/Marketing Career Exploration/Advertising Manager)

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.

Grade 8 Enduring Knowledge – Understandings

Students will understand that

scientific and technological changes can impact a variety of careers.
technology skills can enhance learning and be used in developing a career plan.
communication skills are essential in seeking and maintaining jobs/careers.

Grade 8 Skills and Concepts

Students will

explain how jobs/careers (e.g., Physical Therapist, Radio and Television Broadcaster, Web Designer) have been created as a result of scientific and technological advancements
evaluate the purpose of technology tools (e.g., multi-media, Internet, digital camera, teleconferencing, debit/credit cards) and analyze how these impact productivity in homes, schools and jobs by:
explaining how technology provides access to information and resources at home, school and the workplace
describing the role of technology within a community in maintaining safe and healthy living environment
updating the Individual Learning Plan (ILP) to provide a focus for academic and career planning
explain how communication skills are essential in seeking and maintaining jobs/careers by:
describing effective speaking and listening skills used in a job interview
explaining skills used to seek, obtain, maintain, and change jobs/careers: written communication, nonverbal/verbal communication skills and interview skills
using different formats to summarize and communicate orally and in written form for use in the classroom and the workplace

HIGH SCHOOL EDUCATION

High School

The high school program will continue to build on rigorous and relevant learning experiences from the middle level to prepare students for successful transition to adult life.

The high school curriculum must reflect the belief that all students are capable of learning at high levels and ensure that all students have access to an academically rigorous curriculum that leads to college and work place readiness upon graduation. The high school program should be broader than the content outlined as the state minimum for high school graduation in the *Kentucky Academic Standards*. The curriculum supports students in the acquisition of rigorous core knowledge, skills, habits and attitudes. Courses may be more traditional in nature or a local board of education may substitute an integrated, applied, interdisciplinary or technical/occupational course for a required course that prepares a student for a career path based on the student's Individual Learning Plan (ILP). Such substitutions provide high schools with the opportunity to offer courses that have the same academic rigor as traditional courses but deliver the content through more contextual, hands-on approaches.

Each student must be supported through transitions during their secondary experience with an ILP that provides opportunity for learning in a real-world context relevant to the student's career goals. Every student should be led through a process of academic and career awareness, exploration and planning. Postsecondary planning shall be a core activity within the high school as part of a comprehensive advising and guidance program.

Students shall be supported in the ILP through an advising and guidance process that fosters meaningful, supportive relationships with peers, highly qualified educators and postsecondary education and business communities to foster success beyond high school.

Credits for High School Graduation

A high school graduation credit may be awarded in either of two ways: Carnegie units (defined as at least 120 hours of instructional time in one subject) or performance-based credits, defined at the local level regardless of the number of instructional hours. Districts and schools are accountable for making sure that each student's education program includes the minimum content standards as specified in the *Kentucky Academic Standards* and provides the student with the opportunity to learn the standards including appropriate supports based on the individual learning needs of a student.

The Kentucky Board of Education identifies the minimum credits required for graduation (704 KAR 3:305) and the local district sets the local requirements in their district graduation policy.

Performance-Based Credit
Performance-Based Credits refer to credits earned by a student outside of the traditional structure of a 120 hour instructional course. In order to award such credits, districts must

- establish a policy for a performance-based system that: provides procedures for developing and amending performance-based credit courses
- identifies related performance descriptors and assessments
- establishes grading and reporting procedures
- specifies content standards as addressed in Kentucky's *Kentucky Academic Standards*
- identifies the extent to which end-of-course assessments will be used
- allows for students to demonstrate proficiency and earn credit for learning acquired outside of school or in prior learning experiences
- allows students to pursue internships, cooperative learning experiences and other learning experiences in the school and community

Performance-based credit may be awarded for these types of courses:

- course work that allows satisfactory demonstration of learning
- course work that constitutes satisfactory demonstration of learning in a course for which the student failed to earn credit when the course was previously taken
- standards-based portfolios, senior year or capstone projects
- standards-based online or other technology-mediated courses
- standards-based dual credit or other equivalency courses
- standards-based internship, cooperative learning experience or other supervised learning experience in the school and the community

High School Credit Earned in Middle School

It is expected that most students will earn these credits during their high school years. However, local school districts may offer these courses to middle level students if the following criteria are met:

- the content and the rigor of the course is the same as established in the *Kentucky Academic Standards*
- the students demonstrate mastery of the middle level content as specified in the *Kentucky Academic Standards*
- the district has criteria in place to make reasonable determination that the middle level student is capable of success in the high school course
- the middle level course is taught by teachers with either secondary or middle level certification with appropriate content specialization

Postsecondary Credit Earned in High School

Dual credit (articulated credit) opportunities allow students to pursue both high school and postsecondary credit-bearing work prior to their graduation from high school. A local board of education shall maintain a copy of its policy on high school graduation requirements that may contain policy regarding dual credit opportunities.

College Board Advanced Placement (AP) courses provide opportunities for students to access challenging curricula that facilitate high-level attainment of Kentucky's learning goals. The AP program provides high school students with opportunities to earn college credits at universities and colleges across the country.

AP courses require use of standardized, prescribed college-level curriculum. Course materials and resources are selected from among identified college-level texts in the appropriate content area.

The College Board has no restrictions on the age/grade level of students who take Advanced Placement courses and/or Advanced Placement examinations. College credit is solely based on the level of performance on each examination. Access to the courses may be achieved through regular classes, virtual opportunities, independent study or other means.

Dual enrollment opportunities allow students to pursue postsecondary credit bearing work prior to their graduation from high school. This differs from dual credit in that students are earning only postsecondary credit, not high school credit, for that course.

High School Credits Earned through Career and Technical Education

High school graduation requirements allow for interdisciplinary or applied courses to substitute for specific academic courses required for graduation. This option provides high schools the opportunity to offer courses that have the same academic rigor as traditional courses but deliver the content through more contextual, applied, hands-on approaches. Students may earn required high school credits through Career and Technical Education interdisciplinary or applied courses that include the minimum required content standards specified in the *Kentucky Academic Standards*.

Other Credits Required

In addition to the minimum credit requirements associated with the content standards as provided in the Kentucky Academic Standards, seven credits including four based on the student's Individual Learning Plan are also required. These seven credits must be based on academic content and learning goals for students.

HIGH SCHOOL ~~ARTS AND HUMANITIES~~ VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – ~~Arts and Humanities~~ Visual and Performing Arts– High School

At the high school level, students may choose to specialize in one or more art forms. Specialization will enable students to study an art form in an in-depth manner and work toward achieving proficiency and mastery in creating, performing, and responding to their chosen art form. Students who specialize in an art form will participate in performance-based arts courses designed to develop skills and understanding that will enable students to use the art form as a high level communication tool. This is accomplished through the development of skills in the processes that artists engage in to make the arts.

Students choosing not to specialize in an art form will move beyond the grounding in the arts achieved at the middle school level toward proficiency in the arts. Emphasis for these students should be placed on exposing students to a variety of arts through active experiences, and developing further understanding and appreciation of the historical and cultural significance of the arts. A higher emphasis on the process of responding to the arts is a natural outcome of this more general approach to art education, however engagement in the creative aspects of the arts remains critical in the general education of all students and promotes deep understanding and appreciation of the arts.

The Standards

The standards are directly related to the *National Core Arts Standards*. These are process standards, which are designed to engage students in artistic processes and creative expression as put forward in Senate Bill 1 (2009), KRS 158:6451, Section 1, Schools shall develop their students' ability to: "Express their creative talents and interests in visual arts, music, dance, and dramatic arts".

Standards Organization

The standards are organized around four arts processes:

1. **Creating:** Conceiving and developing new artistic ideas and work
   Creating involves planning and creating new dance, media arts, music, theatre, or visual arts. Creating may involve improvising in music, dance or theatre. Improvising is the composing of new music, reciting/acting new dramatic material, or creating new dance movements on the spur of the moment.

2. **Performing/Producing/Presenting:** Realizing artistic ideas and work through interpretation and presentation

   Performing is limited to the performing arts of music, dance and theatre. Performing generally involves sharing previously created works with an audience. Although the process of performing involves following a creative plan conceived by a composer, playwright or choreographer, there is still opportunity for creative interpretations within the performance.

   Producing is the process of sharing work in the area of media arts. Since media arts productions do not result in performances, the sharing process is different from the performing arts. Media artists still follow the same steps in the creation of works and preparation of works for sharing with others; however the result is more often a product such as a video or video game.

Presenting is often associated with sharing in more formal settings such as exhibition in the visual arts. The same steps to prepare works for presenting are considered-the audience, venue and communication aspects of an exhibition..

3. **Responding:** Understanding and evaluating how the arts convey meaning

   Responding to the arts involves having the viewer take a close look to interpret the meanings in artistic works. The arts are created for the purpose of communication. Responding to them engages a thinking process that enables the viewer/audience to gather the intent of the work and the message being share by the artist.

   Responding also involves the process of evaluating art works. The viewer/audience will apply criteria to evaluate the effectiveness of artistic works.

4. **Connecting:** Relating artistic ideas and work with personal meaning and external context

   Connecting involves both looking inward and outward. Artists use personal experiences and gained knowledge to inform their own creative works. They also relate artistic ideas with the world around them; to society, culture, and history. This deepens the understanding of the work and appreciation of those who create the arts.

Anchor Standards
There are eleven Anchor Standards that are common across all art forms. These standards illustrate steps that are taken within each of the Artistic Processes.

Performance Standards
Each artistic discipline has a set of performance standards. These standards illustrate what each of the Anchor Standards might look like as students engage in the Artistic Processes within an artistic discipline. Performance standard are written for pre-kindergarten through eighth grade as grade level standards, and at the high school in three proficiency levels; Proficient, Accomplished, Advanced. All Performance Standards align to the eleven overarching Anchor Standards.

Discipline: Dance	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Explore

Enduring Understanding: Choreographers use a variety of sources as inspiration and transform concepts and ideas into movement for artistic expression.

Essential Question: Where do choreographers get ideas for dances?

HS Proficient DA:Cr1.1.I	**HS Accomplished DA:Cr1.1.II**	**HS Advanced DA:Cr1.1.III**
a. Explore a variety of stimuli for sourcing movement to develop an improvisational or choreographed dance study. Analyze the process and the relationship between the stimuli and the movement. b. Experiment with the elements of dance to explore personal movement preferences and strengths, and select movements that challenge skills and build on strengths in an original dance study or dance.	a. Synthesize content generated from stimulus materials to choreograph dance studies or dances using original or codified movement. b. Apply personal movement preferences and strengths with the movement vocabulary of several dance styles or genres to choreograph an original dance study or dance that communicates an artistic intent. Compare personal choices to those made by well-known choreographers.	a. Synthesize content generated from stimulus material. Experiment and take risks to discover a personal voice to communicate artistic intent. b. Expand personal movement preferences and strengths to discover unexpected solutions that communicate the artistic intent of an original dance. Analyze the unexpected solutions and explain why they were effective in expanding artistic intent.

Discipline: Dance		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan **Enduring Understanding**: The elements of dance, dance structures, and choreographic devices serve as both a foundation and a departure point for choreographers. **Essential Question**: What influences choice-making in creating choreography?		
HS Proficient DA:Cr2.1.I	**HS Accomplished DA:Cr2.1.II**	**HS Advanced DA:Cr2.1.III**
a. Collaborate to design a dance using choreographic devices and dance structures to support an artistic intent. Explain how the dance structures clarify the artistic intent.	a. Work individually and collaboratively to design and implement a variety of choreographic devices and dance structures to develop original dances. Analyze how the structure and final composition informs the artistic intent.	a. Demonstrate fluency and personal voice in designing and choreographing original dances. Justify choreographic choices and explain how they are used to intensify artistic intent.
b. Develop an artistic statement for an original dance study or dance. Discuss how the use of movement elements, choreographic devices and dance structures serve to communicate the artistic statement.	b. Develop an artistic statement that reflects a personal aesthetic for an original dance study or dance. Select and demonstrate movements that support the artistic statement.	b. Construct an artistic statement that communicates a personal, cultural and artistic perspective.

Discipline: Dance		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Revise **Enduring Understanding**: Choreographers analyze, evaluate, refine, and document their work to communicate meaning. **Essential Question**: How do choreographers use self-reflection, feedback from others, and documentation to improve the quality of their work?		
HS Proficient **DA:Cr3.1.I**	**HS Accomplished** **DA:Cr3.1.II**	**HS Advanced** **DA:Cr3.1.III**
a. Clarify the artistic intent of a dance by manipulating choreographic devices and dance structures based on established artistic criteria and feedback from others. Analyze and evaluate impact of choices made in the revision process.	a. Clarify the artistic intent of a dance by refining choreographic devices and dance structures, collaboratively or independently using established artistic criteria, self-reflection and the feedback of others. Analyze and evaluate impact of choices made in the revision process.	a. Clarify the artistic intent of a dance by manipulating and refining choreographic devices, dance structures, and artistic criteria using self-reflection and feedback from others. Document choices made in the revision process and justify how the refinements support artistic intent.
b. Compare recognized systems to document a section of a dance using writing, symbols, or media technologies.	b. Develop a strategy to record a dance using recognized systems of dance documentation (for example, writing, a form of notation symbols, or using media technologies).	b. Document a dance using recognized systems of dance documentation (for example, writing, a form of notation symbols, or using media technologies).

Discipline: Dance	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Express

Enduring Understanding: Space, time, and energy are basic elements of dance.

Essential Question: How do dancers work with space, time and energy to communicate artistic expression?

HS Proficient DA:Pr4.1.I	**HS Accomplished DA:Pr4.1.II**	**HS Advanced DA:Pr4.1.III**
a. Develop partner and ensemble skills that enable contrasting level changes through lifts, balances, or other means while maintaining a sense of spatial design and relationship. Use space intentionally during phrases and through transitions between phrases. Establish and break relationships with others as appropriate to the choreography.	a. Dance alone and with others with spatial intention. Expand partner and ensemble skills to greater ranges and skill level. Execute complex floor and air sequences with others while maintaining relationships through focus and intentionality.	a. Modulate and use the broadest range of movement in space for artistic and expressive clarity. Use inward and outward focus to clarify movement and intent. Establish and break relationships with other dancers and audience as appropriate to the dance.
b. Use syncopation and accent movements related to different tempi. Take rhythmic cues from different aspects of accompaniment. Integrate breath phrasing with metric and kinesthetic phrasing.	b. Perform dance studies and compositions that use time and tempo in unpredictable ways. Use internal rhythms and kinetics as phrasing tools. Dance "in the moment."	b. Modulate time factors for artistic interest and expressive acuity. Demonstrate time complexity in phrasing with and without musical accompaniment. Use multiple and complex rhythms (for example, contrapuntal and/or polyrhythmic) at the same time. Work with and against rhythm of accompaniment or sound environments.
c. Connect energy and dynamics to movements by applying them in and through all parts of the body. Develop total body awareness so that movement phrases demonstrate variances of energy and dynamics.	c. Initiate movement phrases by applying energy and dynamics. Vary energy and dynamics over the length of a phrase and transition smoothly out of the phrase and into the next phrase, paying close attention to its movement initiation and energy.	c. Modulate dynamics to clearly express intent while performing dance phrases and choreography. Perform movement sequences expressively using a broad dynamic range and employ dynamic skills for establishing relationships with other

		dancers and projecting to the audience.

Discipline: Dance	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic technique and work for presentation.

Process Component: Embody

Enduring Understanding: Dancers use the mind-body connection and develop the body as an instrument for artistry and artistic expression.

Essential Question: What must a dancer do to prepare the mind and body for artistic expression?

HS Proficient **DA:Pr5.1.I**	**HS Accomplished** **DA:Pr5.1.II**	**HS Advanced** **DA:Pr5.1.III**
a. Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to retain and execute dance choreography.	a. Dance with sensibility toward other dancers while executing complex spatial, rhythmic and dynamic sequences to meet performance goals.	a. Apply body-mind principles to technical dance skills in complex choreography when performing solo, partnering, or dancing in ensemble works in a variety of dance genres and styles. Self-evaluate performances and discuss and analyze performance ability with others.
b. Develop a plan for healthful practices in dance activities and everyday life including nutrition and injury prevention. Discuss implementation of the plan and how it supports personal performance goals.	b. Apply anatomical principles and healthful practices to a range of technical dance skills for achieving fluency of movement. Follow a personal nutrition plan that supports health for everyday life.	b. Research healthful and safe practices for dancers and modify personal practice based on findings. Discuss how-research informs practice.
c. Collaborate with peers to establish and implement a rehearsal plan to meet performance goals. Use a variety of strategies to analyze and evaluate performances of self and others (for example, use video recordings of practice to analyze the difference between the way movements look and how they feel to match performance with visual affect). Articulate	c. Plan and execute collaborative and independent practice and rehearsal processes with attention to technique and artistry informed by personal performance goals. Reflect on personal achievements.	c. Initiate, plan, and direct rehearsals with attention to technical details and fulfilling artistic expression. Use a range of rehearsal strategies to achieve performance excellence.

performance goals and justify reasons for selecting particular practice strategies.		

Discipline: Dance	**Artistic Process**: Performing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Dance performance is an interaction between performer, production elements, and audience that heightens and amplifies artistic expression.

Essential Question: How does a dancer heighten artistry in a public performance?

HS Proficient **DA:Pr6.1.I**	**HS Accomplished** **DA:Pr6.1.II**	**HS Advanced** **DA:Pr6.1.III**
a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Demonstrate performance etiquette and performance practices during class, rehearsal and performance.	a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Model performance etiquette and performance practices during class, rehearsal and performance. Implement	a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Model performance etiquette and performance practices during class, rehearsal and performance. Enhance

Post-performance, accept notes from choreographer and apply corrections to future performances. Document the rehearsal and performance process and evaluate methods and strategies using dance terminology and production terminology.	performance strategies to enhance projection. Post-performance, accept notes from choreographer and apply corrections to future performances. Document the rehearsal and performance process and evaluate methods and strategies using dance terminology and production terminology.	performance using a broad repertoire of strategies for dynamic projection. Develop a professional portfolio (resume, head shot, etc.) that documents the rehearsal and performance process with fluency in professional dance terminology and production terminology.
b. Evaluate possible designs for the production elements of a performance and select and execute the ideas that would intensify and heighten the artistic intent of the dances.	b. Work collaboratively to produce a dance concert on a stage or in an alternative performance venue and plan the production elements that would be necessary to fulfill the artistic intent of the dance works.	b. Work collaboratively to produce dance concerts in a variety of venues and design and organize the production elements that would be necessary to fulfill the artistic intent of the dance works in each of the venues.

Discipline: Dance	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Analyze

Enduring Understanding: Dance is perceived and analyzed to comprehend its meaning.

Essential Question: How is a dance understood?

HS Proficient DA:Re.7.1.I	**HS Accomplished DA:Re.7.1.II**	**HS Advanced DA:Re.7.1.III**
a. Analyze recurring patterns of movement and their relationships in dance in context of artistic intent.	a. Analyze dance works and provide examples of recurring patterns of movement and their relationships that create structure and meaning in dance.	a. Analyze dance works from a variety of dance genres and styles and explain how recurring patterns of movement and their relationships create well-structured and meaningful choreography.
b. Analyze the use of elements of dance in a variety of genres, styles, or	b. Analyze and compare the movement patterns and their relationships in a variety of	b. Explain how dance communicates aesthetic and cultural values in a variety of

cultural movement practices within its cultural context to communicate intent. Use genre-specific dance terminology.	genres, styles, or cultural movement practices and explain how their differences impact communication and intent within a cultural context. Use genre-specific dance terminology.	genres, styles, or cultural movement practices. Use genre-specific dance terminology

Discipline: Dance	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Dance is interpreted by considering intent, meaning, and artistic expression as communicated through the use of the body, elements of dance, dance technique, dance structure, and context.

Essential Question: How is dance interpreted?

HS Proficient DA:Re8.1.I	**HS Accomplished DA:Re8.1.II**	**HS Advanced DA:Re8.1.III**
Select and compare different dances and discuss their intent and artistic expression. Explain how the relationships among the elements of dance, use of body, dance technique, and context enhance meaning and support intent using genre specific dance terminology.	Analyze and discuss how the elements of dance, execution of dance movement principles, and context contribute to artistic expression. Use genre specific dance terminology.	Analyze and interpret how the elements of dance, execution of dance movement principles, and context contribute to artistic expression across different genres, styles, or cultural movement practices. Use genre specific dance terminology.

Discipline: Dance		**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Critique **Enduring Understanding**: Criteria for evaluating dance vary across genres, styles, and cultures. **Essential Question**: What criteria are used to evaluate dance?		
HS Proficient **DA:Re9.1.I**	**HS Accomplished** **DA:Re9.1.II**	**HS Advanced** **DA:Re9.1.III**
Analyze the artistic expression of a dance. Discuss insights using evaluative criteria and dance terminology.	Compare and contrast two or more dances using evaluative criteria to critique artistic expression. Consider societal values and a range of perspectives. Use genre-specific dance terminology.	Define personal artistic preferences to critique dance. Consider societal and personal values, and a range of artistic expression. Discuss perspectives with peers and justify views.

Discipline: Dance		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: As dance is experienced, all personal experiences, knowledge, and contexts are integrated and synthesized to interpret meaning. **Essential Question**: How does dance deepen our understanding of ourselves, other knowledge, and events around us?		
HS Proficient **DA:Cn10.1.I**	**HS Accomplished** **DA:Cn10.1.II**	**HS Advanced** **DA:Cn10.1.III**
a. Analyze a dance to determine the ideas expressed by the choreographer. Explain how the perspectives expressed by the choreographer may impact one's own interpretation. Provide evidence to support one's analysis.	a. Analyze a dance that is related to content learned in other subjects and research its context. Synthesize information learned and share new ideas about its impact on one's perspective.	a. Review original choreography developed over time with respect to its content and context and its relationship to personal perspectives. Reflect on and analyze the variables that contributed to changes in one's personal growth.

b. Collaboratively identify a dance related question or problem. Conduct research through interview, research database, text, media, or movement. Analyze and apply information gathered by creating a group dance that answers the question posed. Discuss how the dance communicates new perspectives or realizations. Compare orally and in writing the process used in choreography to that of other creative, academic, or scientific procedures.	b. Use established research methods and techniques to investigate a topic. Collaborate with others to identify questions and solve movement problems that pertain to the topic. Create and perform a piece of choreography. Discuss orally or in writing the insights relating to knowledge gained through the research process, the synergy of collaboration, and the transfer of learning from this project to other learning situations.	b. Investigate various dance related careers through a variety of research methods and techniques. Select those careers of most interest. Develop and implement a Capstone Project that reflects a possible career choice.

Discipline: Dance	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Process Component: Relate

Enduring Understanding: Dance literacy includes deep knowledge and perspectives about societal, cultural, historical, and community contexts.

Essential Question: How does knowing about societal, cultural, historical and community experiences expand dance literacy?

HS Proficient DA:Cn11.1.HS.I	**HS Accomplished DA:Cn11.1.HS.II**	**HS Advanced DA:Cn11.1.HS.III**

Analyze and discuss dances from selected genres or styles and/or historical time periods, and formulate reasons for the similarities and differences between them in relation to the ideas and perspectives of the peoples from which the dances originate.	Analyze dances from several genres or styles, historical time periods, and/or world dance forms. Discuss how dance movement characteristics, techniques, and artistic criteria relate to the ideas and perspectives of the peoples from which the dances originate.	Analyze dances from several genres or styles, historical time periods, and/or world dance forms. Discuss how dance movement characteristics, techniques, and artistic criteria relate to the ideas and perspectives of the peoples from which the dances originate, and how the analysis has expanded one's dance literacy.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Conceive **Enduring Understanding**: Media arts ideas, works, and processes are shaped by the imagination, creative processes, and by experiences, both within and outside of the arts. **Essential Question**: How do media artists generate ideas? How can ideas for media arts productions be formed and developed to be effective and original?		
HS Proficient (MA:Cr1.1.I)	**HS Accomplished (MA:Cr1.1.II)**	**HS Advanced (MA:Cr1.1.III)**
Use identified generative	Strategically utilize	Integrate aesthetic principles

methods to formulate multiple ideas, develop artistic goals, and problem solve in media arts creation processes.	generative methods to formulate multiple ideas, refine artistic goals, and increase the originality of approaches in media arts creation processes.	with a variety of generative methods to fluently form original ideas, solutions, and innovations in media arts creation processes.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Develop **Enduring Understanding**: Media artists plan, organize, and develop creative ideas, plans, and models into process structures that can effectively realize the artistic idea. **Essential Question**: How do media artists organize and develop ideas and models into process structures to achieve the desired end product?		
HS Proficient (MA:Cr2.1.I)	**HS Accomplished (MA:Cr2.1.II)**	**HS Advanced (MA:Cr2.1.III)**
Apply aesthetic criteria in developing, proposing, and refining artistic ideas, plans, prototypes, and production processes for media arts productions, considering original inspirations, goals, and presentation context.	Apply a personal aesthetic in designing, testing, and refining original artistic ideas, prototypes, and production strategies for media arts productions, considering artistic intentions, constraints of resources, and presentation context.	Integrate a sophisticated personal aesthetic and knowledge of systems processes in forming, testing, and proposing original artistic ideas, prototypes, and production frameworks, considering complex constraints of goals, time, resources, and personal limitations.

Discipline: Media Arts		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Construct **Enduring Understanding**: The forming, integration, and refinement of aesthetic components, principles, and processes creates purpose, meaning, and artistic quality in media artworks. **Essential Question**: What is required to produce a media artwork that conveys purpose, meaning, and artistic quality? How do media artists improve/refine their work?		
HS Proficient (MA:Cr3.1.I	**HS Accomplished (MA:Cr3.1.II)**	**HS Advanced (MA:Cr3.1.III)**

a. Consolidate production processes to demonstrate deliberate choices in organizing and integrating content and stylistic conventions in media arts productions, demonstrating understanding of associated principles, such as emphasis and tone. b. Refine and modify media artworks, honing aesthetic quality and intentionally accentuating stylistic elements, to reflect an understanding of personal goals and preferences.	a. Consolidate production processes to demonstrate deliberate choices in organizing and integrating content and stylistic conventions in media arts production, demonstrating understanding of associated principles, such as continuity and juxtaposition. b. Refine and elaborate aesthetic elements and technical components to intentionally form impactful expressions in media artworks for specific purposes, intentions, audiences and contexts.	a. Synthesize content, processes, and components to express compelling purpose, story, emotion, or ideas in complex media arts productions, demonstrating mastery of associated principles, such as hybridization. b. Intentionally and consistently refine and elaborate elements and components to form impactful expressions in media artworks, directed at specific purposes, audiences, and contexts.

Discipline: Media Arts		**Artistic Process**: Producing
Anchor Standard 4: Select, analyze, and interpret artistic work for presentation. **Process Component:** Integrate **Enduring Understanding**: Media artists integrate various forms and contents to develop complex, unified artworks. **Essential Question**: How are complex media arts experiences constructed?		
HS Proficient (MA:Pr4.1.I)	**HS Accomplished (MA:Pr4.1.II)**	**HS Advanced (MA:Pr4.1.III)**
Integrate various arts, media arts forms, and content into	Integrate various arts, media arts forms, and academic	Synthesize various arts, media arts forms and

unified media arts productions, considering the reaction and interaction of the audience, such as experiential design.	content into unified media arts productions that retain thematic integrity and stylistic continuity, such as transmedia productions.	academic content into unified media arts productions that retain artistic fidelity across platforms, such as transdisciplinary productions.

Discipline: Media Arts		**Artistic Process**: Producing
Anchor Standard 5: Develop and refine artistic technique and work for presentation. **Process Component:** Practice **Enduring Understanding**: Media artists require a range of skills and abilities to creatively solve problems within and through media arts productions. **Essential Question**: What skills are required for creating effective media artworks and how are they improved? How are creativity and innovation developed within and through media arts productions? How do media artists use various tools and techniques?		
HS Proficient (MA:Pr5.1.I	**HS Accomplished (MA:Pr5.1.II)**	**HS Advanced (MA:Pr5.1.III)**

a. Demonstrate progression in artistic, design, technical, and soft skills, as a result of selecting and fulfilling specified roles in the production of a variety of media artworks. b. Develop and refine a determined range of creative and adaptive innovation abilities, such as design thinking, and risk taking, in addressing identified challenges and constraints within and through media arts productions. c. Demonstrate adaptation and innovation through the combination of tools, techniques and content, in standard and innovative ways, to communicate intent in the production of media artworks.	a. Demonstrate effective command of artistic, design, technical and soft skills in managing and producing media artworks. b. Demonstrate effective ability in creative and adaptive innovation abilities, such as resisting closure, and responsive use of failure, to address sophisticated challenges within and through media arts productions. c. Demonstrate the skillful adaptation and combination of tools, styles, techniques, and interactivity to achieve specific expressive goals in the production of a variety of media artworks.	a. Employ mastered artistic, design, technical, and soft skills in managing and producing media artworks. b. Fluently employ mastered creative and innovative adaptability in formulating lines of inquiry and solutions, to address complex challenges within and through media arts productions. c. Independently utilize and adapt tools, styles, and systems in standard, innovative, and experimental ways in the production of complex media artworks.

Discipline: Media Arts	**Artistic Process**: Producing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Media artists purposefully present, share, and distribute media artworks for various contexts.

Essential Question: How does time, place, audience, and context affect presenting or performing choices for media artworks? How can presenting or sharing media artworks in a public format help a media artist learn and grow?

HS Proficient	HS Accomplished	HS Advanced

(MA:Pr6.1.I)	(MA:Pr6.1.II)	(MA:Pr6.1.III)
a. Design the presentation and distribution of collections of media artworks, considering combinations of artworks, formats, and audiences. b. Evaluate and implement improvements in presenting media artworks, considering personal and local impacts, such as the benefits for self and others.	a. Curate and design the presentation and distribution of collections of media artworks through a variety of contexts, such as mass audiences, and physical and virtual channels. b. Evaluate and implement improvements in presenting media artworks, considering personal, local, and social impacts such as changes that occurred for people, or to a situation.	a. Curate, design, and promote the presentation and distribution of media artworks for intentional impacts, through a variety of contexts, such as markets and venues. b. Independently evaluate, compare, and integrate improvements in presenting media artworks, considering personal to global impacts, such as new understandings that were gained by artist and audience.

Discipline: Media Arts	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Perceive

Enduring Understanding: Identifying the qualities and characteristics of media artworks improves one's artistic appreciation and production.

Essential Question: How do we 'read' media artworks and discern their relational components? How do media artworks function to convey meaning and manage audience experience?

HS Proficient	HS Accomplished	HS Advanced

(MA:Re7.1.I)	(MA:Re7.1.II)	(MA:Re7.1.III)
a. Analyze the qualities of and relationships between the components, style, and preferences communicated by media artworks and artists. b. Analyze how a variety of media artworks manage audience experience and create intention through multimodal perception.	a. Analyze and synthesize the qualities and relationships of the components in a variety of media artworks, and feedback on how they impact audience. b. Analyze how a broad range of media artworks manage audience experience, create intention and persuasion through multimodal perception.	a. Analyze and synthesize the qualities and relationships of the components and audience impact in a variety media artworks. b. Survey an exemplary range of media artworks, analyzing methods for managing audience experience, creating intention and persuasion through multimodal perception, and systemic communications.

Discipline: Media Arts		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Interpretation and appreciation require consideration of the intent, form, and context of the media and artwork. **Essential Question**: How do people relate to and interpret media artworks?		
HS Proficient (MA:Re8.1.I)	**HS Accomplished (MA:Re8.1.II)**	**HS Advanced (MA:Re8.1.III)**

Analyze the intent, meanings, and reception of a variety of media artworks, focusing on personal and cultural contexts.	Analyze the intent, meanings, and influence of a variety of media artworks, based on personal, societal, historical, and cultural contexts.	Analyze the intent, meanings and impacts of diverse media artworks, considering complex factors of context and bias.

Discipline: Media Arts		**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: Skillful evaluation and critique are critical components of experiencing, appreciating, and producing media artworks. **Essential Question**: How and why do media artists value and judge media artworks? When and how should we evaluate and critique media artworks to improve them?		
HS Proficient (MA:Re9.1.HS.I)	**HS Accomplished (MA:Re9.1.II)**	**HS Advanced (MA:Re9.1.III)**
Evaluate media art works and production processes at decisive stages, using identified criteria, and considering context and artistic goals.	Form and apply defensible evaluations in the constructive and systematic critique of media artworks and production processes.	Independently develop rigorous evaluations of, and strategically seek feedback for media artworks and production processes, considering complex goals and factors.

Discipline: Media Arts		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Process Component:** Synthesize **Enduring Understanding**: Media artworks synthesize meaning and form cultural experience. **Essential Question**: How do we relate knowledge and experiences to understanding and making media artworks? How do we learn about and create meaning through producing media artworks?		
HS Proficient	**HS Accomplished**	**HS Advanced**

(MA:Cn10.1.I)	(MA:Cn10.1.II)	(MA:Cn10.1.III)
a. Access, evaluate, and integrate personal and external resources to inform the creation of original media artworks, such as experiences, interests, and cultural experiences. b. Explain and demonstrate the use of media artworks to expand meaning and knowledge, and create cultural experiences, such as learning and sharing through online environments.	a. Synthesize internal and external resources to enhance the creation of persuasive media artworks, such as cultural connections, introspection, research, and exemplary works. b. Explain and demonstrate the use of media artworks to synthesize new meaning and knowledge, and reflect and form cultural experiences, such as new connections between themes and ideas, local and global networks, and personal influence.	a. Independently and proactively access relevant and qualitative resources to inform the creation of cogent media artworks. b. Demonstrate and expound on the use of media artworks to consummate new meaning, knowledge, and impactful cultural experiences.

Discipline: Media Arts	**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: Media artworks and ideas are better understood and produced by relating them to their purposes, values, and various contexts. **Essential Question**: How does media arts relate to its various contexts, purposes, and values? How does investigating these relationships inform and deepen the media artist's understanding and work?	

HS Proficient (MA:Cn11.1.I)	**HS Accomplished (MA:Cn11.1.II)**	**HS Advanced (MA:Cn11.1.III)**
a. Demonstrate and explain how media artworks and ideas relate to various contexts, purposes, and values, such as social trends, power, equality, and personal/cultural identity. b. Critically evaluate and effectively interact with legal, technological, systemic, and vocational contexts of media arts, considering ethics, media literacy, social media, virtual worlds, and digital identity.	a. Examine in depth and demonstrate the relationships of media arts ideas and works to various contexts, purposes, and values, such as markets, systems, propaganda, and truth. b. Critically investigate and ethically interact with legal, technological, systemic, and vocational contexts of media arts, considering ethics, media literacy, digital identity, and artist/audience interactivity.	a. Demonstrate the relationships of media arts ideas and works to personal and global contexts, purposes, and values, through relevant and impactful media artworks. b. Critically investigate and strategically interact with legal, technological, systemic, and vocational contexts of media arts.

Music Technology Strand

Discipline: Music – Music Technology Strand	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Imagine **Enduring Understanding**: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources. **Essential Question**: How do musicians generate creative ideas?		
HS Proficient **MU:Cr1.1.T.I**	**HS Accomplished** **MU:Cr1.1.T.II**	**HS Advanced** **MU:Cr1.1.T.III**
Generate melodic, rhythmic, and harmonic ideas for compositions or improvisations using digital tools.	Generate melodic, rhythmic, and harmonic ideas for compositions and improvisations using digital tools and resources.	Generate melodic, rhythmic, and harmonic ideas for compositions and improvisations that incorporate digital tools, resources, and systems.

Discipline: Music – Music Technology Strand	**Artistic Process**: Creating	
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan and Make **Enduring Understanding**: Musicians' creative choices are influenced by their expertise, context, and expressive intent. **Essential Question**: How do musicians make creative decisions?		
HS Proficient **MU:Cr2.1.T.I**	**HS Accomplished** **MU:Cr2.1.T.II**	**HS Advanced** **MU:Cr2.1.T.II**
Select melodic, rhythmic, and harmonic ideas to develop into a larger work using digital tools and resources.	Select melodic, rhythmic, and harmonic ideas to develop into a larger work that exhibits unity and variety using digital and analog tools.	Select, develop, and organize multiple melodic, rhythmic and harmonic ideas to develop into a larger work that exhibits unity, variety, complexity, and coherence using digital and analog tools, resources, and systems.

Discipline: Music – Music Technology Strand	**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work.	

Process Component: Evaluate and Refine **Enduring Understanding**: Musicians evaluate and refine their work through openness to new ideas, persistence, and the application of appropriate criteria. **Essential Question**: How do musicians improve the quality of their creative work?		
HS Proficient **MU:Cr3.1.T.I**	**HS Accomplished** **MU:Cr3.1.T.II**	**HS Advanced** **MU:Cr3.1.T.III**
Drawing on feedback from teachers and peers, develop and implement strategies to improve and refine the technical and expressive aspects of draft compositions and improvisations.	Develop and implement varied strategies to improve and refine the technical and expressive aspects of draft compositions and improvisations.	Develop and implement varied strategies and apply appropriate criteria to improve and refine the technical and expressive aspects of draft compositions and improvisations.

Discipline: Music – Music Technology Strand	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work. **Process Component:** Present **Enduring Understanding**: Musicians' presentation of creative work is the culmination of a process of creation and communication. **Essential Question**: When is creative work ready to share?		
HS Proficient **MU:Cr3.2.T.I**	**HS Accomplished** **MU:Cr3.2.T.II**	**HS Advanced** **MU:Cr3.2.T.III**
Share compositions or improvisations that demonstrate a proficient level of musical and technological craftsmanship as well as the use of digital tools and resources in developing and organizing musical ideas.	Share compositions and improvisations that demonstrate an accomplished level of musical and technological craftsmanship as well as the use of digital and analog tools and resources in developing and organizing musical ideas.	Share a portfolio of musical creations representing varied styles and genres that demonstrates an advanced level of musical and technological craftsmanship as well as the use of digital and analog tools, resources and systems in developing and organizing musical ideas.

Discipline: Music – Music Technology Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Performers' interest in and knowledge of musical works, understanding of their own abilities, and the context for a performance influence the selection of repertoire.

Essential Question: How do performers select repertoire?

HS Proficient MU:Pr4.1.T.I	HS Accomplished MU:Pr4.1.T.II	HS Advanced MU:Pr4.1.T.III
Develop and explain the criteria used for selecting a varied repertoire of music based on interest, music reading skills, and an understanding of the performer's technical and technological skill.	Develop and apply criteria to select a varied repertoire to study and perform based on interest; an understanding of theoretical and structural characteristics of the music; and the performer's technical skill using digital tools and resources.	Develop and apply criteria to select varied programs to study and perform based on interest, an understanding of the theoretical and structural characteristics, as well as expressive challenges in the music, and the performer's technical skill using digital tools, resources, and systems.

Discipline: Music – Music Technology Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

HS Proficient MU:Pr4.2.T.I	HS Accomplished MU:Pr4.2.T.II	HS Advanced MU:Pr4.2.T.III
Describe how context, structural aspects of the music, and digital media/tools inform prepared and improvised performances.	Describe and demonstrate how context, theoretical and structural aspects of the music and digital media/tools inform and influence prepared and improvised performances.	Examine, evaluate and critique how context, theoretical and structural aspects of the music and digital media/tools inform and influence prepared and improvised performances.

Discipline: Music – Music Technology Strand	**Artistic Process**: Performing	
Anchor Standard 4: Select, analyze and interpret artistic work for presentation. **Process Component:** Interpret **Enduring Understanding**: Performers make interpretive decisions based on their understanding of context and intent. **Essential Question**: How do performers interpret musical works?		
HS Proficient **MU:Pr4.3.T.I**	**HS Accomplished** **MU:Pr4.3.T.II**	**HS Advanced** **MU:Pr4.3.T.III**
Demonstrate how understanding the context, expressive challenges, and use of digital tools in a varied repertoire of music influence prepared or improvised performances.	Demonstrate how understanding the style, genre, context, and use of digital tools and resources in a varied repertoire of music influences prepared or improvised performances and performers' ability to connect with audiences.	Demonstrate how understanding the style, genre, context, and integration of digital technologies in a varied repertoire of music informs and influences prepared and improvised performances and their ability to connect with audiences.

Discipline: Music – Music Technology Strand	**Artistic Process**: Performing	
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Evaluate and Refine **Enduring Understanding**: Musicians' creative choices are influenced by their context, expressive intent, and established criteria. **Essential Question**: How do musicians make creative decisions?		
HS Proficient **MU:Pr5.1.T.I**	**HS Accomplished** **MU:Pr5.1.T.II**	**HS Advanced** **MU:Pr5.1.T.III**
Identify and implement rehearsal strategies to improve the technical and expressive aspects of prepared and improvised performances in a varied repertoire of music.	Develop and implement rehearsal strategies to improve and refine the technical and expressive aspects of prepared and improvised performances in a varied repertoire of music.	Apply appropriate criteria as well as feedback from multiple sources and develop and implement varied strategies to improve and refine the technical and expressive aspects of prepared and improvised performances in varied programs of music.

Discipline: Music – Music Technology Strand	Artistic Process: Performing	
Anchor Standard 6: Convey meaning through the presentation of artistic work. **Process Component:** Present **Enduring Understanding**: Musicians judge performance based on criteria that vary across time, place, and cultures. The context and how a work is presented influence the audience response. **Essential Question**: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?		
HS Proficient MU:Pr6.1.T.I	**HS Accomplished MU:Pr6.1.T.II**	**HS Advanced MU:Pr6.1.T.III**
a. Using digital tools, demonstrate attention to technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music.	a. Using digital tools and resources, demonstrate technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music representing diverse cultures, styles, and genres.	a. Integrating digital and analog tools and resources, demonstrate an understanding and attention to technical accuracy and expressive qualities of the music in prepared and improvised performances of a varied repertoire of music representing diverse cultures, styles, genres, and historical periods.
b. Demonstrate an understanding of the context of music through prepared and improvised performances.	b. Demonstrate an understanding of the expressive intent when connecting with an audience through prepared and improvised performances.	b. Demonstrate an ability to connect with audience members before, and engaging with and responding to them during prepared and improvised performances.

Discipline: Music – Music Technology Strand		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Select **Enduring Understanding**: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes. **Essential Question**: How do individuals choose music to experience?		
HS Proficient **MU:Re7.1.T.I**	**HS Accomplished** **MU:Re7.1.T.II**	**HS Advanced** **MU:Re7.1.T.III**
Cite reasons for choosing music based on the use of the elements of music, digital and electronic aspects, and connections to interest or purpose.	Select and critique contrasting musical works, defending opinions based on manipulations of the elements of music, digital and electronic aspects, and the purpose and context of the works.	Select, describe and compare a variety of musical selections based on characteristics and knowledge of the music, understanding of digital and electronic aspects, and the purpose and context of the works.

Discipline: Music – Music Technology Strand		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Analyze **Enduring Understanding**: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music. **Essential Question**: How does understanding the structure and context of music inform a response?		
HS Proficient **MU:Re7.2.T.I**	**HS Accomplished** **MU:Re7.2.T.II**	**HS Advanced** **MU:Re7.2.T.III**
Explain how knowledge of the structure (repetition, similarities, contrasts), technological aspects, and purpose of the music informs the response.	Explain how an analysis of the structure, context, and technological aspects of the music informs the response.	Demonstrate and justify how an analysis of the structural characteristics, context, and technological and creative decisions, informs interest in and response to the music.

Discipline: Music – Music Technology Strand		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent. **Essential Question**: How do we discern musical creators' and performers' expressive intent?		
HS Proficient **MU:Re8.1.T.I**	**HS Accomplished** **MU:Re8.1.T.II**	**HS Advanced** **MU:Re8.1.T.III**
Explain and support an interpretation of the expressive intent of musical selections based on treatment of the elements of music, digital and electronic features, and purpose.	Connect the influence of the treatment of the elements of music, digital and electronic features, context, purpose, and other art forms to the expressive intent of musical works.	Examine, cite research and multiple sources to connect the influence of the treatment of the elements of music, digital and electronic features, context, purpose, and other art forms to the expressive intent of musical works.

Discipline: Music – Music Technology Strand		**Artistic Process**: Responding
Anchor Standard 9: Apply criteria to evaluate artistic work. **Process Component:** Evaluate **Enduring Understanding**: The personal evaluation of musical works and performances is informed by analysis, interpretation, and established criteria. **Essential Question**: How do we judge the quality of musical work(s) and performance(s)?		
HS Proficient **MU:Re9.1.T.I**	**HS Accomplished** **MU:Re9.1.T.II**	**HS Advanced** **MU:Re9.1.T.III**
Evaluate music using criteria based on analysis, interpretation, digital and electronic features, and personal interests.	Apply criteria to evaluate music based on analysis, interpretation, artistic intent, digital, electronic, and analog features, and musical qualities.	Develop and justify the evaluation of a variety of music based on established and personally-developed criteria, digital, electronic and analog features, and understanding of purpose and context.

Discipline: Music – Music Technology Strand		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.		
HS Proficient **MU:Cn10.0.T.I**	**HS Accomplished** **MU:Cn10.0.T.II**	**HS Advanced** **MU:Cn10.0.T.III**
Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music – Music Technology Strand		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts and daily life inform creating, performing, and responding to music?		
HS Proficient **MU:Cn11.0.T.I**	**HS Accomplished** **MU:Cn11.0.T.II**	**HS Advanced** **MU:Cn11.0.T.III**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.

Music Composition and Theory Strand		
Discipline: Music – Composition and Theory Strand	**Artistic Process**: Creating	
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Imagine **Enduring Understanding**: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources. **Essential Question**: How do musicians generate creative ideas?		
HS Proficient MU:Cr1.1.C.I	**HS Accomplished MU:Cr1.1.C.II**	**HS Advanced MU:Cr1.1.C.III**
Describe how sounds and short musical ideas can be used to represent personal experiences, moods, visual images, and/or storylines.	Describe and demonstrate how sounds and musical ideas can be used to represent sonic events, memories, visual images, concepts, texts, or storylines.	Describe and demonstrate multiple ways in which sounds and musical ideas can be used to represent extended sonic experiences or abstract ideas.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Plan and Make

Enduring Understanding: Musicians' creative choices are influenced by their expertise, context, and expressive intent.

Essential Question: How do musicians make creative decisions?

HS Proficient **MU:Cr2.1.C.I**	**HS Accomplished** **MU:Cr2.1.C.II**	**HS Advanced** **MU:Cr2.1.C.II**
a. Assemble and organize sounds or short musical ideas to create initial expressions of selected experiences, moods, images, or storylines.	a. Assemble and organize multiple sounds or musical ideas to create initial expressive statements of selected sonic events, memories, images, concepts, texts, or storylines.	a. Assemble and organize multiple sounds or extended musical ideas to create initial expressive statements of selected extended sonic experiences or abstract ideas.
b. Identify and describe the development of sounds or short musical ideas in drafts of music within simple forms (such as one-part, cyclical, or binary).	b. Describe and explain the development of sounds and musical ideas in drafts of music within a variety of simple or moderately complex forms (such as binary, rondo, or ternary).	b. Analyze and demonstrate the development of sounds and extended musical ideas in drafts of music within a variety of moderately complex or complex forms.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Evaluate and Refine

Enduring Understanding: Musicians evaluate and refine their work through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their creative work?

HS Proficient MU:Cr3.1.C.I	**HS Accomplished MU:Cr3.1.C.II**	**HS Advanced MU:Cr3.1.C.III**
Identify, describe, and apply teacher-provided criteria to assess and refine the technical and expressive aspects of evolving drafts leading to final versions.	Identify, describe, and apply selected teacher-provided or personally-developed criteria to assess and refine the technical and expressive aspects of evolving drafts leading to final versions.	Research, identify, explain, and apply personally-developed criteria to assess and refine the technical and expressive aspects of evolving drafts leading to final versions.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Present

Enduring Understanding: Musicians' presentation of creative work is the culmination of a process of creation and communication.

Essential Question: When is creative work ready to share?

HS Proficient **MU:Cr3.2.C.I**	**HS Accomplished** **MU:Cr3.2.C.II**	**HS Advanced** **MU:Cr3.2.C.III**
a. Share music through the use of notation, performance, or technology, and demonstrate how the elements of music have been employed to realize expressive intent. b. Describe the given context and performance medium for presenting personal works, and how they impact the final composition and presentation.	a. Share music through the use of notation, solo or group performance, or technology, and demonstrate and describe how the elements of music and compositional techniques have been employed to realize expressive intent. b. Describe the selected contexts and performance mediums for presenting personal works, and explain why they successfully impact the final composition and presentation.	a. Share music through the use of notation, solo or group performance, or technology, and demonstrate and explain how the elements of music, compositional techniques and processes have been employed to realize expressive intent. b. Describe a variety of possible contexts and mediums for presenting personal works, and explain and compare how each could impact the success of the final composition and presentation.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Performers' interest in and knowledge of musical works, understanding of their own abilities, and the context for a performance influence the selection of repertoire.

Essential Question: How do performers select repertoire?

HS Proficient MU:Pr4.1.C.I	**HS Accomplished MU:Pr4.1.C.II**	**HS Advanced MU:Pr4.1.C.III**
Identify and select specific excerpts, passages, or sections in musical works that express a personal experience, mood, visual image, or storyline in simple forms (such as one-part, cyclical, binary).	Identify and select specific passages, sections, or movements in musical works that express personal experiences and interests, moods, visual images, concepts, texts, or storylines in simple forms (such as binary, ternary, rondo) or moderately complex forms.	Identify and select specific sections, movements, or entire works that express personal experiences and interests, moods, visual images, concepts, texts, or storylines in moderately complex or complex forms.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

HS Proficient MU:Pr4.2.C.I	**HS Accomplished MU:Pr4.2.C.II**	**HS Advanced MU:Pr4.2.C.III**
Analyze how the elements of music (including form) of selected works relate to style and mood, and explain the implications for rehearsal or performance.	Analyze how the elements of music (including form) of selected works relate to the style, function, and context, and explain the implications for rehearsal and performance.	Analyze how the elements of music (including form), and compositional techniques of selected works relate to the style, function, and context, and explain and support the analysis and its implications for rehearsal and performance.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Interpret

Enduring Understanding: Performers make interpretive decisions based on their understanding of context and intent.

Essential Question: How do performers interpret musical works?

HS Proficient MU:Pr4.3.C.I	**HS Accomplished MU:Pr4.3.C.II**	**HS Advanced MU:Pr4.3.C.III**
Develop interpretations of works based on an understanding of the use of elements of music, style, and mood, explaining how the interpretive choices reflect the creators' intent.	Develop interpretations of works based on an understanding of the use of elements of music, style, mood, function, and context, explaining and supporting	Develop interpretations of works based on an understanding of the use of elements of music (including form), compositional techniques, style, function, and context, explaining and

	how the interpretive choices reflect the creators' intent.	justifying how the interpretive choices reflect the creators' intent.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic techniques and work for presentation.

Process Component: Rehearse, Evaluate and Refine

Enduring Understanding: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their performance?

HS Proficient **MU:Pr5.1.C.I**	**HS Accomplished** **MU:Pr5.1.C.II**	**HS Advanced** **MU:Pr5.1.C.III**
a. Create rehearsal plans for works, identifying repetition and variation within the form.	a. Create rehearsal plans for works, identifying the form, repetition and variation within the form, and the style and historical or cultural context of the work.	a. Create rehearsal plans for works, identifying the form, repetition and variation within the form, compositional techniques, and the style and historical or cultural context of the work.
b. Using established criteria and feedback, identify the way(s) in which performances convey the elements of music, style, and mood.	b. Using established criteria and feedback, identify the ways in which performances convey the formal design, style, and historical/cultural context of the works.	b. Using established criteria and feedback, identify the ways in which performances use compositional techniques and convey the formal design, style, and historical/cultural context of the works.
c. Identify and implement strategies for improving the technical and expressive aspects of multiple works.	c. Identify and implement strategies for improving the technical and expressive aspects of varied works.	c. Identify, compare, and implement strategies for improving the technical and expressive aspects of multiple contrasting works.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Performing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Musicians judge performance based on criteria that vary across time, place, and cultures. The context and how a work is presented influence the audience response.

Essential Question: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?

HS Proficient MU:Pr6.1.C.I	**HS Accomplished MU:Pr6.1.C.II**	**HS Advanced MU:Pr6.1.C.III**
a. Share live or recorded performances of works (both personal and others'), and explain how the elements of music are used to convey intent. b. Identify how compositions are appropriate for an audience or context, and how this will shape future compositions.	a. Share live or recorded performances of works (both personal and others'), and explain how the elements of music and compositional techniques are used to convey intent. b. Explain how compositions are appropriate for both audience and context, and how this will shape future compositions.	a. Share live or recorded performances of works (both personal and others'), and explain and/or demonstrate understanding of how the expressive intent of the music is conveyed. b. Explain how compositions are appropriate for a variety of audiences and contexts, and how this will shape future compositions.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Select

Enduring Understanding: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes.

Essential Question: How do individuals choose music to experience?

HS Proficient **MU:Re7.1.C.I**	**HS Accomplished** **MU:Re7.1.C.II**	**HS Advanced** **MU:Re7.1.C.III**
Apply teacher-provided criteria to select music that expresses a personal experience, mood, visual image, or storyline in simple forms (such as one-part, cyclical, binary), and describe the choices as models for composition.	Apply teacher-provided or personally-developed criteria to select music that expresses personal experiences and interests, moods, visual images, concepts, texts, or storylines in simple or moderately complex forms, and describe and defend the choices as models for composition.	Apply researched or personally-developed criteria to select music that expresses personal experiences and interests, visual images, concepts, texts, or storylines in moderately complex or complex forms, and describe and justify the choice as models for composition.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Analyze

Enduring Understanding: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music.

Essential Question: How does understanding the structure and context of music inform a response?

HS Proficient **MU:Re7.2.C.I**	**HS Accomplished** **MU:Re7.2.C.II**	**HS Advanced** **MU:Re7.2.C.III**
Analyze aurally the elements of music (including form) of musical works, relating them to style, mood, and context, and describe how the analysis provides models for personal growth as composer, performer, and/or listener.	Analyze aurally and/or by reading the scores of musical works the elements of music (including form), compositional techniques and procedures, relating them to style, mood, and context; and explain how the analysis provides models for personal growth as composer, performer, and/or listener.	Analyze aurally and/or by reading the scores of musical works the elements of music (including form), compositional techniques and procedures, relating them to aesthetic effectiveness, style, mood, and context; and explain how the analysis provides models for personal growth as composer, performer, and/or listener.

Discipline: Music – Composition and Theory Strand		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Interpret **Enduring Understanding**: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent. **Essential Question**: How do we discern musical creators' and performers' expressive intent?		
HS Proficient **MU:Re8.1.C.I**	**HS Accomplished** **MU:Re8.1.C.II**	**HS Advanced** **MU:Re8.1.C.III**
Develop and explain interpretations of varied works, demonstrating an understanding of the composers' intent by citing technical and expressive aspects as well as the style/genre of each work.	Develop and support interpretations of varied works, demonstrating an understanding of the composers' intent by citing the use of elements of music (including form), compositional techniques, and the style/genre and context of each work.	Develop, justify and defend interpretations of varied works, demonstrating an understanding of the composers' intent by citing the use of elements of music (including form), compositional techniques, and the style/genre and context of each work.

Discipline: Music – Composition and Theory Strand	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Evaluate

Enduring Understanding: The personal evaluation of musical works and performances is informed by analysis, interpretation, and established criteria.

Essential Question: How do we judge the quality of musical work(s) and performance(s)?

HS Proficient MU:Re9.1.C.I	**HS Accomplished MU:Re9.1.C.II**	**HS Advanced MU:Re9.1.C.III**
a. Describe the effectiveness of the technical and expressive aspects of selected music and performances, demonstrating understanding of fundamentals of music theory. b. Describe the way(s) in which critiquing others' work and receiving feedback from others can be applied in the personal creative process.	a. Explain the effectiveness of the technical and expressive aspects of selected music and performances, demonstrating understanding of music theory as well as compositional techniques and procedures. b. Describe ways in which critiquing others' work and receiving feedback from others have been specifically applied in the personal creative process.	a. Evaluate the effectiveness of the technical and expressive aspects of selected music and performances, demonstrating understanding of theoretical concepts and complex compositional techniques and procedures. b. Describe and evaluate ways in which critiquing others' work and receiving feedback from others have been specifically applied in the personal creative process.

Discipline: Music – Composition and Theory Strand		**Artistic Process**: Connecting
Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art. **Enduring Understanding**: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing and responding. **Essential Question**: How do musicians make meaningful connections to creating, performing and responding?		
HS Proficient **MU:Cn10.0.C.I**	**HS Accomplished** **MU:Cn10.0.C.II**	**HS Advanced** **MU:Cn10.0.C.III**
Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music – Composition and Theory Strand		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts and daily life inform creating, performing, and responding to music?		
HS Proficient **MU:Cn11.0.C.I**	**HS Accomplished** **MU:Cn11.0.C.II**	**HS Advanced** **MU:Cn11.0.C.III**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

Harmonizing Instruments Strand		
Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Creating	
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Imagine **Enduring Understanding**: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources. **Essential Question**: How do musicians generate creative ideas?		
HS Proficient **MU:Cr1.1.H.I**	**HS Accomplished** **MU:Cr1.1.H.II**	**HS Advanced** **MU:Cr1.1.H.II**
Generate melodic, rhythmic, and harmonic ideas for improvisations, compositions (forms such as theme and variation or 12-bar blues), and three-or-more-chord accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Generate melodic, rhythmic, and harmonic ideas for compositions (forms such as rounded binary or rondo), improvisations, accompaniment patterns in a variety of styles, and harmonizations for given melodies.	Generate melodic, rhythmic, and harmonic ideas for a collection of compositions (representing a variety of forms and styles), improvisations in several different styles, and stylistically appropriate harmonizations for given melodies~~.~~

Discipline: Music – Harmonizing Instruments Strand		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Plan and Make **Enduring Understanding**: Musicians' creative choices are influenced by their expertise, context, and expressive intent. **Essential Question**: How do musicians make creative decisions?		
HS Proficient **MU:Cr2.1.H.I**	**HS Accomplished** **MU:Cr2.1.H.II**	**HS Advanced** **MU:Cr2.1.H.II**
Select, develop, and use standard notation and audio/video recording to document melodic, rhythmic, and harmonic ideas for drafts of improvisations, compositions (forms such as theme and variation or 12-bar blues), and three-or-more-chord accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Select, develop, and use standard notation and audio/video recording to document melodic, rhythmic, and harmonic ideas for drafts of compositions (forms such as rounded binary or rondo), improvisations, accompaniment patterns in a variety of styles, and harmonizations for given melodies.	Select, develop, and use standard notation and audio/video recording to document melodic, rhythmic, and harmonic ideas for drafts of compositions (representing a variety of forms and styles), improvisations in several different styles, and stylistically appropriate harmonizations for given melodies.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Evaluate and Refine

Enduring Understanding: Musicians evaluate and refine their work through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their creative work?

HS Proficient MU:Cr3.1.H.I	**HS Accomplished MU:Cr3.1.H.II**	**HS Advanced MU:Cr3.1.H.II**
Develop and apply criteria to critique, improve, and refine drafts of improvisations, compositions (forms such as theme and variation or 12-bar blues) and three-or-more-chord accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Develop and apply criteria to critique, improve, and refine drafts of compositions (forms such as rounded binary or rondo), improvisations, accompaniment patterns in a variety of styles, and harmonizations for given melodies.	Develop and apply criteria to critique, improve, and refine drafts of compositions (representing a variety of forms and styles), improvisations in a variety of styles, and stylistically appropriate harmonizations for given melodies.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Creating

Anchor Standard 3: Refine and complete artistic work.

Process Component: Present

Enduring Understanding: Musicians' presentation of creative work is the culmination of a process of creation and communication.

Essential Question: When is creative work ready to share?

HS Proficient MU:Cr3.2.H.I	**HS Accomplished MU:Cr3.2.H.II**	**HS Advanced MU:Cr3.2.H.II**
Perform final versions of improvisations, compositions (forms such as theme and variation or 12-bar blues), and three-or-more-chord accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns), demonstrating technical skill in applying principles of composition/improvisation and originality in developing and organizing musical ideas.	Perform final versions of compositions (forms such as rounded binary or rondo), improvisations, accompaniment patterns in a variety of styles, and harmonizations for given melodies, demonstrating technical skill in applying principles of composition/improvisation and originality in developing and organizing musical ideas.	Perform final versions of a collection of compositions (representing a variety of forms and styles), improvisations in several different styles, and stylistically appropriate harmonizations for given melodies, demonstrating technical skill in applying principles of composition/improvisation and originality in developing and organizing musical ideas.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Performers' interest in and knowledge of musical works, understanding of their own abilities, and the context for a performance influence the selection of repertoire.

Essential Question: How do performers select repertoire?

HS Proficient MU:Pr4.1.H.I	**HS Accomplished MU:Pr4.1.H.II**	**HS Advanced MU:Pr4.1.H.III**
Explain the criteria used when selecting a varied repertoire of music for individual or small group performances that include melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Develop and apply criteria for selecting a varied repertoire of music for individual and small group performances that include melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of styles.	Develop and apply criteria for selecting a varied repertoire for a program of music for individual and small group performances that include melodies, repertoire pieces, stylistically appropriate accompaniments, and improvisations in a variety of contrasting styles.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

HS Proficient MU:Pr4.2.H.I	**HS Accomplished MU:Pr4.2.H.II**	**HS Advanced MU:Pr4.2.H.III**
Identify and describe important theoretical and structural characteristics and context (social, cultural, or historical) in a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Identify and describe important theoretical and structural characteristics and context (social, cultural, and historical) in a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of styles.	Identify and describe important theoretical and structural characteristics and context (social, cultural, and historical) in a varied repertoire of music selected for performance programs that includes melodies, repertoire pieces, stylistically appropriate accompaniments, and improvisations in a variety of contrasting styles.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Interpret

Enduring Understanding: Performers make interpretive decisions based on their understanding of context and intent.

Essential Question: How do performers interpret musical works?

HS Proficient **MU:PR4.3.H.I**	**HS Accomplished** **MU:PR4.3.H.II**	**HS Advanced** **MU:PR4.3.H.II**
Describe in interpretations the context (social, cultural, or historical) and expressive intent in a varied repertoire of music selected for performance that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns).	Explain in interpretations the context (social, cultural, and historical) and expressive intent in a varied repertoire of music selected for performance that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of styles.	Explain and present interpretations that demonstrate and describe the context (social, cultural, and historical) and an understanding of the creator's intent in repertoire for varied programs of music that include melodies, repertoire pieces, stylistically appropriate accompaniments, and improvisations in a variety of contrasting styles.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic techniques and work for presentation.

Process Component: Rehearse, Evaluate and Refine

Enduring Understanding: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their performance?

HS Proficient **MU:Pr5.1.H.I**	**HS Accomplished** **MU:Pr5.1.H.II**	**HS Advanced** **MU:Pr5.1.H.III**
Develop and apply criteria to critique individual and small group performances of a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns), and create rehearsal strategies to address performance challenges and refine the performances.	Develop and apply criteria to critique individual and small group performances of a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of styles, and create rehearsal strategies to address performance challenges and refine the performances.	Develop and apply criteria, including feedback from multiple sources, to critique varied programs of music repertoire (melodies, repertoire pieces, stylistically appropriate accompaniments, improvisations in a variety of contrasting styles) selected for individual and small group performance, and create rehearsal strategies to address performance challenges and refine the performances.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Performing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Musicians judge performance based on criteria that vary across time, place, and cultures. The context and how a work is presented influence the audience response.

Essential Question: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?

HS Proficient **MU:Pr6.1.H.I**	**HS Accomplished** **MU:Pr6.1.H.II**	**HS Advanced** **MU:Pr6.1.H.III**
Perform with expression and technical accuracy, in individual and small group performances, a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of patterns (such as arpeggio, country and gallop strumming, finger picking patterns), demonstrating sensitivity to the audience and an understanding of the context (social, cultural, or historical).	Perform with expression and technical accuracy, in individual and small group performances, a varied repertoire of music that includes melodies, repertoire pieces, improvisations, and chordal accompaniments in a variety of styles, demonstrating sensitivity to the audience and an understanding of the context (social, cultural, and historical).	Perform with expression and technical accuracy, in individual and small group performances, a varied repertoire for programs of music that includes melodies, repertoire pieces, stylistically appropriate accompaniments, and improvisations in a variety of contrasting styles, demonstrating sensitivity to the audience and an understanding of the context (social, cultural, and historical).

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Select

Enduring Understanding: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes.

Essential Question: How do individuals choose music to experience?

HS Proficient MU:Re7.1.H.I	**HS Accomplished MU:Re7.1.H.II**	**HS Advanced MU:Re7.1.H.III**
Apply criteria to select music for specified purposes, supporting choices by citing characteristics found in the music and connections to interest, purpose, and context.	Apply criteria to select music for a variety of purposes, justifying choices citing knowledge of the music and the specified purpose and context.	Select, describe, and compare a variety of individual and small group musical programs from varied cultures, genres, and historical periods.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Analyze

Enduring Understanding: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music.

Essential Question: How does understanding the structure and context of music inform a response?

HS Proficient MU:Re7.2.H.I	**HS Accomplished MU:Re7.2.H.II**	**HS Advanced MU:Re7.2.H.III**
Compare passages in musical selections and explain how the elements of music and context (social, cultural, or historical) inform the response.	Explain how the analysis of the structures and context (social, cultural, and historical) of contrasting musical selections inform the response.	Demonstrate and justify how the structural characteristics function within a variety of musical selections, and distinguish how context (social, cultural, and historical) and creative decisions inform the response.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent.

Essential Question: How do we discern musical creators' and performers' expressive intent?

HS Proficient **MU:Re8.1.H.I**	**HS Accomplished** **MU:Re8.1.H.II**	**HS Advanced** **MU:Re8.1.H.III**
Explain and support interpretations of the expressive intent and meaning of musical selections, citing as evidence the treatment of the elements of music, context (personal, social, and cultural), and (when appropriate) the setting of the text, and outside sources.	Explain and support interpretations of the expressive intent and meaning of musical selections, citing as evidence the treatment of the elements of music, context (personal, social, and cultural), and (when appropriate) the setting of the text, and varied researched sources.	Establish and justify interpretations of the expressive intent and meaning of musical selections by comparing and synthesizing varied researched sources, including reference to examples from other art forms.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Evaluate

Enduring Understanding: The personal evaluation of musical works and performances is informed by analysis, interpretation, and established criteria.

Essential Question: How do we judge the quality of musical work(s) and performance(s)?

HS Proficient **MU:Re9.1.H.I**	**HS Accomplished** **MU:Re9.1.H.II**	**HS Advanced** **MU:Re9.1.H.III**

Develop and apply teacher-provided and established criteria based on personal preference, analysis, and context (personal, social, and cultural) to evaluate individual and small group musical selections for listening.	Apply personally-developed and established criteria based on research, personal preference, analysis, interpretation, expressive intent, and musical qualities to evaluate contrasting individual and small group musical selections for listening.	Develop and justify evaluations of a variety of individual and small group musical selections for listening based on personally-developed and established criteria, personal decision making, and knowledge and understanding of context.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Enduring Understanding: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing and responding.

Essential Question: How do musicians make meaningful connections to creating, performing and responding?

HS Proficient MU:Cn10.1.H.I	**HS Accomplished MU:CN10.1.H.II**	**HS Advanced MU:Cn10.1.H.III**
Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music – Harmonizing Instruments Strand	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Enduring Understanding: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding.

Essential Question: How do the other arts, other disciplines, contexts and daily life inform creating, performing, and responding to music?

HS Proficient MU:Cn11.1.H.I	**HS Accomplished MU:CN11.1.H.II**	**HS Advanced MU:Cn11.1.H.III**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts and daily life.

Traditional and Emerging Ensembles Strand		
Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Creating	
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Imagine **Enduring Understanding**: The creative ideas, concepts, and feelings that influence musicians' work emerge from a variety of sources. **Essential Question**: How do musicians generate creative ideas?		
HS Proficient **MU:Cr1.1.E.I**	**HS Accomplished** **MU:Cr1.1.E.II**	**HS Advanced** **MU:Cr1.1.E.II**
Compose and improvise ideas for melodies, rhythmic passages, and arrangements for specific purposes that reflect characteristic(s) of music from a variety of historical periods studied in rehearsal.	Compose and improvise ideas for arrangements, sections, and short compositions for specific purposes that reflect characteristic(s) of music from a variety of cultures studied in rehearsal.	Compose and improvise musical ideas for a variety of purposes and contexts.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Plan and Make

Enduring Understanding: Musicians' creative choices are influenced by their expertise, context, and expressive intent.

Essential Question: How do musicians make creative decisions?

HS Proficient **MU:Cr2.1.E.I**	**HS Accomplished** **MU:Cr2.1.E.II**	**HS Advanced** **MU:Cr2.1.E.II**
a. Select and develop draft melodies, rhythmic passages, and arrangements for specific purposes that demonstrate understanding of characteristic(s) of music from a variety of historical periods studied in rehearsal. b. Preserve draft compositions and improvisations through standard notation and audio recording.	a. Select and develop arrangements, sections, and short compositions for specific purposes that demonstrate understanding of characteristic(s) of music from a variety of cultures studied in rehearsal. b. Preserve draft compositions and improvisations through standard notation, audio, or video recording.	a. Select and develop composed and improvised ideas into draft musical works organized for a variety of purposes and contexts. b. Preserve draft musical works through standard notation, audio, or video recording.

Discipline: Music – Traditional and Emerging Ensembles Strand		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Evaluate and Refine **Enduring Understanding**: Musicians evaluate and refine their work through openness to new ideas, persistence, and the application of appropriate criteria. **Essential Question**: How do musicians improve the quality of their creative work?		
HS Proficient **MU:Cr3.1.E.I**	**HS Accomplished** **MU:Cr3.1.E.II**	**HS Advanced** **MU:Cr3.1.E.II**
Evaluate and refine draft melodies, rhythmic passages, arrangements, and improvisations based on established criteria, including the extent to which they address identified purposes.	Evaluate and refine draft arrangements, sections, short compositions, and improvisations based on personally-developed criteria, including the extent to which they address identified purposes.	Evaluate and refine varied draft musical works based on appropriate criteria, including the extent to which they address identified purposes and contexts.

Discipline: Music – Traditional and Emerging Ensembles Strand		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Present **Enduring Understanding**: Musicians' presentation of creative work is the culmination of a process of creation and communication. **Essential Question**: When is creative work ready to share?		
HS Proficient **MU:Cr3.2.E.I**	**HS Accomplished** **MU:Cr3.2.E.II**	**HS Advanced** **MU:Cr3.2.E.II**

Share personally-developed melodies, rhythmic passages, and arrangements – individually or as an ensemble – that address identified purposes.	Share personally-developed arrangements, sections, and short compositions – individually or as an ensemble – that address identified purposes.	Share varied, personally-developed musical works – individually or as an ensemble – that address identified purposes and contexts.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Performers' interest in and knowledge of musical works, understanding of their own abilities, and the context for a performance influence the selection of repertoire.

Essential Question: How do performers select repertoire?

HS Proficient MU:Pr4.1.E.I	**HS Accomplished MU:Pr4.1.E.II**	**HS Advanced MU:Pr4.1.E.III**
Explain the criteria used to select a varied repertoire to study based on an understanding of theoretical and structural characteristics of the music, the technical skill of the individual or ensemble, and the purpose or context of the performance.	Develop and apply criteria to select a varied repertoire to study and perform based on an understanding of theoretical and structural characteristics and expressive challenges in the music, the technical skill of the individual or ensemble, and the purpose and context of the performance.	Develop and apply criteria to select varied programs to study and perform based on an understanding of theoretical and structural characteristics and expressive challenges in the music, the technical skill of the individual or ensemble, and the purpose and context of the performance.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Analyze

Enduring Understanding: Analyzing creators' context and how they manipulate elements of music provides insight into their intent and informs performance.

Essential Question: How does understanding the structure and context of musical works inform performance?

HS Proficient **MU:Pr4.2.E.I**	**HS Accomplished** **MU:Pr4.2.E.II**	**HS Advanced** **MU:Pr4.2.E.III**
Demonstrate, using music reading skills where appropriate, how compositional devices employed and theoretical and structural aspects of musical works impact and inform prepared or improvised performances.	Document and demonstrate, using music reading skills where appropriate, how compositional devices employed and theoretical and structural aspects of musical works may impact and inform prepared and improvised performances.	Examine, evaluate, and critique, using music reading skills where appropriate, how the structure and context impact and inform prepared and improvised performances.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze and interpret artistic work for presentation.

Process Component: Interpret

Enduring Understanding: Performers make interpretive decisions based on their understanding of context and intent.

Essential Question: How do performers interpret musical works?

HS Proficient MU:PR4.3.E.I	HS Accomplished MU:PR4.3.E.II	HS Advanced MU:PR4.3.E.II
Demonstrate an understanding of context in a varied repertoire of music through prepared and improvised performances.	Demonstrate how understanding the style, genre, and context of a varied repertoire of music influences prepared and improvised performances as well as performers' technical skill to connect with the audience.	Demonstrate how understanding the style, genre, and context of a varied repertoire of music informs prepared and improvised performances as well as performers' technical skill to connect with the audience.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic techniques and work for presentation.

Process Component: Rehearse, Evaluate and Refine

Enduring Understanding: To express their musical ideas, musicians analyze, evaluate, and refine their performance over time through openness to new ideas, persistence, and the application of appropriate criteria.

Essential Question: How do musicians improve the quality of their performance?

HS Proficient MU:Pr5.1.E.I	HS Accomplished MU:Pr5.1.E.II	HS Advanced MU:Pr5.1.E.III
Develop strategies to address expressive challenges in a varied repertoire of music, and evaluate their success using feedback from ensemble peers and other sources to refine performances.	Develop and apply appropriate rehearsal strategies to address individual and ensemble challenges in a varied repertoire of music, and evaluate their success.	Develop, apply, and refine appropriate rehearsal strategies to address individual and ensemble challenges in a varied repertoire of music.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Performing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Present

Enduring Understanding: Musicians judge performance based on criteria that vary across time, place, and cultures. The context and how a work is presented influence the audience response.

Essential Question: When is a performance judged ready to present? How do context and the manner in which musical work is presented influence audience response?

HS Proficient **MU:Pr6.1.E.I**	**HS Accomplished** **MU:Pr6.1.E.II**	**HS Advanced** **MU:Pr6.1.E.III**
a. Demonstrate attention to technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music representing diverse cultures, styles, and genres. b. Demonstrate an understanding of expressive intent by connecting with an audience through prepared and improvised performances.	a. Demonstrate mastery of the technical demands and an understanding of expressive qualities of the music in prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods. b. Demonstrate an understanding of intent as a means for connecting with an audience through prepared and improvised performances.	a. Demonstrate an understanding and mastery of the technical demands and expressive qualities of the music through prepared and improvised performances of a varied repertoire representing diverse cultures, styles, genres, and historical periods in multiple types of ensembles. b. Demonstrate an ability to connect with audience members before and during the process of engaging with and responding to them through prepared and improvised performances.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Select

Enduring Understanding: Individuals' selection of musical works is influenced by their interests, experiences, understandings, and purposes.

Essential Question: How do individuals choose music to experience?

HS Proficient MU:Re7.1.E.I	**HS Accomplished MU:Re7.1.E.II**	**HS Advanced MU:Re7.1.E.III**
Apply criteria to select music for specified purposes, supporting choices by citing characteristics found in the music and connections to interest, purpose, and context.	Apply criteria to select music for a variety of purposes, justifying choices citing knowledge of the music and the specified purpose and context.	Use research and personally-developed criteria to justify choices made when selecting music, citing knowledge of the music, and individual and ensemble purpose and context.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Analyze

Enduring Understanding: Response to music is informed by analyzing context (social, cultural, and historical) and how creators and performers manipulate the elements of music.

Essential Question: How does understanding the structure and context of music inform a response?

HS Proficient MU:Re7.2.E.I	HS Accomplished MU:Re7.2.E.II	HS Advanced MU:Re7.2.E.III
Explain how the analysis of passages and understanding the way the elements of music are manipulated inform the response to music.	Explain how the analysis of structures and contexts inform the response to music.	Demonstrate and justify how the analysis of structures, contexts, and performance decisions inform the response to music

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Through their use of elements and structures of music, creators and performers provide clues to their expressive intent.

Essential Question: How do we discern musical creators' and performers' expressive intent?

HS Proficient MU:Re8.1.E.I	HS Accomplished MU:Re8.1.E.II	HS Advanced MU:Re8.1.E.III
Explain and support interpretations of the expressive intent and meaning of musical works, citing as evidence the treatment of the elements of music, contexts, (when appropriate) the setting of the text, and personal research.	Support interpretations of the expressive intent and meaning of musical works citing as evidence the treatment of the elements of music, contexts, (when appropriate) the setting of the text, and varied researched sources.	Justify interpretations of the expressive intent and meaning of musical works by comparing and synthesizing varied researched sources, including reference to other art forms.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Evaluate

Enduring Understanding: The personal evaluation of musical works and performances is informed by analysis, interpretation, and established criteria.

Essential Question: How do we judge the quality of musical work(s) and performance(s)?

HS Proficient MU:Re9.1.E.I	HS Accomplished MU:Re9.1.E.II	HS Advanced MU:Re9.1.E.III
Evaluate works and performances based on personally- or collaboratively-developed criteria, including analysis of the structure and context.	Evaluate works and performances based on research as well as personally- and collaboratively-developed criteria, including analysis and interpretation of the structure and context.	Develop and justify evaluations of music, programs of music, and performances based on criteria, personal decision-making, research, and understanding of contexts.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Enduring Understanding: Musicians connect their personal interests, experiences, ideas, and knowledge to creating, performing and responding.

Essential Question: How do musicians make meaningful connections to creating, performing and responding?

HS Proficient MU:Cn10.1.E.I	HS Accomplished MU:CN10.1.E.II	HS Advanced MU:Cn10.1.E.III
Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

Discipline: Music – Traditional and Emerging Ensembles Strand	**Artistic Process**: Connecting

Anchor Standard 1: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding. **Enduring Understanding**: Understanding connections to varied contexts and daily life enhances musicians' creating, performing, and responding. **Essential Question**: How do the other arts, other disciplines, contexts and daily life inform creating, performing, and responding to music?		
HS Proficient MU:Cn11.1.E.I	**HS Accomplished MU:CN11.1.E.II**	**HS Advanced MU:Cn11.1.E.III**
Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

Discipline: Theatre		**Artistic Process**: Creating
Anchor Standard 1: Generate and conceptualize artistic ideas and work. **Process Component:** Envision/Conceptualize **Enduring Understanding**: Theatre artists rely on intuition, curiosity, and critical inquiry. **Essential Question**: What happens when theatre artists use their imaginations and/or learned theatre skills while engaging in creative exploration and inquiry?		
HS Proficient TH:Cr1.1.I.	**HS Accomplished TH:Cr1.1.II.**	**HS Advanced TH:Cr1.1.III.**

a. Apply basic research to construct ideas about the visual composition of a drama/theatre work. b. Explore the impact of technology on design choices in a drama/theatre work. c. Use script analysis to generate ideas about a character that is believable and authentic in a drama/theatre work.	a. Investigate historical and cultural conventions and their impact on the visual composition of a drama/theatre work. b. Understand and apply technology to design solutions for a drama/theatre work. c. Use personal experiences and knowledge to develop a character that is believable and authentic in a drama/theatre work.	a. Synthesize knowledge from a variety of dramatic forms, theatrical conventions, and technologies to create the visual composition of a drama/ theatre work. b. Create a complete design for a drama/theatre work that incorporates all elements of technology. c. Integrate cultural and historical contexts with personal experiences to create a character that is believable and authentic, in a drama/theatre work.

Discipline: Theatre		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Develop **Enduring Understanding**: Theatre artists work to discover different ways of communicating meaning. **Essential Question**: How, when, and why do theatre artists' choices change?		
HS Proficient **TH:Cr2.1.I.**	**HS Accomplished** **TH:Cr2.1.II.**	**HS Advanced** **TH:Cr2.1.III.**

a. Explore the function of history and culture in the development of a dramatic concept through a critical analysis of original ideas in a drama/theatre work. b. Investigate the collaborative nature of the actor, director, playwright, and designers and explore their interdependent roles in a drama/theatre work.	a. Refine a dramatic concept to demonstrate a critical understanding of historical and cultural influences of original ideas applied to a drama/theatre work. b. Cooperate as a creative team to make interpretive choices for a drama/theatre work.	a. Develop and synthesize original ideas in a drama/theatre work utilizing critical analysis, historical and cultural context, research, and western or non-western theatre traditions. b. Collaborate as a creative team to discover artistic solutions and make interpretive choices in a devised or scripted drama/theatre work.

<table>
<tr><td colspan="3">Discipline: Theatre   Artistic Process: Creating</td></tr>
<tr><td colspan="3">Anchor Standard 3: Refine and complete artistic work.

Process Component: Rehearse

Enduring Understanding: Theatre artists refine their work and practice their craft through rehearsal.

Essential Question: How do theatre artists transform and edit their initial ideas?</td></tr>
<tr><th>HS Proficient</th><th>HS Accomplished</th><th>HS Advanced</th></tr>
</table>

TH:Cr3.1.I.	TH:Cr3.1.II.	TH:Cr3.1.III.
a. Practice and revise a devised or scripted drama/theatre work using theatrical staging conventions.	a. Use the rehearsal process to analyze the dramatic concept and technical design elements of a devised or scripted drama/theatre work.	a. Refine, transform, and re-imagine a devised or scripted drama/theatre work using the rehearsal process to invent or re-imagine style, genre, form, and conventions.
b. Explore physical, vocal and physiological choices to develop a performance that is believable, authentic, and relevant to a drama/theatre work.	b. Use research and script analysis to revise physical, vocal, and physiological choices impacting the believability and relevance of a drama/ theatre work.	b. Synthesize ideas from research, script analysis, and context to create a performance that is believable, authentic, and relevant in a drama/theatre work.
c. Refine technical design choices to support the story and emotional impact of a devised or scripted drama/ theatre work.	c. Re-imagine and revise technical design choices during the course of a rehearsal process to enhance the story and emotional impact of a devised or scripted drama/theatre work.	c. Apply a high level of technical proficiencies to the rehearsal process to support the story and emotional impact of a devised or scripted drama/theatre work.

Discipline: Theatre	**Artistic Process**: Performing

Anchor Standard 4: Select, analyze, and interpret artistic work for presentation.

Process Component: Select

Enduring Understanding: Theatre artists make strong choices to effectively convey meaning.

Essential Question: Why are strong choices essential to interpreting a drama or theatre piece?

HS Proficient **TH:Pr4.1.I.**	**HS Accomplished** **TH:Pr4.1.II.**	**HS Advanced** **TH:Pr4.1.III.**
a. Examine how character relationships assist in telling the story of a drama/theatre work. b. Shape character choices using given circumstances in a drama/theatre work.	a. Discover how unique choices shape believable and sustainable drama/ theatre work. b. Identify essential text information, research from various sources, and the director's concept that influence character choices in a drama/theatre work.	a. Apply reliable research of directors' styles to form unique choices for a directorial concept in a drama/theatre work. b. Apply a variety of researched acting techniques as an approach to character choices in a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Performing

Anchor Standard 5: Develop and refine artistic technique and work for presentation.

Process Component: Prepare

Enduring Understanding: Theatre artists develop personal processes and skills for a performance or design.

Essential Question: What can I do to fully prepare a performance or technical design?

HS Proficient TH:Pr5.1.I.	HS Accomplished TH:Pr5.1.II.	HS Advanced TH:Pr5.1.III.
a. Practice various acting techniques to expand skills in a rehearsal or drama/theatre performance. b. Use researched technical elements to increase the impact of design for a drama/theatre production.	a. Refine a range of acting skills to build a believable and sustainable drama/theatre performance. b. Apply technical elements and research to create a design that communicates the concept of a drama/theatre production.	a. Use and justify a collection of acting exercises from reliable resources to prepare a believable and sustainable performance. b. Explain and justify the selection of technical elements used to build a design that communicates the concept of a drama/theatre production.

Discipline: Theatre	**Artistic Process**: Performing

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Share, Present

Enduring Understanding: Theatre artists share and present stories, ideas, and envisioned worlds to explore the human experience.

Essential Question: What happens when theatre artists and audiences share a creative experience?

HS Proficient TH:Pr6.1.I.	HS Accomplished TH:Pr6.1.II.	HS Advanced TH:Pr6.1.III.
Perform a scripted drama/theatre work for a specific audience.	Present a drama/theatre work using creative processes that shape the production for a specific audience.	Present a drama/theatre production for a specific audience that employs research and analysis grounded in the creative perspectives of the playwright, director, designer, and dramaturg.

Discipline: Theatre	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Reflect

Enduring Understanding: Theatre artists reflect to understand the impact of drama processes and theatre experiences.

Essential Question: How do theatre artists comprehend the essence of drama processes and theatre experiences?

HS Proficient **TH: Re7.1.I.**	**HS Accomplished** **TH: Re7.1.II.**	**HS Advanced** **TH: Re7.1.-III.**
Respond to what is seen, felt, and heard in a drama/theatre work to develop criteria for artistic choices.	Demonstrate an understanding of multiple interpretations of artistic criteria and how each might be used to influence future artistic choices of a drama/theatre work.	Use historical and cultural context to structure and justify personal responses to a drama/theatre work.

Discipline: Theatre	**Artistic Process**: Responding

Anchor Standard 8: Interpret intent and meaning in artistic work.

Process Component: Interpret

Enduring Understanding: Theatre artists' interpretations of drama/theatre work are influenced by personal experiences and aesthetics.

Essential Question: How can the same work of art communicate different messages to different people?

HS Proficient **TH:Re8.1.I.**	**HS Accomplished** **TH:Re8.1.II.**	**HS Advanced** **TH:Re8.1.III.**
a. Analyze and compare artistic choices developed from personal experiences in multiple drama/theatre works. b. Identify and compare cultural perspectives and contexts that may influence the evaluation of a drama/theatre work. c. Justify personal aesthetics, preferences, and beliefs through participation in and observation of a drama/theatre work.	a. Develop detailed supporting evidence and criteria to reinforce artistic choices, when participating in or observing a drama/theatre work. b. Apply concepts from a drama/theatre work for personal realization about cultural perspectives and understanding. c. Debate and distinguish multiple aesthetics, preferences, and beliefs through participation in and observation of drama/theatre work.	a. Use detailed supporting evidence and appropriate criteria to revise personal work and interpret the work of others when participating in or observing a drama/ theatre work. b. Use new understandings of cultures and contexts to shape personal responses to drama/theatre work. c. Support and explain aesthetics, preferences, and beliefs to create a context for critical research that informs artistic decisions in a drama/theatre work.

<table>
<tr><td colspan="3">Discipline: Theatre   Artistic Process: Responding</td></tr>
<tr><td colspan="3">Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Evaluate

Enduring Understanding: Theatre artists apply criteria to investigate, explore, and assess drama and theatre work.

Essential Question: How are the theatre artist's processes and the audience's perspectives impacted by analysis and synthesis?</td></tr>
<tr><th>HS Proficient
TH:Re9.1.I.</th><th>HS Accomplished
TH:Re9.1.II.</th><th>HS Advanced
TH:Re9.1.III.</th></tr>
<tr><td>a. Examine a drama/ theatre work using supporting evidence and criteria, while considering art forms, history, culture, and other disciplines.</td><td>a. Analyze and assess a drama/theatre work by connecting it to art forms, history, culture, and other disciplines using supporting evidence and criteria.</td><td>a. Research and synthesize cultural and historical information related to a drama/theatre work to support or evaluate artistic choices.</td></tr>
<tr><td>b. Consider the aesthetics of the production elements in a drama/theatre work.</td><td>b. Construct meaning in a drama/theatre work, considering personal aesthetics and knowledge of production elements while respecting others' interpretations.</td><td>b. Analyze and evaluate varied aesthetic interpretations of production elements for the same drama/theatre work.</td></tr>
<tr><td>c. Formulate a deeper understanding and appreciation of a drama/ theatre work by considering its specific purpose or intended audience.</td><td>c. Verify how a drama/theatre work communicates for a specific purpose and audience.</td><td>c. Compare and debate the connection between a drama/theatre work and contemporary issues that may impact audiences.</td></tr>
</table>

Discipline: Theatre	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Process Component: Empathize

Enduring Understanding: Theatre artists allow awareness of interrelationships between self and others to influence and inform their work.

Essential Question: What happens when theatre artists foster understanding between self and others through critical awareness, social responsibility, and the exploration of empathy?

HS Proficient **TH:Cn10.1.I.**	**HS Accomplished** **TH:Cn10.1.II.**	**HS Advanced** **TH:Cn10.1.III.**
Investigate how cultural perspectives, community ideas and personal beliefs impact a drama/theatre work.	Choose and interpret a drama/theatre work to reflect or question personal beliefs.	Collaborate on a drama/theatre work that examines a critical global issue using multiple personal, community, and cultural perspectives.

Discipline: Theatre	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Process Component: Interrelate

Enduring Understanding: Theatre artists understand and can communicate their creative process as they analyze the way the world may be understood.

Essential Question: What happens when theatre artists allow an understanding of themselves and the world to inform perceptions about theatre and the purpose of their work?

HS Proficient **TH:Cn11.1.I.**	**HS Accomplished** **TH:Cn11.1.II.**	**HS Advanced** **TH:Cn11.1.III.**
Explore how cultural, global, and historic belief systems affect creative choices in a drama/theatre work.	Integrate conventions and knowledge from different art forms and other disciplines to develop a cross-cultural drama/theatre work.	Develop a drama/theatre work that identifies and questions cultural, global, and historic belief systems.

Discipline: Theatre	**Artistic Process**: Connecting

Anchor Standard 11: Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

Process Component: Research

Enduring Understanding: Theatre artists critically inquire into the ways others have thought about and created drama processes and productions to inform their own work.

Essential Question: In what ways can research into theatre histories, theories, literature, and performances alter the way a drama process or production is understood?

HS Proficient **TH:Cn11.2.I.**	**HS Accomplished** **TH:Cn11.2.II.**	**HS Advanced** **TH:Cn11.2.III.**
a. Research how other theatre artists apply creative processes to tell stories in a devised or scripted drama/theatre work, using theatre research methods. b. Use basic theatre research methods to better understand the social and cultural background of a drama/theatre work.	a. Formulate creative choices for a devised or scripted drama/theatre work based on theatre research about the selected topic. b. Explore how personal beliefs and biases can affect the interpretation of research data applied in drama/theatre work.	a. Justify the creative choices made in a devised or scripted drama/theatre work, based on a critical interpretation of specific data from theatre research. b. Present and support an opinion about the social, cultural, and historical understandings of a drama/theatre work, based on critical research.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Creativity and innovative thinking are essential life skills that can be developed.

Essential Question: What conditions, attitudes, and behaviors support creativity and innovative thinking?
What factors prevent or encourage people to take creative risks? How does collaboration expand the creative process?

HS Proficient **VA:Cr1.1.I**	**HS Accomplished** **VA:Cr1.1.II**	**HS Advanced** **VA:Cr1.1.III**
Use multiple approaches to begin creative endeavors.	Individually or collaboratively formulate new creative problems based on student's existing artwork.	Visualize and hypothesize to generate plans for ideas and directions for creating art and design that can affect social change.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 1: Generate and conceptualize artistic ideas and work.

Process Component: Investigate, Plan and Make

Enduring Understanding: Artists and designers shape artistic investigations, following or breaking with traditions in pursuit of creative art-making goals.

Essential Question: How does knowing the contexts histories, and traditions of art forms help us create works of art and design? Why do artists follow or break from established traditions? How do artists determine what resources and criteria are needed to formulate artistic investigations?

HS Proficient **VA:Cr1.2.I**	**HS Accomplished** **VA:Cr1.2.II**	**HS Advanced** **VA:Cr1.2.III**
Shape an artistic investigation of an aspect of present-day life using a contemporary practice of art or design.	Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design.	Choose from a range of materials and methods of traditional and contemporary artistic practices, following or breaking established conventions, to plan the making of multiple works of art and design based on a theme, idea, or concept.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Investigate

Enduring Understanding: Artists and designers experiment with forms, structures, materials, concepts, media, and art-making approaches.

Essential Question: How do artists work? How do artists and designers determine whether a particular direction in their work is effective? How do artists and designers learn from trial and error?

HS Proficient **VA:Cr2.1.I**	**HS Accomplished** **VA:Cr2.1.II**	**HS Advanced** **VA:Cr2.1.III**
Engage in making a work of art or design without having a preconceived plan.	Through experimentation, practice, and persistence, demonstrate acquisition of skills and knowledge in a chosen art form.	Experiment, plan, and make multiple works of art and design that explore a personally meaningful theme, idea, or concept.

Discipline: Visual Arts	**Artistic Process**: Creating

Anchor Standard 2: Organize and develop artistic ideas and work.

Process Component: Investigate

Enduring Understanding: Artists and designers balance experimentation and safety, freedom and responsibility while developing and creating artworks.

Essential Question: How do artists and designers care for and maintain materials, tools, and equipment? Why is it important for safety and health to understand and follow correct procedures in handling materials, tools, and equipment? What responsibilities come with the freedom to create?

HS Proficient **VA:Cr2.2.I**	**HS Accomplished** **VA:Cr2.2.II**	**HS Advanced** **VA:Cr2.2.III**
Explain how traditional and non-traditional materials may impact human health and the environment and demonstrate safe handling of materials, tools, and equipment.	Demonstrate awareness of ethical implications of making and distributing creative work.	Demonstrate understanding of the importance of balancing freedom and responsibility in the use of images, materials, tools, and equipment in the creation and circulation of creative work.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 2: Organize and develop artistic ideas and work. **Process Component:** Investigate **Enduring Understanding**: People create and interact with objects, places, and design that define, shape, enhance, and empower their lives. **Essential Question**: How do objects, places, and design shape lives and communities? How do artists and designers determine goals for designing or redesigning objects, places, or systems? How do artists and designers create works of art or design that effectively communicate?		
HS Proficient **VA:Cr2.3.I**	**HS Accomplished** **VA:Cr2.3.II**	**HS Advanced** **VA:Cr2.3.III**
Collaboratively develop a proposal for an installation, artwork, or space design that transforms the perception and experience of a particular place.	Redesign an object, system, place, or design in response to contemporary issues.	Demonstrate in works of art or design how visual and material culture defines, shapes, enhances, inhibits, and/or empowers people's lives.

Discipline: Visual Arts		**Artistic Process**: Creating
Anchor Standard 3: Refine and complete artistic work. **Process Component:** Reflect- Refine- Complete **Enduring Understanding**: Artist and designers develop excellence through practice and constructive critique, reflecting on, revising, and refining work over time. **Essential Question**: What role does persistence play in revising, refining, and developing work? How do artists grow and become accomplished in art forms? How does collaboratively reflecting on a work help us experience it more completely?		
HS Proficient **VA:Cr3.1.I**	**HS Accomplished** **VA:Cr3.1.II**	**HS Advanced** **VA:Cr3.1.III**
Apply relevant criteria from traditional and contemporary cultural contexts to examine, reflect on, and plan revisions for works of art and design in progress.	Engage in constructive critique with peers, then reflect on, re-engage, revise, and refine works of art and design in response to personal artistic vision.	Reflect on, re-engage, revise, and refine works of art or design considering relevant traditional and contemporary criteria as well as personal artistic vision.

Discipline: Visual Arts		**Artistic Process**: Presenting
Anchor Standard 4: Select, analyze and interpret artistic work for presentation. **Process Component:** Select **Enduring Understanding**: Artists and other presenters consider various techniques, methods, venues, and criteria when analyzing, selecting, and curating objects artifacts, and artworks for preservation and presentation. **Essential Question**: How are artworks cared for and by whom? What criteria, methods, and processes are used to select work for preservation or presentation? Why do people value objects, artifacts, and artworks, and select them for presentation?		
HS Proficient **VA:Pr4.1.I**	**HS Accomplished** **VA:Pr4.1.II**	**HS Advanced** **VA:Pr4.1.III**
Analyze, select, and curate artifacts and/or artworks for presentation and preservation.	Analyze, select, and critique personal artwork for a collection or portfolio presentation.	Critique, justify, and present choices in the process of analyzing, selecting, curating, and presenting artwork for a specific exhibit or event.

Discipline: Visual Arts		**Artistic Process**: Presenting
Anchor Standard 5: Develop and refine artistic techniques and work for presentation. **Process Component:** Analyze **Enduring Understanding**: Artists, curators and others consider a variety of factors and methods including evolving technologies when preparing and refining artwork for display and or when deciding if and how to preserve and protect it. **Essential Question**: What methods and processes are considered when preparing artwork for presentation or preservation? How does refining artwork affect its meaning to the viewer? What criteria are considered when selecting work for presentation, a portfolio, or a collection?		
HS Proficient **VA:Pr5.1.I**	**HS Accomplished** **VA:Pr5.1.II**	**HS Advanced** **VA:Pr5.1.III**
Analyze and evaluate the reasons and ways an exhibition is presented.	Evaluate, select, and apply methods or processes appropriate to display artwork in a specific place.	Investigate, compare, and contrast methods for preserving and protecting art.

Discipline: Visual Arts	**Artistic Process**: Presenting

Anchor Standard 6: Convey meaning through the presentation of artistic work.

Process Component: Share

Enduring Understanding: Objects, artifacts, and artworks collected, preserved, or presented either by artists, museums, or other venues communicate meaning and a record of social, cultural, and political experiences resulting in the cultivating of appreciation and understanding.

Essential Question: What is an art museum? How does the presenting and sharing of objects, artifacts, and artworks influence and shape ideas, beliefs, and experiences? How do objects, artifacts, and artworks collected, preserved, or presented, cultivate appreciation and understanding?

HS Proficient **VA:Pr6.1.I**	**HS Accomplished** **VA:Pr6.1.II**	**HS Advanced** **VA:Pr6.1.III**
Analyze and describe the impact that an exhibition or collection has on personal awareness of social, cultural, or political beliefs and understandings.	Make, explain, and justify connections between artists or artwork and social, cultural, and political history.	Curate a collection of objects, artifacts, or artwork to impact the viewer's understanding of social, cultural, and/or political experiences.

Discipline: Visual Arts	**Artistic Process**: Responding

Anchor Standard 7: Perceive and analyze artistic work.

Process Component: Perceive

Enduring Understanding: Individual aesthetic and empathetic awareness developed through engagement with art can lead to understanding and appreciation of self, others, the natural world, and constructed environments.

Essential Question: How do life experiences influence the way you relate to art? How does learning about art impact how we perceive the world? What can we learn from our responses to art?

HS Proficient **VA:Pr7.1.I**	**HS Accomplished** **VA:Pr7.1.II**	**HS Advanced** **VA:Pr7.1.III**
Hypothesize ways in which art influences perception and understanding of human experiences.	Recognize and describe personal aesthetic and empathetic responses to the natural world and constructed environments.	Analyze how responses to art develop over time based on knowledge of and experience with art and life.

Discipline: Visual Arts		**Artistic Process**: Responding
Anchor Standard 7: Perceive and analyze artistic work. **Process Component:** Perceive **Enduring Understanding**: Visual imagery influences understanding of and responses to the world. **Essential Question**: What is an image? Where and how do we encounter images in our world? How do images influence our views of the world?		
HS Proficient **VA:Re7.2.I**	**HS Accomplished** **VA:Re7.2.II**	**HS Advanced** **VA:Re7.2.III**
Analyze how one's understanding of the world is affected by experiencing visual imagery.	Evaluate the effectiveness of an image or images to influence ideas, feelings, and behaviors of specific audiences.	Determine the commonalities within a group of artists or visual images attributed to a particular type of art, timeframe, or culture.

Discipline: Visual Arts		**Artistic Process**: Responding
Anchor Standard 8: Interpret intent and meaning in artistic work. **Process Component:** Analyze **Enduring Understanding**: People gain insights into meanings of artworks by engaging in the process of art criticism. **Essential Question**: What is the value of engaging in the process of art criticism? How can the viewer "read" a work of art as text? How does knowing and using visual art vocabularies help us understand and interpret works of art?		
HS Proficient **VA:Re8.1.I**	**HS Accomplished** **VA:Re8.1.II**	**HS Advanced** **VA:Re8.1.III**
Interpret an artwork or collection of works, supported by relevant and sufficient evidence found in the work and its various contexts.	Identify types of contextual information useful in the process of constructing interpretations of an artwork or collection of works.	Analyze differing interpretations of an artwork or collection of works in order to select and defend a plausible critical analysis.

Discipline: Visual Arts	**Artistic Process**: Responding

Anchor Standard 9: Apply criteria to evaluate artistic work.

Process Component: Interpret

Enduring Understanding: People evaluate art based on various criteria.

Essential Question: How does one determine criteria to evaluate a work of art? How and why might criteria vary? How is a personal preference different from an evaluation?

HS Proficient **VA:Re9.1.I**	**HS Accomplished** **VA:Re9.1.II**	**HS Advanced** **VA:Re9.1.III**
Establish relevant criteria in order to evaluate a work of art or collection of works.	Determine the relevance of criteria used by others to evaluate a work of art or collection of works.	Construct evaluations of a work of art or collection of works based on differing sets of criteria.

Discipline: Visual Arts	**Artistic Process**: Connecting

Anchor Standard 10: Synthesize and relate knowledge and personal experiences to make art.

Process Component: Synthesize

Enduring Understanding: Through art-making, people make meaning by investigating and developing awareness of perceptions, knowledge, and experiences.

Essential Question: How does engaging in creating art enrich people's lives? How does making art attune people to their surroundings? How do people contribute to awareness and understanding of their lives and the lives of their communities through art-making?

HS Proficient **VA:Cn10.1.I**	**HS Accomplished** **VA:Cn10.1.II**	**HS Advanced** **VA:Cn10.1.III**
Document the process of developing ideas from early stages to fully elaborated ideas.	Utilize inquiry methods of observation, research, and experimentation to explore unfamiliar subjects through art-making.	Synthesize knowledge of social, cultural, historical, and personal life with art-making approaches to create meaningful works of art or design.

Discipline: Visual Arts		**Artistic Process**: Connecting
Anchor Standard 11: Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding. **Process Component:** Relate **Enduring Understanding**: People develop ideas and understandings of society, culture, and history through their interactions with and analysis of art. **Essential Question**: How does art help us understand the lives of people of different times, places, and cultures? How is art used to impact the views of a society? How does art preserve aspects of life?		
HS Proficient **VA:Cn11.1.I**	**HS Accomplished** **VA:Cn11.1.II**	**HS Advanced** **VA:Cn11.1.III**
Describe how knowledge of culture, traditions, and history may influence personal responses to art.	Compare uses of art in a variety of societal, cultural, and historical contexts and make connections to uses of art in contemporary and local contexts.	Appraise the impact of an artist or a group of artists on the beliefs, values, and behaviors of a society.

~~HIGH SCHOOL ENGLISH LANGUAGE ARTS~~

~~Kentucky Academic Standards – English/Language Arts – High School~~

~~The standards are organized around the follow features:~~

- ~~**Reading and Literature**: Text complexity and the growth of comprehension~~
- ~~**Writing and Research**: Text types, grade-level focuses, and research~~
- ~~**Speaking and Listening:** Flexible communication~~
- ~~**Language Development:** Conventions and vocabulary~~

~~STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE AND TECHNICAL SUBJECTS~~

~~Students who are College and Career ready in reading, Writing, Speaking, Listening, and Language~~

~~The descriptions that follow are not standards themselves but instead offer a portrait of students who meet the standards set out in this document. As students advance through the grades and master the standards in reading, writing, speaking, listening, and language, they are able to exhibit with increasing fullness and regularity these capacities of the literate individual.~~

~~They demonstrate independence.~~
~~Students can, without significant scaffolding, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and convey intricate or multifaceted information. Likewise, students are able independently to discern a speaker's key points, request clarification, and ask relevant questions. They build on others' ideas, articulate their own ideas, and confirm they have been understood. Without prompting, they demonstrate command of standard English and acquire and use a wide-ranging vocabulary. More broadly, they become self-directed learners, effectively seeking out and using resources to assist them, including teachers, peers, and print and digital reference materials.~~

~~They build strong content knowledge.~~
~~Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.~~

~~They respond to the varying demands of audience, task, purpose, and discipline.~~
~~Students adapt their communication in relation to audience, task, purpose, and discipline. They set and adjust purpose for reading, writing, speaking, listening, and language use as warranted by the task. They appreciate nuances, such as how the composition of an audience should affect tone when speaking and how the connotations of words affect meaning. They also know that different disciplines call for different types of evidence (e.g., documentary evidence in history, experimental evidence in science).~~

~~They comprehend as well as critique.~~
~~Students are engaged and open-minded—but discerning—readers and listeners. They work diligently to understand precisely what an author or speaker is saying, but they also question an author's or speaker's assumptions and premises and assess the veracity of claims and the soundness of reasoning.~~

~~They value evidence.~~
~~Students cite specific evidence when offering an oral or written interpretation of a text. They use relevant evidence when supporting their own points in writing and speaking, making their reasoning clear to the reader or listener, and they constructively evaluate others' use of evidence.~~

~~They use technology and digital media strategically and capably.~~
~~Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.~~

~~They come to understand other perspectives and cultures.~~
~~Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.~~

~~STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE AND TECHNICAL SUBJECTS~~

~~How to read this document~~

~~Overall Document Organization~~

~~The Standards comprise three main sections: a comprehensive K–5 section and two content area–specific sections for grades 6–12, one for ELA and one for history/social studies, science, and technical subjects. Three appendices accompany the main document.~~

~~Each section is divided into strands. K–5 and 6–12 ELA have Reading, Writing, Speaking and Listening, and Language strands; the 6–12 history/ social studies, science, and technical subjects section focuses on Reading and Writing. Each strand is headed by a strand-specific set of College and Career Readiness Anchor Standards that is identical across all grades and content areas.~~

~~Standards for each grade within K–8 and for grades 9–10 and 11–12 follow the CCR anchor standards in each strand. Each grade-specific standard (as these standards are collectively referred to) corresponds to the same-numbered CCR anchor standard. Put another way, each CCR anchor standard has an accompanying grade-specific standard translating the broader CCR statement into grade-appropriate end-of-year expectations.~~

~~Individual CCR anchor standards can be identified by their strand, CCR status, and number (R.CCR.6, for example). Individual grade-specific standards can be identified by their strand, grade, and number (or number and letter, where applicable), so that RI.4.3, for example, stands for Reading, Informational Text, grade 4, standard 3 and W.5.1a stands for Writing, grade 5, standard 1a. Strand designations can be found in brackets alongside the full strand title.~~

~~Who is responsible for which portion of the Standards~~

~~A single K–5 section lists standards for reading, writing, speaking, listening, and language across the curriculum, reflecting the fact that most or all of the instruction students in these grades receive comes from one teacher. Grades 6–12 are covered in two content area–specific sections, the first for the English language arts teacher and the second for teachers of history/social studies, science, and technical subjects. Each section uses the same CCR anchor standards but also includes grade-specific standards tuned to the literacy requirements of the particular discipline(s).~~

~~Key features of the Standards~~

~~Reading: Text complexity and the growth of comprehension~~

~~The Reading standards place equal emphasis on the sophistication of what students read and the skill with which they read. Standard 10 defines a grade-by grade "staircase" of increasing text complexity that rises from beginning reading to the college and career readiness level. Whatever they are reading, students must also show a steadily growing ability to discern more from and make fuller use of text, including making an increasing number of connections among ideas and between texts, considering a wider range of textual evidence, and becoming more sensitive to inconsistencies, ambiguities, and poor reasoning in texts.~~

~~Writing: text types, responding to reading, and research~~

~~The Standards acknowledge the fact that whereas some writing skills, such as the ability to plan, revise, edit, and publish, are applicable to many types of writing, other skills are more properly defined in terms of specific writing types: arguments, informative/explanatory texts, and narratives. Standard 9 stresses the importance of the writing-reading connection by requiring students to draw and write about evidence from literary and informational texts. Because of the centrality of writing to most forms of inquiry, research standards are prominently included in this strand, though skills important to research are infused throughout the document.~~

~~Speaking and Listening: flexible communication and collaboration~~

~~Including but not limited to skills necessary for formal presentations, the Speaking and Listening standards require students to develop a range of broadly useful oral communication and interpersonal skills. Students must learn to work together, express and listen carefully to ideas, integrate information from oral, visual, quantitative, and media sources, evaluate what they hear, use media and visual displays strategically to help achieve communicative purposes, and adapt speech to context and task.~~

~~Language: Conventions, effective use, and vocabulary~~

~~The Language standards include the essential "rules" of standard written and spoken English, but they also approach language as a matter of craft and informed choice among alternatives. The vocabulary standards focus on understanding words and phrases, their relationships, and their nuances and on acquiring new vocabulary, particularly general academic and domain-specific words and phrases.~~

~~Appendices A, B, and C~~

~~Appendix A contains supplementary material on reading, writing, speaking and listening, and language as well as a glossary of key terms. Appendix B consists of text exemplars illustrating the complexity, quality, and range of reading appropriate for various grade levels with accompanying sample performance tasks. Appendix C includes annotated samples demonstrating at least adequate performance in student writing at various grade levels.~~

~~College and Career Readiness Anchor Standards for Reading~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Key Ideas and Details~~

~~1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.~~

~~2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.~~

~~3 Analyze how and why individuals, events, and ideas develop and interact over the course of a text.~~

~~Craft and Structure~~

~~4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.~~

~~5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.~~

~~6 Assess how point of view or purpose shapes the content and style of a text.~~

~~Integration of Knowledge and Ideas~~

~~7 Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*~~

~~8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.~~

~~9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.~~

~~Range of Reading and Level of Text Complexity~~

~~10 Read and comprehend complex literary and informational texts independently and proficiently.~~

~~*Please see “Research to Build Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.~~

~~Note on range and content of student reading~~

~~*To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students’ own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts.*~~

Reading Standards for Literature 6–12

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details	
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
2. Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.
3. Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	3. Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).
Craft and Structure	
4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).	4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)
5. Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.	5. Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.
6. Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.	6. Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).
Integration of Knowledge and Ideas	
7. Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden's "Musée des Beaux Arts" and Breughel's Landscape with the Fall of Icarus).	7. Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.)
8. (Not applicable to literature)	8. (Not applicable to literature)
9. Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).	9. Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.
Range of Reading and Level of Text Complexity	
10. By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.

Reading Standards for Informational Text 6–12

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details	
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
2. Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.	3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.
Craft and Structure	
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).	4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).
5. Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).	5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
6. Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.	6. Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.
Integration of Knowledge and Ideas	
7. Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.	7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.	8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses).
9. Analyze seminal U.S. documents of historical and literary significance (e.g., Washington's Farewell Address, the Gettysburg Address, Roosevelt's Four Freedoms speech, King's "Letter from Birmingham Jail"), including how they address related themes and concepts.	9. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.
Range of Reading and Level of Text Complexity	
10. By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.

~~College and Career Readiness Anchor Standards for Writing~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Text Types and Purposes*~~

~~1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.~~

~~2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.~~

~~3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.~~

~~Production and Distribution of Writing~~

~~4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.~~

~~5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.~~

~~6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.~~

~~Research to Build and Present Knowledge~~

~~7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.~~

~~8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.~~

~~9 Draw evidence from literary or informational texts to support analysis, reflection, and research.~~

~~Range of Writing~~

~~10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.~~

~~*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.~~

~~Note on range and content of student writing~~

~~For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within argument and explanation within narrative— to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.~~

Writing Standards 6–12

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes	
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.	1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Writing Standards 6–12

Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes (continued)	
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
Production and Distribution of Writing	
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 54.)	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12 on page 54.)
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Research to Build and Present Knowledge	
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Writing Standards 6–12

Grades 9–10 students:	Grades 11–12 students:
Research to Build and Present Knowledge (continued)	
9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]"). b. Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").	9. Draw evidence form literary or informational texts to support analysis, reflection, and research. a. Apply *grades 11–12 Reading standards* to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics"). b. Apply grades 11–12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses]").
Range of Writing	
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

~~College and Career Readiness Anchor Standards for Speaking and Listening~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Comprehension and Collaboration~~

~~1 Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.~~

~~2 Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.~~

~~3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.~~

~~Presentation of Knowledge and Ideas~~

~~4 Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.~~

~~5 Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.~~

~~6 Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.~~

~~Note on range and content of student speaking and listening~~

~~To become college and career ready, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains. They must be able to contribute appropriately to these conversations, to make comparisons and contrasts, and to analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline. Whatever their intended major or profession, high school graduates will depend heavily on their ability to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.~~

~~New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. The Internet has accelerated the speed at which connections between speaking, listening, reading, and writing can be made, requiring that students be ready to use these modalities nearly simultaneously. Technology itself is changing quickly, creating a new urgency for students to be adaptable in response to change~~

Speaking and Listening Standards 6–12

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:	Grades 11–12 students:
Comprehension and Collaboration	
1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9–10 topics, texts, and issues,* building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.	1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 11–12 topics, texts, and issues,* building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
2. Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.	2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.	3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.
Presentation of Knowledge and Ideas	
4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.	4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks.
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on pages 54 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 for specific expectations.)

~~College and Career Readiness Anchor Standards for Language~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Conventions of Standard English~~

~~1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.~~

~~2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.~~

~~Knowledge of Language~~

~~3 Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.~~

~~Vocabulary acquisition and Use~~

~~4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.~~

~~5 Demonstrate understanding of word relationships and nuances in word meanings.~~

~~6 Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.~~

~~Note on range and content of student language use~~

~~*To be college and career ready in language, students must have firm control over the conventions of standard English. At the same time, they must come to appreciate that language is as at least as much a matter of craft as of rules and be able to choose words, syntax, and punctuation to express themselves and achieve particular functions and rhetorical effects. They must also have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content. They need to become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them. They must learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.*~~

Language Standards 6–12

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:	Grades 11–12 students:
Conventions of Standard English	
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Use parallel structure.* b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.	1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested. b. Resolve issues of complex or contested usage, consulting references (e.g., *Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage*) as needed.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses. b. Use a colon to introduce a list or quotation. c. Spell correctly.	2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Observe hyphenation conventions. b. Spell correctly.
Knowledge of Language	
3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. a. Write and edit work so that it conforms to the guidelines in a style manual (e.g., *MLA Handbook*, Turabian's *Manual for Writers*) appropriate for the discipline and writing type.	3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. a. Vary syntax for effect, consulting references (e.g., Tufte's *Artful Sentences*) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.

Language Standards 6–12

Grades 9–10 students:	Grades 11–12 students:
Vocabulary Acquisition and Use	
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 9–10 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., *analyze, analysis, analytical; advocate, advocacy*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 11–12 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., *conceive, conception, conceivable*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text. b. Analyze nuances in the meaning of words with similar denotations.	5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text. b. Analyze nuances in the meaning of words with similar denotations.
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

~~Language Progressive Skills, by Grade~~

~~The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.~~

Standard	Grade(s)							
	3	4	5	6	7	8	9–10	11–12
L.3.1f. Ensure subject-verb and pronoun-antecedent agreement.								
L.3.3a. Choose words and phrases for effect.								
L.4.1f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.								
L.4.1g. Correctly use frequently confused words (e.g., *to/too/two; there/their*).								
L.4.3a. Choose words and phrases to convey ideas precisely.*								
L.4.3b. Choose punctuation for effect.								
L.5.1d. Recognize and correct inappropriate shifts in verb tense.								
L.5.2a. Use punctuation to separate items in a series.†								
L.6.1c. Recognize and correct inappropriate shifts in pronoun number and person.								
L.6.1d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
L.6.1e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
L.6.2a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
L.6.3a. Vary sentence patterns for meaning, reader/listener interest, and style.‡								
L.6.3b. Maintain consistency in style and tone.								
L.7.1c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.								
L.8.1d. Recognize and correct inappropriate shifts in verb voice and mood.								
L.9–10.1a. Use parallel structure.								

~~* Subsumed by L.7.3a~~
~~† Subsumed by L.9–10.1a~~
~~‡ Subsumed by L.11–12.3a~~

~~Standard 10: Range, Quality, and Complexity of Student Reading 6–12~~
~~Measuring Text Complexity: Three Factors~~

~~**Qualitative evaluation of the text:** Levels of meaning, structure, language conventionality and clarity, and knowledge demands~~

~~**Quantitative evaluation of the text:** Readability measures and other scores of text complexity~~

~~**Matching reader to text and task:** Reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed)~~

~~**Note:** More detailed information on text complexity and how it is measured is contained in Appendix A.~~

~~Range of Text Types for 6–12~~

~~Students in grades 6–12 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.~~

	~~**Literature**~~		~~**Informational Text**~~
~~Stories~~	~~drama~~	~~Poetry~~	~~Literary nonfiction~~
~~Includes the subgenres of adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, and graphic novels~~	~~Includes one-act and multi-act plays, both in written form and on film~~	~~Includes the subgenres of narrative poems, lyrical poems, free verse poems, sonnets, odes, ballads, and epics~~	~~Includes the subgenres of exposition, argument, and functional text in the form of personal essays, speeches, opinion pieces, essays about art or literature, biographies, memoirs, journalism, and historical, scientific, technical, or economic accounts (including digital sources) written for a broad audience~~

~~Texts Illustrating the Complexity, Quality, and Range of Student Reading 6–12~~

	Literature: Stories, Dramas, Poetry	Informational Texts: Literary Nonfiction
6–8	▪ *Little Women* by Louisa May Alcott (1869) ▪ *The Adventures of Tom Sawyer* by Mark Twain (1876) ▪ "The Road Not Taken" by Robert Frost (1915) ▪ *The Dark Is Rising* by Susan Cooper (1973) ▪ *Dragonwings* by Laurence Yep (1975) ▪ *Roll of Thunder, Hear My Cry* by Mildred Taylor (1976)	▪ "Letter on Thomas Jefferson" by John Adams (1776) ▪ *Narrative of the Life of Frederick Douglass, an American Slave* by Frederick Douglass (1845) ▪ "Blood, Toil, Tears and Sweat: Address to Parliament on May 13th, 1940" by Winston Churchill (1940) ▪ *Harriet Tubman: Conductor on the Underground Railroad* by Ann Petry (1955) ▪ *Travels with Charley: In Search of America* by John Steinbeck (1962)
9–10	▪ *The Tragedy of Macbeth* by William Shakespeare (1592) ▪ "Ozymandias" by Percy Bysshe Shelley (1817) ▪ "The Raven" by Edgar Allen Poe (1845) ▪ "The Gift of the Magi" by O. Henry (1906) ▪ *The Grapes of Wrath* by John Steinbeck (1939) ▪ *Fahrenheit 451* by Ray Bradbury (1953) ▪ *The Killer Angels* by Michael Shaara (1975)	▪ "Speech to the Second Virginia Convention" by Patrick Henry (1775) ▪ "Farewell Address" by George Washington (1796) ▪ "Gettysburg Address" by Abraham Lincoln (1863) ▪ "State of the Union Address" by Franklin Delano Roosevelt (1941) ▪ "Letter from Birmingham Jail" by Martin Luther King, Jr. (1964) ▪ "Hope, Despair and Memory" by Elie Wiesel (1997)
11–CCR	▪ "Ode on a Grecian Urn" by John Keats (1820) ▪ *Jane Eyre* by Charlotte Brontë (1848) ▪ "Because I Could Not Stop for Death" by Emily Dickinson (1890) ▪ *The Great Gatsby* by F. Scott Fitzgerald (1925) ▪ *Their Eyes Were Watching God* by Zora Neale Hurston (1937) ▪ *A Raisin in the Sun* by Lorraine Hansberry (1959) ▪ *The Namesake* by Jhumpa Lahiri (2003)	▪ *Common Sense* by Thomas Paine (1776) ▪ *Walden* by Henry David Thoreau (1854) ▪ "Society and Solitude" by Ralph Waldo Emerson (1857) ▪ "The Fallacy of Success" by G. K. Chesterton (1909) ▪ *Black Boy* by Richard Wright (1945) ▪ "Politics and the English Language" by George Orwell (1946) ▪ "Take the Tortillas Out of Your Poetry" by Rudolfo Anaya (1995)

Note: ~~Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of grades 6–12 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth.~~

~~STANDARDS FOR~~

~~Literacy in History/Social Studies, Science, and Technical Subjects~~

~~**9–12**~~

~~College and Career Readiness Anchor Standards for Reading~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Key Ideas and Details~~

~~1 Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.~~

~~2 Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.~~

~~3 Analyze how and why individuals, events, or ideas develop and interact over the course of a text.~~

~~Craft and Structure~~

~~4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.~~

~~5 Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.~~

~~6 Assess how point of view or purpose shapes the content and style of a text.~~

~~Integration of Knowledge and Ideas~~

~~7 Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*~~

~~8 Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.~~

~~9 Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.~~

~~Range of Reading and Level of Text Complexity~~

~~10 Read and comprehend complex literary and informational texts independently and proficiently.~~

~~*Please see “Research to Build and Present Knowledge” in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.~~

~~Note on range and content of student reading~~

~~Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.~~

~~Reading Standards for Literacy in History/Social Studies 6–12~~

~~The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.~~

RH

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
~~1. Cite specific textual evidence to support analysis of primary and secondary sources.~~	~~1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.~~	~~1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.~~
~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.~~	~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.~~	~~2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.~~
~~3. Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).~~	~~3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.~~	~~3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.~~
~~Craft and Structure~~		
~~4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.~~	~~4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.~~	~~4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).~~
~~5. Describe how a text presents information (e.g., sequentially, comparatively, causally).~~	~~5. Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.~~	~~5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.~~
~~6. Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).~~	~~6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.~~	~~6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.~~
~~Integration of Knowledge and Ideas~~		
~~7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.~~	~~7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.~~	~~7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.~~
~~8. Distinguish among fact, opinion, and reasoned judgment in a text.~~	~~8. Assess the extent to which the reasoning and evidence in a text support the author's claims.~~	~~8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.~~
~~9. Analyze the relationship between a primary and secondary source on the same topic.~~	~~9. Compare and contrast treatments of the same topic in several primary and secondary sources.~~	~~9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.~~
~~Range of Reading and Level of Text Complexity~~		
~~10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.~~	~~10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.~~	~~10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–12 text complexity band independently and proficiently.~~

~~Reading Standards for Literacy in Science and Technical Subjects 6–12~~

RST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
~~1. Cite specific textual evidence to support analysis of science and technical texts.~~	~~1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.~~	~~1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.~~
~~2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.~~	~~2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.~~	~~2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.~~
~~3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.~~	~~3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.~~	~~3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.~~
~~Craft and Structure~~		
~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics*.~~	~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.~~	~~4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.~~
~~5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.~~	~~5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).~~	~~5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.~~
~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.~~	~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.~~	~~6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.~~
~~Integration of Knowledge and Ideas~~		
~~7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).~~	~~7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.~~	~~7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.~~
~~8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.~~	~~8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.~~	~~8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.~~
~~9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.~~	~~9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.~~	~~9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.~~
~~Range of Reading and Level of Text Complexity~~		
~~10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.~~	~~10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.~~	~~10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–12 text complexity band independently and proficiently.~~

~~College and Career Readiness Anchor Standards for Writing~~

~~The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.~~

~~Text Types and Purposes*~~

~~1 Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.~~

~~2 Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.~~

~~3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.~~

~~Production and Distribution of Writing~~

~~4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.~~

~~5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.~~

~~6 Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.~~

~~Research to Build and Present Knowledge~~

~~7 Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.~~

~~8 Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.~~

~~9 Draw evidence from literary or informational texts to support analysis, reflection, and research.~~

~~Range of Writing~~

~~10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.~~

~~*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.~~

~~Note on range and content of student writing~~

~~For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.~~

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

The standards below begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Text Types and Purposes

Grades 6–8 students:

1. Write arguments focused on *discipline-specific content*.
   a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
   b. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
   c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
   d. Establish and maintain a formal style.
   e. Provide a concluding statement or section that follows from and supports the argument presented.

Grades 9–10 students:

1. Write arguments focused on *discipline-specific content.*
   a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence.
   b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
   c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
   d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
   e. Provide a concluding statement or section that follows from or supports the argument presented.

Grades 11–12 students:

1. Write arguments focused on *discipline-specific content.*
   a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
   b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.
   c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
   d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
   e. Provide a concluding statement or section that follows from or supports the argument presented.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes (continued)		
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style and objective tone. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)

Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Production and Distribution of Writing		
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Research to Build and Present Knowledge		
7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
9. Draw evidence from informational texts to support analysis reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.	9. Draw evidence from informational texts to support analysis, reflection, and research.
Range of Writing		
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

~~HIGH SCHOOL MATHEMATICS~~

~~Kentucky Academic Standards – Mathematics – High School~~

~~Mathematics Academic Standards Academic Standards contain several headings, each one the title of a single progression having significant presence in that particular grade level. Under each of these progression headings, there appear standards, divided into standards describing concepts student should understand and standards describing skills students should acquire.~~

~~**Introduction**~~

~~**Toward greater focus and coherence**~~
~~For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is "a mile wide and an inch deep." These Standards are a substantial answer to that challenge.~~

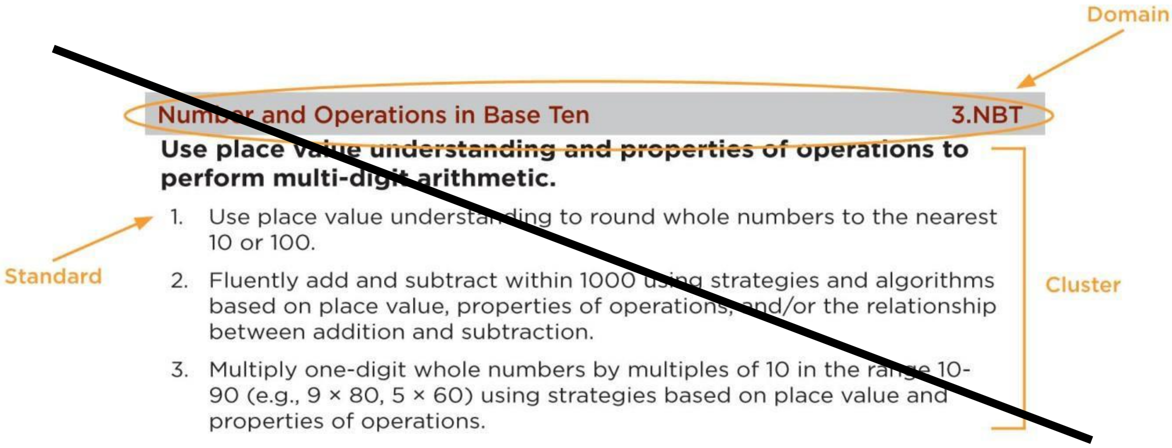
~~**Understanding mathematics**~~
~~These Standards define what students should understand and be able to do in their study of mathematics. Asking a student to understand something means asking a teacher to assess whether the student has understood it. But what does mathematical understanding look like? One hallmark of mathematical understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, *why* a particular mathematical statement is true or where a mathematical rule comes from. There is a world of difference between a student who can summon a mnemonic device to expand a product such as $(a + b)(x + y)$ and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding $(a + b + c)(x + y)$. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.~~

~~The Standards set grade-specific standards but do not define the intervention methods or materials necessary to support students who are well below or well above grade-level expectations. It is also beyond the scope of the Standards to define the full range of supports appropriate for English language learners and for students with special needs. At the same time, all students must have the opportunity to learn and meet the same high standards if they are to access the knowledge and skills necessary in their post-school lives. The Standards should be read as allowing for the widest possible range of students to participate fully from the outset, along with appropriate accommodations to ensure maximum participation of students with special education needs. For example, for students with disabilities reading should allow for use of Braille, screen reader technology, or other assistive devices, while writing should include the use of a scribe, computer, or speech-to-text technology. In a similar vein, speaking and listening should be interpreted broadly to include sign language. No set of grade-specific standards can fully reflect the great variety in abilities, needs, learning rates, and achievement levels of students in any given classroom. However, the Standards do provide clear signposts along the way to the goal of college and career readiness for all students.~~

~~**How to read the grade level standards**~~
~~*Standards* define what students should understand and be able to do.~~

~~*Clusters* are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.~~

~~*Domains* are larger groups of related standards. Standards from different domains may sometimes be closely related.~~



~~These Standards do not dictate curriculum or teaching methods. For example, just because topic A appears before topic B in the standards for a given grade, it does not necessarily mean that topic A must be taught before topic B. A teacher might prefer to teach topic B before topic A, or might choose to highlight connections by teaching topic A and topic B at the same time. Or, a teacher might prefer to teach a topic of his or her own choosing that leads, as a byproduct, to students reaching the standards for topics A and B.~~

~~What students can learn at any particular grade level depends upon what they have learned before. Ideally then, each standard in this document might have been phrased in the form, "Students who already know ... should next come to learn ...." But at present this approach is unrealistic—not least because existing education research cannot specify all such learning pathways. Of necessity therefore, grade placements for specific topics have been made on the basis of state and international comparisons and the collective experience and collective professional judgment of educators, researchers and mathematicians. One promise of common state standards is that over time they will allow research on learning progressions to inform and improve the design of standards to a much greater extent than is possible today. Learning opportunities will continue to vary across schools and school systems, and educators should make every effort to meet the needs of individual students based on their current understanding.~~

~~These Standards are not intended to be new names for old ways of doing business. They are a call to take the next step. It is time for states to work together to build on lessons learned from two decades of standards based reforms. It is time to recognize that standards are not just promises to our children, but promises we intend to keep.~~

~~Mathematics | Standards for Mathematical Practice~~

~~The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).~~

~~1. Make sense of problems and persevere in solving them.~~

~~Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.~~

~~2. Reason abstractly and quantitatively.~~

~~Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.~~

~~3. Construct viable arguments and critique the reasoning of others.~~

~~Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.~~

~~4. Model with mathematics.~~

~~Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.~~

~~5. Use appropriate tools strategically.~~

~~Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.~~

~~6. Attend to precision.~~

~~Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.~~

~~7. Look for and make use of structure.~~

~~Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well-remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression~~ $\cancel{x^2 + 9x + 14}$~~, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see~~ $\cancel{5 - 3(x - y)^2}$ ~~as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers~~ $\cancel{x}$ ~~and~~ $\cancel{y}$~~.~~

~~8. Look for and express regularity in repeated reasoning.~~
~~Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y – 2)/(x – 1) = 3. Noticing the regularity in the way terms cancel when expanding (x – 1)(x + 1), (x – 1)(x^2 + x + 1), and (x – 1)(x^3 + x^2 + x + 1) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.~~

~~Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content~~

~~The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.~~

~~The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word “understand” are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.~~

~~In this respect, those content standards which set an expectation of understanding are potential “points of intersection” between the Standards for Mathematical Content and the Standards for Mathematical Practice. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the time, resources, innovative energies, and focus necessary to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.~~

~~Mathematics Standards for High School~~

~~The high school standards specify the mathematics that all students should study in order to be college and career ready. Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by (+), as in this example:~~

> ~~(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers).~~

~~All standards without a (+) symbol should be in the common mathematics curriculum for all college and career ready students. Standards without a (+) symbol may also appear in courses intended for all students. The high school standards are listed in conceptual categories:~~

- ~~Number and Quantity~~
- ~~Algebra~~
- ~~Functions~~
- ~~Modeling~~
- ~~Geometry~~
- ~~Statistics and Probability~~

~~Conceptual categories portray a coherent view of high school mathematics; a student's work with functions, for example, crosses a number of traditional course boundaries, potentially up through and including calculus.~~

~~Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (_). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to all standards in that group.~~

~~Mathematics | High School—Number and Quantity~~

~~**Numbers and Number Systems.** During the years from kindergarten to eighth grade, students must repeatedly extend their conception of number. At first, “number” means “counting number”: 1, 2, 3.. Soon after that, 0 is used to represent “none” and the whole numbers are formed by the counting numbers together with zero. The next extension is fractions. At first, fractions are barely numbers and tied strongly to pictorial representations. Yet by the time students understand division of fractions, they have a strong concept of fractions as numbers and have connected them, via their decimal representations, with the base-ten system used to represent the whole numbers. During middle school, fractions are augmented by negative fractions to form the rational numbers. In Grade 8, students extend this system once more, augmenting the rational numbers with the irrational numbers to form the real numbers. In high school, students will be exposed to yet another extension of number, when the real numbers are augmented by the imaginary numbers to form the complex numbers.~~

~~With each extension of number, the meanings of addition, subtraction, multiplication, and division are extended. In each new number system—integers, rational numbers, real numbers, and complex numbers—the four operations stay the same in two important ways: They have the commutative, associative, and distributive properties and their new meanings are consistent with their previous meanings.~~

~~Extending the properties of whole-number exponents leads to new and productive notation. For example, properties of whole-number exponents suggest that $(5^{1/3})^3$ should be $5^{(1/3)3} = 5^1 = 5$ and that $5^{1/3}$ should be the cube root of 5.~~

~~Calculators, spreadsheets, and computer algebra systems can provide ways for students to become better acquainted with these new number systems and their notation. They can be used to generate data for numerical experiments, to help understand the workings of matrix, vector, and complex number algebra, and to experiment with non-integer exponents.~~

~~**Quantities.** In real world problems, the answers are usually not numbers but quantities: numbers with units, which involves measurement. In their work in measurement up through Grade 8, students primarily measure commonly used attributes such as length, area, and volume. In high school, students encounter a wider variety of units in modeling, e.g., acceleration, currency conversions, derived quantities such as person-hours and heating degree days, social science rates such as per-capita income, and rates in everyday life such as points scored per game or batting averages. They also encounter novel situations in which they themselves must conceive the attributes of interest. For example, to find a good measure of overall highway safety, they might propose measures such as fatalities per year, fatalities per year per driver, or fatalities per vehicle-mile traveled. Such a conceptual process is sometimes called quantification. Quantification is important for science, as when surface area suddenly “stands out” as an important variable in evaporation. Quantification is also important for companies, which must conceptualize relevant attributes and create or choose suitable measures for them.~~

~~Number and Quantity Overview~~

~~The Real Number System~~

- ~~Extend the properties of exponents to rational exponents~~
- ~~Use properties of rational and irrational numbers.~~

~~Quantities~~

- ~~Reason quantitatively and use units to solve problems~~

~~The Complex Number System~~

- ~~Perform arithmetic operations with complex numbers~~
- ~~Represent complex numbers and their operations on the complex plane~~
- ~~Use complex numbers in polynomial identities and equations~~

~~Vector and Matrix Quantities~~

- ~~Represent and model with vector quantities.~~
- ~~Perform operations on vectors.~~
- ~~Perform operations on matrices and use matrices in applications~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning~~

~~The Real Number System N-RN~~

~~Extend the properties of exponents to rational exponents.~~

1. ~~Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.~~
2. ~~Rewrite expressions involving radicals and rational exponents using the properties of exponents.~~

~~Use properties of rational and irrational numbers.~~

3. ~~Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.~~

~~Quantities★ N-Q~~

~~Reason quantitatively and use units to solve problems.~~

1. ~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.~~
2. ~~Define appropriate quantities for the purpose of descriptive modeling.~~
3. ~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.~~

~~The Complex Number System N-CN~~

~~Perform arithmetic operations with complex numbers.~~

1. ~~Know there is a complex number i such that i2 = –1, and every complex number has the form a + bi with a and b real.~~
2. ~~Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.~~
3. ~~(+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.~~

~~Represent complex numbers and their operations on the complex plane.~~

4. ~~(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.~~
5. ~~(+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, (–1 + √3 i)3 = 8 because (–1 + √3 i) has modulus 2 and argument 120°.~~
6. ~~(+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.~~

~~Use complex numbers in polynomial identities and equations.~~

7. ~~Solve quadratic equations with real coefficients that have complex solutions.~~
8. ~~(+) Extend polynomial identities to the complex numbers. For example, rewrite x2 + 4 as (x + 2i)(x – 2i).~~
9. ~~(+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.~~

~~Vector and Matrix Quantities~~ ~~N-V~~

~~Represent and model with vector quantities.~~

1 ~~(+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v).~~

2 ~~(+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.~~

3 ~~(+) Solve problems involving velocity and other quantities that can be represented by vectors.~~

~~Perform operations on vectors.~~

4 ~~(+) Add and subtract vectors.~~

- a. ~~Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.~~
- b. ~~Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.~~
- c. ~~Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.~~

5 ~~(+) Multiply a vector by a scalar.~~

- a. ~~Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.~~
- b. ~~Compute the magnitude of a scalar multiple $c\boldsymbol{v}$ using $||c\boldsymbol{v}|| = |c|v$. Compute the direction of $c\boldsymbol{v}$ knowing that when $|c|v \neq 0$, the direction of $c\boldsymbol{v}$ is either along $\boldsymbol{v}$ (for $c > 0$) or against $\boldsymbol{v}$ (for $c < 0$).~~

~~Perform operations on matrices and use matrices in applications.~~

6 ~~(+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.~~

7 ~~(+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.~~

8 ~~(+) Add, subtract, and multiply matrices of appropriate dimensions.~~

9 ~~(+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.~~

10 ~~(+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.~~

11 ~~(+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.~~

12 ~~(+) Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.~~

~~Mathematics | High School—Algebra~~

~~**Expressions**. An expression is a record of a computation with numbers, symbols that represent numbers, arithmetic operations, exponentiation, and, at more advanced levels, the operation of evaluating a function. Conventions about the use of parentheses and the order of operations assure that each expression is unambiguous. Creating an expression that describes a computation involving a general quantity requires the ability to express the computation in general terms, abstracting from specific instances.~~

~~Reading an expression with comprehension involves analysis of its underlying structure. This may suggest a different but equivalent way of writing the expression that exhibits some different aspect of its meaning. For example, $p + 0.05p$ can be interpreted as the addition of a 5% tax to a price p. Rewriting $p + 0.05p$ as $1.05p$ shows that adding a tax is the same as multiplying the price by a constant factor.~~

~~Algebraic manipulations are governed by the properties of operations and exponents, and the conventions of algebraic notation. At times, an expression is the result of applying operations to simpler expressions. For example, $p + 0.05p$ is the sum of the simpler expressions p and $0.05p$. Viewing an expression as the result of operation on simpler expressions can sometimes clarify its underlying structure.~~

~~A spreadsheet or a computer algebra system (CAS) can be used to experiment with algebraic expressions, perform complicated algebraic manipulations, and understand how algebraic manipulations behave.~~

~~**Equations and inequalities**. An equation is a statement of equality between two expressions, often viewed as a question asking for which values of the variables the expressions on either side are in fact equal. These values are the solutions to the equation. An identity, in contrast, is true for all values of the variables; identities are often developed by rewriting an expression in an equivalent form.~~

~~The solutions of an equation in one variable form a set of numbers; the solutions of an equation in two variables form a set of ordered pairs of numbers, which can be plotted in the coordinate plane. Two or more equations and/or inequalities form a system. A solution for such a system must satisfy every equation and inequality in the system.~~

~~An equation can often be solved by successively deducing from it one or more simpler equations. For example, one can add the same constant to both sides without changing the solutions, but squaring both sides might lead to extraneous solutions. Strategic competence in solving includes looking ahead for productive manipulations and anticipating the nature and number of solutions.~~

~~Some equations have no solutions in a given number system, but have a solution in a larger system. For example, the solution of x + 1 = 0 is an integer, not a whole number; the solution of 2x + 1 = 0 is a rational number, not an integer; the solutions of x2 – 2 = 0 are real numbers, not rational numbers; and the solutions of x2 + 2 = 0 are complex numbers, not real numbers.~~

~~The same solution techniques used to solve equations can be used to rearrange formulas. For example, the formula for the area of a trapezoid, A = ((b1+b2)/2)h, can be solved for h using the same deductive process.~~

~~Inequalities can be solved by reasoning about the properties of inequality. Many, but not all, of the properties of equality continue to hold for inequalities and can be useful in solving them.~~

~~**Connections to Functions and Modeling**. Expressions can define functions, and equivalent expressions define the same function. Asking when two functions have the same value for the same input leads to an equation; graphing the two functions allows for finding approximate solutions of the equation. Converting a verbal description to an equation, inequality, or system of these is an essential skill in~~

~~modeling.~~

~~Algebra Overview~~

~~Seeing Structure in Expressions~~

- ~~Interpret the structure of expressions~~
- ~~Write expressions in equivalent forms to solve problems~~

~~Arithmetic with Polynomials and Rational Expressions~~

- ~~Perform arithmetic operations on polynomials~~
- ~~Understand the relationship between zeros and factors of polynomials~~
- ~~Use polynomial identities to solve problems~~
- ~~Rewrite rational expressions~~

~~Creating Equations~~

- ~~Create equations that describe numbers or relationships~~

~~Reasoning with Equations and Inequalities~~

- ~~Understand solving equations as a process of reasoning and explain the reasoning~~
- ~~Solve equations and inequalities in one variable~~
- ~~Solve systems of equations~~
- ~~Represent and solve equations and inequalities graphically~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity in repeated reasoning~~

~~Seeing Structure in Expressions A-SSE~~

~~Interpret the structure of expressions~~

1 ~~Interpret expressions that represent a quantity in terms of its context.★~~

- a. ~~Interpret parts of an expression, such as terms, factors, and coefficients.~~
- b. ~~Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P.~~

2 ~~Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 - (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).~~

~~Write expressions in equivalent forms to solve problems~~

3 ~~Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★~~

- a. ~~Factor a quadratic expression to reveal the zeros of the function it defines.~~
- b. ~~Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.~~
- c. ~~Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.~~

4 ~~Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.★~~

~~Arithmetic with Polynomials and Rational Expressions A-APR~~

~~Perform arithmetic operations on polynomials~~

1 ~~Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.~~

~~Understand the relationship between zeros and factors of polynomials~~

2 ~~Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).~~

3 ~~Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.~~

~~Use polynomial identities to solve problems~~

4 ~~Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x2 + y2)2 = (x2 – y2)2 + (2xy)2can be used to generate Pythagorean triples.~~

5 ~~(+) Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.~~[1]

~~Rewrite rational expressions~~

6 ~~Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.~~

~~[1] The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.~~

7 ~~(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.~~

~~Creating Equations★ A-CED~~

~~Create equations that describe numbers or relationships~~

1 ~~Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.~~

2 ~~Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.~~

3 ~~Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.~~

4 ~~Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.~~

~~Reasoning with Equations and Inequalities A-REI~~

~~Understand solving equations as a process of reasoning and explain the reasoning~~

1 ~~Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.~~

2 ~~Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.~~

~~Solve equations and inequalities in one variable~~

3 ~~Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.~~

4 ~~Solve quadratic equations in one variable.~~

a. ~~Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form.~~

b. ~~Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.~~

~~Solve systems of equations~~

5 ~~Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.~~

6 ~~Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.~~

7 ~~Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x2 + y2 = 3.~~

8 ~~(+) Represent a system of linear equations as a single matrix equation in a vector variable.~~

~~9 (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).~~

~~Represent and solve equations and inequalities graphically~~

~~10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).~~

~~11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★~~

~~12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.~~

~~Mathematics | High School—Functions~~

~~Functions describe situations where one quantity determines another. For example, the return on $10,000 invested at an annualized percentage rate of 4.25% is a function of the length of time the money is invested. Because we continually make theories about dependencies between quantities in nature and society, functions are important tools in the construction of mathematical models. In school mathematics, functions usually have numerical inputs and outputs and are often defined by an algebraic expression. For example, the time in hours it takes for a car to drive 100 miles is a function of the car's speed in miles per hour, v; the rule T(v) = 100/v expresses this relationship algebraically and defines a function whose name is T. The set of inputs to a function is called its domain. We often infer the domain to be all inputs for which the expression defining a function has a value, or for which the function makes sense in a given context.~~

~~A function can be described in various ways, such as by a graph (e.g., the trace of a seismograph); by a verbal rule, as in, "I'll give you a state, you give me the capital city;" by an algebraic expression like f(x) = a + bx; or by a recursive rule. The graph of a function is often a useful way of visualizing the relationship of the function models, and manipulating a mathematical expression for a function can throw light on the function's properties.~~

~~Functions presented as expressions can model many important phenomena. Two important families of functions characterized by laws of growth are linear functions, which grow at a constant rate, and exponential functions, which grow at a constant percent rate. Linear functions with a constant term of zero describe proportional relationships.~~

~~A graphing utility or a computer algebra system can be used to experiment with properties of these functions and their graphs and to build computational models of functions, including recursively defined functions.~~

~~**Connections to Expressions, Equations, Modeling, and Coordinates.**~~
~~Determining an output value for a particular input involves evaluating an expression; finding inputs that yield a given output involves solving an equation. Questions about when two functions have the same value for the same input lead to equations, whose solutions can be visualized from the intersection of their graphs. Because functions describe relationships between quantities, they are frequently used in modeling. Sometimes functions are defined by a recursive process, which can be displayed effectively using a spreadsheet or other technology.~~

~~Functions Overview~~

~~Interpreting Functions~~

- ~~Understand the concept of a function and use function notation~~
- ~~Interpret functions that arise in applications in terms of the context~~
- ~~analyze functions using different representations~~

~~Building Functions~~

- ~~Build a function that models a relationship between two quantities~~
- ~~Build new functions from existing functions~~

~~Linear, Quadratic, and Exponential Models~~

- ~~Construct and compare linear, quadratic, and exponential models and solve problems~~
- ~~Interpret expressions for functions in terms of the situation they model~~

~~Trigonometric Functions~~

- ~~extend the domain of trigonometric functions using the unit circle~~
- ~~model periodic phenomena with trigonometric functions~~
- ~~Prove and apply trigonometric identities~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity~~

~~Interpreting Functions F-IF~~

~~Understand the concept of a function and use function notation~~

1. ~~Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).~~
2. ~~Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.~~
3. ~~Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.~~

~~Interpret functions that arise in applications in terms of the context~~

4. ~~For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★~~
5. ~~Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★~~
6. ~~Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★~~

~~Analyze functions using different representations~~

7. ~~Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★~~
   - ~~a. Graph linear and quadratic functions and show intercepts, maxima, and minima.~~
   - ~~b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.~~
   - ~~c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.~~
   - ~~d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.~~
   - ~~e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.~~
8. ~~Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.~~
   - ~~a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.~~
   - ~~b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.~~

~~9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.~~

~~Building Functions F-BF~~

~~Build a function that models a relationship between two quantities~~

~~1 Write a function that describes a relationship between two quantities.★~~

~~a. Determine an explicit expression, a recursive process, or steps for calculation from a context.~~

~~b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.~~

~~c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.~~

~~2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★~~

~~Build new functions from existing functions~~

~~3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.~~

~~4 Find inverse functions.~~

~~a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for x ≠ 1.~~

~~b. (+) Verify by composition that one function is the inverse of another.~~

~~c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.~~

~~d. (+) Produce an invertible function from a non-invertible function by restricting the domain.~~

~~e. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.~~

~~Linear, Quadratic, and Exponential Models★ F-LE~~

~~Construct and compare linear, quadratic, and exponential models and solve problems~~

~~1 Distinguish between situations that can be modeled with linear functions and with exponential functions.~~

~~a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.~~

~~b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.~~

~~c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.~~

~~2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).~~

~~3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.~~

~~4 For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.~~

~~**Interpret expressions for functions in terms of the situation they model**~~

~~5 Interpret the parameters in a linear or exponential function in terms of a context.~~

~~**Trigonometric Functions F-TF**~~

~~**Extend the domain of trigonometric functions using the unit circle**~~

~~1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.~~

~~2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.~~

~~3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π–x, π+x, and 2π–x in terms of their values for x, where x is any real number.~~

~~4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.~~

~~**Model periodic phenomena with trigonometric functions**~~

~~5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.★~~

~~6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.~~

~~7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.★~~

~~**Prove and apply trigonometric identities**~~

~~8 Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to calculate trigonometric ratios.~~

~~9 (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.~~

~~Mathematics | High School—Modeling~~

~~Modeling links classroom mathematics and statistics to everyday life, work, and decision-making. Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social, and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data.~~

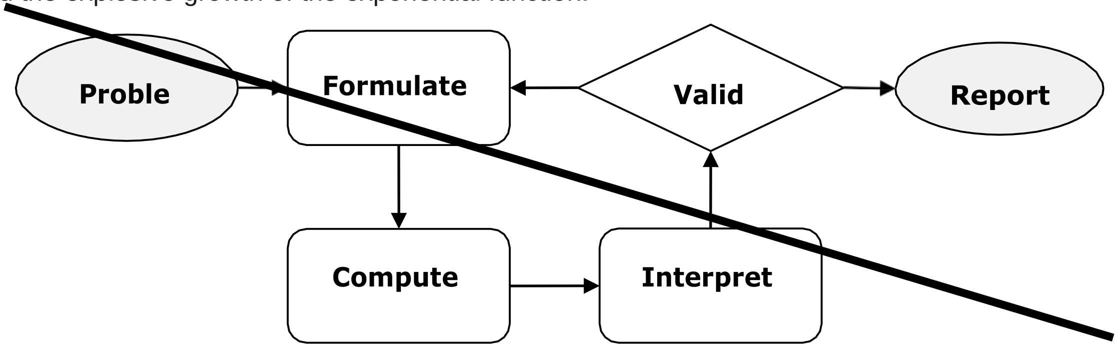
~~A model can be very simple, such as writing total cost as a product of unit price and number bought, or using a geometric shape to describe a physical object like a coin. Even such simple models involve making choices. It is up to us whether to model a coin as a three-dimensional cylinder, or whether a two-dimensional disk works well enough for our purposes. Other situations—modeling a delivery route, a production schedule, or a comparison of loan amortizations—need more elaborate models that use other tools from the mathematical sciences. Real-world situations are not organized and labeled for analysis; formulating tractable models, representing such models, and analyzing them is appropriately a creative process. Like every such process, this depends on acquired expertise as well as creativity.~~

~~Some examples of such situations might include:~~

- ~~Estimating how much water and food is needed for emergency relief in a devastated city of 3 million people, and how it might be distributed. Planning a table tennis tournament for 7 players at a club with 4 tables, where each player plays against each other player.~~
- ~~Designing the layout of the stalls in a school fair so as to raise as much money as possible.~~
- ~~Analyzing stopping distance for a car. Modeling savings account balance, bacterial colony growth, or investment growth.~~
- ~~Engaging in critical path analysis, e.g., applied to turnaround of an aircraft at an airport.~~
- ~~Analyzing risk in situations such as extreme sports, pandemics, and terrorism.~~
- ~~Relating population statistics to individual predictions.~~

~~In situations like these, the models devised depend on a number of factors: How precise an answer do we want or need? What aspects of the situation do we most need to understand, control, or optimize? What resources of time and tools do we have? The range of models that we can create and analyze is also constrained by the limitations of our mathematical, statistical, and technical skills, and our ability to recognize significant variables and relationships among them. Diagrams of various kinds, spreadsheets and other technology, and algebra are powerful tools for understanding and solving problems drawn from different types of real-world situations.~~

~~One of the insights provided by mathematical modeling is that essentially the same mathematical or statistical structure can sometimes model seemingly different situations. Models can also shed light on the mathematical structures themselves, for example, as when a model of bacterial growth makes more vivid the explosive growth of the exponential function.~~



~~The basic modeling cycle is summarized in the diagram. It involves (1) identifying variables in the situation and selecting those that represent essential features, (2) formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables, (3) analyzing and performing operations on these relationships to draw conclusions, (4) interpreting the results of the mathematics in terms of the original situation, (5) validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable, (6) reporting on the conclusions and the reasoning behind them. Choices, assumptions, and approximations are present throughout this cycle.~~

~~In descriptive modeling, a model simply describes the phenomena or summarizes them in a compact form. Graphs of observations are a familiar descriptive model—for example, graphs of global temperature and atmospheric CO2 over time. Analytic modeling seeks to explain data on the basis of deeper theoretical ideas, albeit with parameters that are empirically based; for example, exponential growth of bacterial colonies (until cut-off mechanisms such as pollution or starvation intervene) follows from a constant reproduction rate. Functions are an important tool for analyzing such problems. Graphing utilities, spreadsheets, computer algebra systems, and dynamic geometry software are powerful tools that can be used to model purely mathematical phenomena (e.g., the behavior of polynomials) as well as physical phenomena.~~

~~**Modeling Standards** *Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol*★.~~

~~Mathematics | High School—Geometry~~

~~An understanding of the attributes and relationships of geometric objects can be applied in diverse contexts—interpreting a schematic drawing, estimating the amount of wood needed to frame a sloping roof, rendering computer graphics, or designing a sewing pattern for the most efficient use of material. Although there are many types of geometry, school mathematics is devoted primarily to plane Euclidean geometry, studied both synthetically (without coordinates) and analytically (with coordinates). Euclidean geometry is characterized most importantly by the Parallel Postulate, that through a point not on a given line there is exactly one parallel line. (Spherical geometry, in contrast, has no parallel lines.)~~

~~During high school, students begin to formalize their geometry experiences from elementary and middle school, using more precise definitions and developing careful proofs. Later in college some students develop Euclidean and other geometries carefully from a small set of axioms.~~

~~The concepts of congruence, similarity, and symmetry can be understood from the perspective of geometric transformation. Fundamental are the rigid motions: translations, rotations, reflections, and combinations of these, all of which are here assumed to preserve distance and angles (and therefore shapes generally). Reflections and rotations each explain a particular type of symmetry, and the symmetries of an object offer insight into its attributes—as when the reflective symmetry of an isosceles triangle assures that its base angles are congruent. In the approach taken here, two geometric figures are defined to be congruent if there is a sequence of rigid motions that carries one onto the other. This is the principle of superposition. For triangles, congruence means the equality of all corresponding pairs of sides and all corresponding pairs of angles. During the middle grades, through experiences drawing triangles from given conditions, students notice ways to specify enough measures in a triangle to ensure that all triangles drawn with those measures are congruent. Once these triangle congruence criteria (ASA, SAS, and SSS) are established using rigid motions, they can be used to prove theorems about triangles, quadrilaterals, and other geometric figures. Similarity transformations (rigid motions followed by dilations) define similarity in the same way that rigid motions define congruence, thereby formalizing the similarity ideas of "same shape" and "scale factor" developed in the middle grades. These transformations lead to the criterion for triangle similarity that two pairs of corresponding angles are congruent.~~

~~The definitions of sine, cosine, and tangent for acute angles are founded on right triangles and similarity, and, with the Pythagorean Theorem, are fundamental in many real-world and theoretical situations. The Pythagorean Theorem is generalized to nonright triangles by the Law of Cosines. Together, the Laws of Sines and Cosines embody the triangle congruence criteria for the cases where three pieces of information suffice to completely solve a triangle. Furthermore, these laws yield two possible solutions in the ambiguous case, illustrating that Side-Side-Angle is not a congruence criterion. Analytic geometry connects algebra and geometry, resulting in powerful methods of analysis and problem solving. Just as the number line associates numbers with locations in one dimension, a pair of perpendicular axes associates pairs of numbers with locations in two dimensions. This correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof. Geometric transformations of the graphs of equations correspond to algebraic changes in their equations.~~

~~Dynamic geometry environments provide students with experimental and modeling tools that allow them to investigate geometric phenomena in much the same way as computer algebra systems allow them to experiment with algebraic phenomena.~~

~~**Connections to Equations**. The correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation into a tool for geometric understanding, modeling, and proof.~~

~~Geometry Overview~~

~~Congruence~~

- ~~Experiment with transformations in the plane~~
- ~~Understand congruence in terms of rigid motions~~
- ~~Prove geometric theorems~~
- ~~Make geometric constructions~~

~~Similarity, Right Triangles, and Trigonometry~~

- ~~Understand similarity in terms of similarity transformations~~
- ~~Prove theorems involving similarity~~
- ~~Define trigonometric ratios and solve problems involving right triangles~~
- ~~Apply trigonometry to general triangles~~

~~Circles~~

- ~~Understand and apply theorems about circles~~
- ~~Find arc lengths and areas of sectors of circles~~

~~Expressing Geometric Properties with Equations~~

- ~~Translate between the geometric description and the algebraically~~

~~Geometric Measurement and Dimension~~

- ~~Explain volume formulas and use them to solve problems~~
- ~~Visualize relationships between two-dimensional and three-dimensional objects~~

~~Modeling with Geometry~~

- ~~Apply geometric concepts in modeling situations~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity~~

~~Congruence G-CO~~

~~Experiment with transformations in the plane~~

1. ~~Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.~~
2. ~~Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).~~
3. ~~Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.~~
4. ~~Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.~~
5. ~~Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.~~

~~Understand congruence in terms of rigid motions~~

6. ~~Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.~~
7. ~~Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.~~
8. ~~Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.~~

~~Prove geometric theorems~~

9. ~~Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.~~
10. ~~Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.~~
11. ~~Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.~~

~~Make geometric constructions~~

12. ~~Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.~~
13. ~~Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.~~

~~Similarity, Right Triangles, and Trigonometry G-SRT~~

~~Understand similarity in terms of similarity transformations~~

1 ~~Verify experimentally the properties of dilations given by a center and a scale factor:~~
   - a. ~~A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.~~
   - b. ~~The dilation of a line segment is longer or shorter in the ratio given by the scale factor.~~

2 ~~Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.~~

3 ~~Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.~~

~~Prove theorems involving similarity~~

4 ~~Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.~~

5 ~~Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.~~

~~Define trigonometric ratios and solve problems involving right triangles~~

6 ~~Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.~~

7 ~~Explain and use the relationship between the sine and cosine of complementary angles.~~

8 ~~Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★~~

~~Apply trigonometry to general triangles~~

9 ~~(+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.~~

10 ~~(+) Prove the Laws of Sines and Cosines and use them to solve problems.~~

11 ~~(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).~~

~~Circles G-C~~

~~Understand and apply theorems about circles~~

1. ~~Prove that all circles are similar.~~
2. ~~Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.~~
3. ~~Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.~~
4. ~~(+) Construct a tangent line from a point outside a given circle to the circle.~~

~~**Find arc lengths and areas of sectors of circles**~~

~~5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.~~

~~**Expressing Geometric Properties with Equations G-GPE**~~

~~**Translate between the geometric description and the equation for a conic section**~~

1. ~~Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.~~
2. ~~Derive the equation of a parabola given a focus and directrix.~~
3. ~~(+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.~~

~~**Use coordinates to prove simple geometric theorems algebraically**~~

4. ~~Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).~~
5. ~~Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).~~
6. ~~Find the point on a directed line segment between two given points that partitions the segment in a given ratio.~~
7. ~~Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.★~~

~~**Geometric Measurement and Dimension G-GMD**~~

~~**Explain volume formulas and use them to solve problems**~~

1. ~~Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.~~
2. ~~(+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.~~
3. ~~Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★~~

~~**Visualize relationships between two-dimensional and three-dimensional objects**~~

4. ~~Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.~~

~~**Modeling with Geometry G-MG**~~

~~**Apply geometric concepts in modeling situations**~~

1. ~~Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★~~
2. ~~Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★~~

~~3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★~~

~~Mathematics | High School—Statistics and Probability★~~

~~Decisions or predictions are often based on data—numbers in context. These decisions or predictions would be easy if the data always sent a clear message, but the message is often obscured by variability. Statistics provides tools for describing variability in data and for making informed decisions that take it into account.~~

~~Data are gathered, displayed, summarized, examined, and interpreted to discover patterns and deviations from patterns. Quantitative data can be described in terms of key characteristics: measures of shape, center, and spread. The shape of a data distribution might be described as symmetric, skewed, flat, or bell shaped, and it might be summarized by a statistic measuring center (such as mean or median) and a statistic measuring spread (such as standard deviation or interquartile range). Different distributions can be compared numerically using these statistics or compared visually using plots. Knowledge of center and spread are not enough to describe a distribution. Which statistics to compare, which plots to use, and what the results of a comparison might mean, depend on the question to be investigated and the real-life actions to be taken.~~

~~Randomization has two important uses in drawing statistical conclusions. First, collecting data from a random sample of a population makes it possible to draw valid conclusions about the whole population, taking variability into account. Second, randomly assigning individuals to different treatments allows a fair comparison of the effectiveness of those treatments. A statistically significant outcome is one that is unlikely to be due to chance alone, and this can be evaluated only under the condition of randomness. The conditions under which data are collected are important in drawing conclusions from the data; in critically reviewing uses of statistics in public media and other reports, it is important to consider the study design, how the data were gathered, and the analyses employed as well as the data summaries and the conclusions drawn.~~

~~Random processes can be described mathematically by using a probability model: a list or description of the possible outcomes (the sample space), each of which is assigned a probability. In situations such as flipping a coin, rolling a number cube, or drawing a card, it might be reasonable to assume various outcomes are equally likely. In a probability model, sample points represent outcomes and combine to make up events; probabilities of events can be computed by applying the Addition and Multiplication Rules. Interpreting these probabilities relies on an understanding of independence and conditional probability, which can be approached through the analysis of two-way tables.~~

~~Technology plays an important role in statistics and probability by making it possible to generate plots, regression functions, and correlation coefficients, and to simulate many possible outcomes in a short amount of time.~~

~~**Connections to Functions and Modeling.** Functions may be used to describe data; if the data suggest a linear relationship, the relationship can be modeled with a regression line, and its strength and direction can be expressed through a correlation coefficient.~~

~~Statistics and Probability Overview~~

~~Interpreting Categorical and Quantitative Data~~

- ~~Summarize, represent, and interpret data on a single count or measurement variable~~
- ~~Summarize, represent, and interpret data on two categorical and quantitative variables~~
- ~~Interpret linear models~~

~~Making Inferences and Justifying Conclusions~~

- ~~Understand and evaluate random processes underlying statistical experiments~~
- ~~make inferences and justify conclusions from sample surveys, experiments and observational studies~~

~~Conditional Probability and the Rules of Probability~~

- ~~Understand independence and conditional probability and use them to interpret data~~
- ~~Use the rules of probability to compute probabilities of compound events in a uniform probability model~~

~~Using Probability to Make Decisions~~

- ~~Calculate expected values and use them to solve problems~~
- ~~Use probability to evaluate outcomes of decisions~~

~~Mathematical Practices~~

1. ~~Make sense of problems and persevere in solving them.~~
2. ~~Reason abstractly and quantitatively.~~
3. ~~Construct viable arguments and critique the reasoning of others.~~
4. ~~Model with mathematics.~~
5. ~~Use appropriate tools strategically.~~
6. ~~Attend to precision.~~
7. ~~Look for and make use of structure.~~
8. ~~Look for and express regularity~~

~~Interpreting Categorical and Quantitative Data S-ID~~

~~Summarize, represent, and interpret data on a single count or measurement variable~~

1 ~~Represent data with plots on the real number line (dot plots, histograms, and box plots).~~

2 ~~Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.~~

3 ~~Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).~~

4 ~~Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.~~

~~Summarize, represent, and interpret data on two categorical and quantitative variables~~

5 ~~Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.~~

6 ~~Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.~~

  a. ~~Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.~~

  b. ~~Informally assess the fit of a function by plotting and analyzing residuals.~~

  c. ~~Fit a linear function for a scatter plot that suggests a linear association.~~

~~Interpret linear models~~

7 ~~Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.~~

8 ~~Compute (using technology) and interpret the correlation coefficient of a linear fit.~~

9 ~~Distinguish between correlation and causation.~~

~~Making Inferences and Justifying Conclusions S-IC~~

~~Understand and evaluate random processes underlying statistical experiments~~

1 ~~Understand statistics as a process for making inferences about population parameters based on a random sample from that population.~~

2 ~~Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would *a result of 5 tails in a row cause you to question the model*?~~

~~Make inferences and justify conclusions from sample surveys, experiments, and observational studies~~

3 ~~Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.~~

4 ~~Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.~~

5 ~~Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.~~

6 ~~Evaluate reports based on data.~~

~~Conditional Probability and the Rules of Probability S-CP~~

~~Understand independence and conditional probability and use them to interpret data~~

1 ~~Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").~~

2 ~~Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.~~

3 ~~Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.~~

4 ~~Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.~~

5 ~~Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.~~

~~Use the rules of probability to compute probabilities of compound events in a uniform probability model~~

6 ~~Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.~~

7 ~~Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.~~

8 ~~(+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.~~

9 ~~(+) Use permutations and combinations to compute probabilities of compound events and solve problems.~~

~~Using Probability to Make Decisions S-MD~~

~~Calculate expected values and use them to solve problems~~

1 ~~(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.~~

2 ~~(+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.~~

3 ~~(+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.~~

~~4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?~~

~~Use probability to evaluate outcomes of decisions~~

~~5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.~~

- ~~a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.~~
- ~~b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.~~

~~7 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).~~

~~8 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).~~

~~Note on Courses and Transitions~~

~~The high school portion of the Standards for Mathematical Content specifies the mathematics all students should study for college and career readiness. These standards do not mandate the sequence of high school courses. However, the organization of high school courses is a critical component to implementation of the standards. To that end, sample high school pathways for mathematics – in both a traditional course sequence (Algebra I, Geometry, and Algebra II) as well as an integrated course sequence (Mathematics 1, Mathematics 2, Mathematics 3) – will be made available shortly after the release of the~~ **~~final State Standards. It is expected that additional model pathways based on these standards will become available as well.~~**

~~The standards themselves do not dictate curriculum, pedagogy, or delivery of content. In particular, states may handle the transition to high school in different ways. For example, many students in the U.S. today take Algebra I in the 8th grade, and in some states this is a requirement. The K-7 standards contain the prerequisites to prepare students for Algebra I by 8th grade, and the standards are designed to permit states to continue existing policies concerning Algebra I in 8th grade.~~

~~A second major transition is the transition from high school to post-secondary education for college and careers. The evidence concerning college and career readiness shows clearly that the knowledge, skills, and practices important for readiness include a great deal of mathematics prior to the boundary defined by (+) symbols in these standards. Indeed, some of the highest priority content for college and career readiness comes from Grades 6-8. This body of material includes powerfully useful proficiencies such as applying ratio reasoning in real-world and mathematical problems, computing fluently with positive and negative fractions and decimals, and solving real-world and mathematical problems involving angle measure, area, surface area, and volume. Because important standards for college and career readiness are distributed across grades and courses, systems for evaluating college and career readiness should reach as far back in the standards as Grades 6-8. It is important to note as well that cut scores or other information generated by assessment systems for college and career readiness should be developed in collaboration with representatives from higher education and workforce development programs, and should be validated by subsequent performance of students in college and the workforce.~~

~~Glossary~~

~~**Addition and subtraction within 5, 10, 20, 100, or 1000**. Addition or subtraction of two whole numbers with whole number answers, and with sum or minuend in the range 0-5, 0-10, 0-20, or 0-100, respectively. Example: 8 + 2 = 10 is an addition within 10, 14 – 5 = 9 is a subtraction within 20, and 55 – 18 = 37 is a subtraction within 100.~~

~~**Additive inverses**. Two numbers whose sum is 0 are additive inverses of one another. Example: 3/4 and – 3/4 are additive inverses of one another because 3/4 + (– 3/4) = (– 3/4) + 3/4 = 0.~~

~~**Associative property of addition**. See Table 3 in this Glossary.~~

~~**Associative property of multiplication.** See Table 3 in this Glossary.~~

~~**Bivariate data**. Pairs of linked numerical observations. Example: a list of heights and weights for each player on a football team.~~

~~**Box plot**. A method of visually displaying a distribution of data values by using the median, quartiles, and extremes of the data set. A box shows the middle 50% of the data.[29]~~

~~**Commutative property**. See Table 3 in this Glossary.~~

~~**Complex fraction.** A fraction *A*/*B* where *A* and/or *B* are fractions (*B* nonzero).~~

~~**Computation algorithm**. A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly. *See also:* computation strategy.~~

~~**Computation strategy**. Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another. *See also:* computation algorithm.~~

~~**Congruen**t. Two plane or solid figures are congruent if one can be obtained from the other by rigid motion (a sequence of rotations, reflections, and translations).~~

~~**Counting on.** A strategy for finding the number of objects in a group without having to count every member of the group. For example, if a stack of books is known to have 8 books and 3 more books are added to the top, it is not necessary to count the stack all over again. One can find the total by *counting on*—pointing to the top book and saying "eight," following this with "nine, ten, eleven. There are eleven books now."~~

~~**Dot plot**. *See:* line plot.~~

~~**Dilation**. A transformation that moves each point along the ray through the point emanating from a fixed center, and multiplies distances from the center by a common scale factor.~~

~~**Expanded form**. A multi-digit number is expressed in expanded form when it is written as a sum of single digit multiples of powers of ten. For example, 643 = 600 + 40 + 3.~~

~~**Expected value.** For a random variable, the weighted average of its possible values, with weights given by their respective probabilities.~~

~~**First quartile.** For a data set with median *M*, the first quartile is the median of the data values less than *M*. Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the first quartile is 6.[30] *See also:* median, third quartile, interquartile range.~~

~~**Fraction.** A number expressible in the form *a*/*b* where *a* is a whole number and *b* is a positive whole number. (The word *fraction* in these standards always refers to a non-negative number.) *See also:* rational number.~~

~~29 Adapted from Wisconsin Department of Public Instruction, http://dpi.wi.gov/standards/mathglos.html, accessed March 2, 2010.~~
~~30 [2] Many different methods for computing quartiles are in use. The method defined here is sometimes called the Moore and McCabe method. See Langford, E., "Quartiles in Elementary Statistics," *Journal of Statistics Education* Volume 14, Number 3 (2006).~~

~~**Identity property of 0**. See Table 3 in this Glossary.~~

~~**Independently combined probability models**. Two probability models are said to be combined independently if the probability of each ordered pair in the combined model equals the product of the original probabilities of the two individual outcomes in the ordered pair.~~

~~**Integer.** A number expressible in the form *a* or –*a* for some whole number *a*.~~

~~**Interquartile Range**. A measure of variation in a set of numerical data, the interquartile range is the distance between the first and third quartiles of the data set. Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the interquartile range is 15 – 6 = 9. *See also:* first quartile, third quartile.~~

~~**Line plot**. A method of visually displaying a distribution of data values where each data value is shown as a dot or mark above a number line. Also known as a dot plot.[31]~~

~~**Mean**. A measure of center in a set of numerical data, computed by adding the values in a list and then dividing by the number of values in the list.[32] Example: For the data set {1, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean is 21.~~

~~**Mean absolute deviation**. A measure of variation in a set of numerical data, computed by adding the distances between each data value and the mean, then dividing by the number of data values. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the mean absolute deviation is 20.~~

~~**Median**. A measure of center in a set of numerical data. The median of a list of values is the value appearing at the center of a sorted version of the list—or the mean of the two central values, if the list contains an even number of values. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 90}, the median is 11.~~

~~**Midline**. In the graph of a trigonometric function, the horizontal line halfway between its maximum and minimum values.~~

~~**Multiplication and division within 100.** Multiplication or division of two whole numbers with whole number answers, and with product or dividend in the range 0-100. Example: 72 ÷ 8 = 9.~~

~~**Multiplicative inverses**. Two numbers whose product is 1 are multiplicative inverses of one another. Example: 3/4 and 4/3 are multiplicative inverses of one another because 3/4 × 4/3 = 4/3 × 3/4 = 1.~~

~~**Number line diagram**. A diagram of the number line used to represent numbers and support reasoning about them. In a number line diagram for measurement quantities, the interval from 0 to 1 on the diagram represents the unit of measure for the quantity.~~

~~**Percent rate of change**. A rate of change expressed as a percent. Example: if a population grows from 50 to 55 in a year, it grows by 5/50 = 10% per year.~~

~~**Probability distribution**. The set of possible values of a random variable with a probability assigned to each. Properties of operations. See Table 3 in this Glossary.~~

~~**Properties of equality**. See Table 4 in this Glossary.~~

~~**Properties of inequality**. See Table 5 in this Glossary.~~

~~**Properties of operations**. See Table 3 in this Glossary.~~

~~**Probability**. A number between 0 and 1 used to quantify likelihood for processes that have uncertain outcomes (such as tossing a coin, selecting a person at random from a group of people, tossing a ball at a target, or testing for a medical condition).~~

~~**Probability model.** A probability model is used to assign probabilities to outcomes of a chance process by examining the nature of the process. The set of all outcomes is called the sample space, and their probabilities sum to 1. *See also:* uniform probability model.~~

~~**Random variable**. An assignment of a numerical value to each outcome in a sample space.~~

~~31 Adapted from Wisconsin Department of Public Instruction, *op. cit*.~~
~~32 [4] To be more precise, this defines the *arithmetic mean*.~~

~~**Rational expression**. A quotient of two polynomials with a non-zero denominator.~~

~~**Rational number**. A number expressible in the form *a*/*b* or –*a*/*b* for some fraction *a*/*b*. The rational numbers include the integers.~~

~~**Rectilinear figure**. A polygon all angles of which are right angles.~~

~~**Rigid motion**. A transformation of points in space consisting of a sequence of one or more translations, reflections, and/or rotations. Rigid motions are here assumed to preserve distances and angle measures.~~

~~**Repeating decimal**. The decimal form of a rational number. *See also:* terminating decimal.~~

~~**Sample space**. In a probability model for a random process, a list of the individual outcomes that are to be considered.~~

~~**Scatter plot**. A graph in the coordinate plane representing a set of bivariate data. For example, the heights and weights of a group of people could be displayed on a scatter plot.[33]~~

~~**Similarity transformation**. A rigid motion followed by a dilation.~~

~~**Tape diagram.** A drawing that looks like a segment of tape, used to illustrate number relationships. Also known as a strip diagram, bar model, fraction strip, or length model.~~

~~**Terminating decimal**. A decimal is called terminating if its repeating digit is 0.~~

~~**Third quartile.** For a data set with median *M*, the third quartile is the median of the data values greater than *M*. Example: For the data set {2, 3, 6, 7, 10, 12, 14, 15, 22, 120}, the third quartile is 15. *See also:* median, first quartile, interquartile range.~~

~~**Transitivity principle for indirect measurement**. If the length of object A is greater than the length of object B, and the length of object B is greater than the length of object C, then the length of object A is greater than the length of object C. This principle applies to measurement of other quantities as well.~~

~~**Uniform probability model**. A probability model which assigns equal probability to all outcomes. *See also:* probability model.~~

~~**Vector**. A quantity with magnitude and direction in the plane or in space, defined by an ordered pair or triple of real numbers.~~

~~**Visual fraction model.** A tape diagram, number line diagram, or area model.~~

~~**Whole numbers**. The numbers 0, 1, 2, 3, ….~~

~~33 Adapted from Wisconsin Department of Public Instruction, *op. cit*.~~

~~TABLE 1. Common addition and subtraction situations.~~[34]

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 - 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 - ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? - 2 = 3
	Total Unknown	Addend Unknown	Both Addends Unknown[1]
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 - 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	Bigger Unknown	Smaller Unknown
Compare[3]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 - 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 - 3 = ?, ? + 3 = 5

~~[1]These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.~~ ~~[2]Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.~~ ~~[3]For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.~~

~~[34]Adapted from Box 2-4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).~~

~~**Table 2. Common multiplication and division situations.**~~[35]

	~~Unknown Product~~	~~Group Size Unknown ("How many in each group?" Division)~~	~~number of Groups Unknown ("How many groups?" Division)~~
	~~3 × 6 ?~~	~~3 × ? = 18, and 18 ÷ 3 = ?~~	~~? × 6 = 18, and 18 ÷ 6 ?~~
~~equal Groups~~	~~There are 3 bags with 6 plums in each bag. How many plums are there in all? *Measurement example*. You need 3 lengths of string, each 6 inches long. How much string will you need altogether?~~	~~If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? *Measurement example*. You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?~~	~~If 18 plums are to be packed 6 to a bag, then how many bags are needed? *Measurement example*. You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?~~
~~arrays,[4] area[5]~~	~~There are 3 rows of apples with 6 apples in each row. How many apples are there? *Area example*. What is the area of a 3 cm by 6 cm rectangle?~~	~~If 18 apples are arranged into 3 equal rows, how many apples will be in each row? *Area example*. A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?~~	~~If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? *Area example*. A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?~~
~~Compare~~	~~A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? *Measurement example*. A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?~~	~~A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? *Measurement example*. A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?~~	~~A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? *Measurement example*. A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?~~
~~General~~	~~$a \times b = ?$~~	~~$a \times ? = p$, and $p \div a = ?$~~	~~$? \times b = p$, and $p \div b = ?$~~

~~[4]The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.[5]Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.~~

~~[35] The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.~~

~~**Table 3**. The properties of operations. Here a, b and c stand for arbitrary numbers in a given number system. The properties of operations apply to the rational number system, the real number system, and the complex number system.~~

~~*Associative property of addition*~~	~~(a + b) + c = a + (b + c)~~
~~*Commutative property of addition*~~	~~a + b = b + a~~
~~*Additive identity property of 0*~~	~~a + 0= 0 +a = a~~
~~*Existence of additive inverses*~~	~~For every a there exists –a so that a + (–a) =(–a) + a = 0.~~
~~*Associative property of multiplication*~~	~~(a × b) × c = a × (b × c)~~
~~*Commutative property of multiplication*~~	~~a × b = b × a~~
~~*Multiplicative identity property of 1*~~	~~a × 1 = 1 × a = a~~
~~*Existence of multiplicative inverses*~~	~~For every a ≠ 0 there exists 1/a so that a × 1/a = 1/a × a = 1.~~
~~*Distributive property of multiplication over addition*~~	~~a × (b + c)= a × b + a × c~~

~~**Table 4**. The properties of equality. Here a, b and c stand for arbitrary numbers in the rational, real, or complex number systems.~~

~~*Reflexive property of equality*~~	~~a = a~~
~~*Symmetric property of equality*~~	~~If a = b, then b = a.~~
~~*Transitive property of equality*~~	~~If a = b and b = c, then a = c.~~
~~*Addition property of equality*~~	~~If a = b, then a + c = b + c.~~
~~*Subtraction property of equality*~~	~~If a = b, then a – c = b – c.~~
~~*Multiplication property of equality*~~	~~If a = b, then a × c = b × c.~~
~~*Division property of equality*~~	~~If a = b and c ≠ 0, then a ÷ c = b ÷ c.~~
~~*Substitution property of equality*~~	~~If a = b, then b may be substituted for a in any expression containing a.~~

~~**Table 5**. The properties of inequality. Here a, b and c stand for arbitrary numbers in the rational or real number systems.~~

~~Exactly one of the following is true: a < b, a = b, a > b.~~
~~If a > b and b > c then a > c.~~
~~If a > b, then b < a.~~
~~If a > b, then –a < –b.~~
~~If a > b, then a ± c > b ± c.~~
~~If a > b and c > 0, then a × c > b × c.~~
~~If a > b and c < 0, then a × c < b × c.~~
~~If a > b and c > 0, then a ÷ c > b ÷ c.~~
~~If a > b and c < 0, then a ÷ c < b ÷ c.~~

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~~HIGH SCHOOL~~
~~PRACTICAL LIVING~~
~~(HEALTH AND PHYSICAL EDUCATION)~~

~~Kentucky Academic Standards – Practical Living – High School~~

~~The purpose of health education is to help students acquire an understanding of health concepts and skills and to apply them in making healthy decisions to improve, sustain and promote personal, family and community health.~~

~~The high school health education course provides students with an opportunity to integrate a variety of health concepts, skills and behaviors to plan for their personal health goals. These include prevention of disease and chemical addiction for the promotion of a healthy lifestyle. Students demonstrate comprehensive health knowledge and skills. Their behaviors reflect a conceptual understanding of the issues associated with maintaining good personal health. Students see themselves as having a role in creating a healthy lifestyle for themselves as individuals, for their families and for the larger community. They serve the community through the practice of health-enhancing behaviors that promote wellness throughout life.~~

~~Physical Education plays an important role in every student's physical, mental and social wellbeing. The physically educated student understands and seeks the benefits of a healthy and physically active life. Every student, regardless of physical ability or background, should have the opportunity to pursue and enjoy these benefits, which help to motivate a commitment to fitness throughout life. Physical Education also provides significant opportunities for learning those social skills that are important for cooperation and individual success. Students in high school are proficient in all fundamental movement skills and skill combinations and are competent in self-selected physical activities that they are likely to participate in throughout life. They understand and apply key movement and fitness principles and concepts for all activities in which they demonstrate competence. They develop the ability to understand and anticipate how physical activity interests and abilities change across a lifetime. Students demonstrate competency in a variety lifetime physical activities and plan, implement, self-assess and modify a personal fitness plan.~~

~~The Health and Physical Education content standards at the high school level are directly aligned with Kentucky's **Academic Expectations.** The Health and Physical Education standards are organized around five "Big Ideas" that are important to the discipline of health and physical education. These big ideas are: Personal Wellness, Nutrition, Safety, Psychomotor Skills and Lifetime Physical Wellness. The Big Ideas are conceptual organizers for health and physical education and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.~~

~~Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to health and physical education. The understandings represent the desired results- what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lessons plans.~~

~~Skills and concepts describe the ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for health and physical education are fundamental to health literacy and build on prior learning.~~

~~The health and physical education program provides a connection to Kentucky's Learning Goals 3 (self-sufficient individuals) and Learning Goal 4 (responsible group member), which are included in Kentucky statue, but they are not included in the state's academic assessment program. These connections provide a comprehensive link between essential content, skills and abilities important to learning. In addition Learning Goal 5 (think and solve problems) and Learning Goal 6 (connect and integrate knowledge) are addressed in health and physical education.~~

~~All physical education courses taught in the state of Kentucky must be in compliance with the Federal Special Education Law and Title IX and shall not include practice for or participation in interscholastic athletics.~~

~~Big Idea: Personal Wellness (Health Education)~~

~~Wellness is maximum well-being or total health. Personal wellness is a combination of physical, mental, emotional, spiritual and social well-being. It involves making behavioral choices and decisions each day that promote an individual's physical well-being, the prevention of illnesses and diseases and the ability to remain, physically, mentally, spiritually, socially and emotionally healthy.~~

~~Academic Expectations~~

~~2.29~~ ~~Students demonstrate skills that promote individual well-being and healthy family relationships.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.32~~ ~~Students demonstrate strategies for becoming and remaining mentally and emotionally healthy.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~4.1~~ ~~Students effectively use interpersonal skills.~~
~~4.4~~ ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use a decision-making process to make informed decisions among options.~~

~~High School Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~individuals have a responsibility to advocate for personal, family and community health.~~
- ~~inter and intrapersonal communication skills are needed to enhance individual well-being and healthy relationships.~~
- ~~physical, social, emotional and mental changes occur during adolescence and throughout life.~~
- ~~decisions regarding sexuality have short and long term consequences and responsibilities.~~
- ~~the environment, lifestyle, family history, peers and other factors impact physical, social, mental and emotional health.~~
- ~~culture, values (e.g., individual, family and community) media and use of technology (e.g., television, computers, MP3 Players, electronic/arcade games) can influence personal behavioral choices.~~
- ~~behavioral choices affect physical, mental, emotional and social well-being and can have positive or negative consequences on one's health.~~
- ~~positive health habits can help prevent injuries and spreading of diseases to self and others.~~
- ~~self-management and coping strategies can enhance mental and emotional health.~~
- ~~a variety of resources are available to inform, treat and counsel individuals with physical, mental, social and emotional health needs.~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~High School Skills and Concepts – Personal and Physical Health~~

~~Students will~~

- ~~understand the importance of assuming responsibility for personal health behaviors by:~~
  - ~~predicting how decisions regarding health behaviors have consequences for self and others~~
  - ~~explaining how body system functions can be maintained and improved (e.g., exercise, nutrition, safety)~~
  - ~~explaining how decision-making relates to responsible sexual behavior (e.g., abstinence, preventing pregnancy, preventing HIV/STDs), impacts physical, mental and social well-being of an individual~~
- ~~apply goal-setting and decision-making skills in developing, implementing and evaluating a personal wellness plan~~
- ~~evaluate the effectiveness of communication methods for expressing accurate health information and ideas~~
- ~~evaluate how an individual's behaviors and choices of diet, exercise and rest affect the body~~

~~High School Skills and Concepts – Growth and Development~~

~~Students will~~

- ~~explain basic structures and functions of the reproductive system as it relates to the human life cycle (e.g., conception, birth, childhood, adolescence, adulthood)~~

~~High School Skills and Concepts – Social, Mental and Emotional Health~~

~~Students will~~

- ~~demonstrate social interaction skills by:~~
  - ~~identifying and utilizing management techniques needed for dealing with intrapersonal and interpersonal relationships throughout life~~
  - ~~using and explaining the importance of effective social interaction skills (e.g., respect, self-advocacy, cooperation, communication, identifying different perspectives and points of view, empathy, friendship)~~
  - ~~recommending and justifying effective strategies (e.g., problem solving, decision making, refusal skills, anger management, conflict resolution) for responding to stress, conflict, peer pressure and bullying~~
  - ~~identifying and explaining changes in roles, responsibilities and skills needed to effectively work in groups throughout life (e.g., setting realistic goals, time and task management, planning, decision- making process, perseverance)~~
- ~~recommend and justify effective self-management and coping strategies (e.g., setting realistic goals, time, task and stress management, decision making, learning style preference, perseverance) for maintaining mental and emotional health~~
- ~~demonstrate the ability to use various strategies when making decisions related to health needs and risks of young adults~~
- ~~demonstrate refusal, negotiation and collaboration skills to use in avoiding potential harmful situations~~

~~Big Idea: Personal Wellness (Health Education) – Continued~~

~~High School Skills and Concepts – Family and Community Health~~

~~Students will~~

- ~~access and use a variety of resources from home, school and community that provide valid health information~~
- ~~understand and analyze how personal, family and community health can be influenced and challenged by:~~
    - ~~family traditions/values~~
    - ~~peer pressure~~
    - ~~technology and media messages~~
    - ~~cultural beliefs and diversity~~
    - ~~interrelationships between environmental factors and community health~~
- ~~use print and non-print sources to:~~
    - ~~analyze how the prevention and the control of health problems are influenced by research and medical advances~~
    - ~~investigate the role of health care providers in disease prevention~~
    - ~~analyze how public health policies and government regulations influence health promotion and disease prevention~~

~~High School Skills and Concepts – Communicable, Non-Communicable and Chronic Diseases Prevention~~

~~Students will~~

- ~~demonstrate an understanding of diseases by:~~
    - ~~describing symptoms, causes, patterns of transmission, prevention and treatments of communicable diseases (colds, flu, mononucleosis, hepatitis, HIV/STD, tuberculosis)~~
    - ~~describing symptoms, causes, patterns of transmission, prevention and treatments of non-communicable diseases (cancer, cardiovascular disease, diabetes, obesity, asthma, emphysema)~~
- ~~explore family history, environment, lifestyle and other risk factors related to the cause or prevention of disease and other health problems~~
- ~~demonstrate an understanding of how to maintain a healthy body by:~~
    - ~~analyzing the impact of personal health behaviors on the functioning of body systems~~
    - ~~analyzing how behavior can impact health maintenance and disease prevention during adolescence and adulthood~~

~~High School Skills and Concepts – Alcohol, Tobacco and Other Drugs~~

~~Students will~~

- ~~demonstrate an understanding of the use and misuse of alcohol, tobacco and other drugs by:~~
    - ~~distinguishing between legal (e.g., over the counter, prescription drugs) and illegal drugs (e.g., inhalants, marijuana, stimulants, depressants) and describing how their usage affects the body systems~~
    - ~~predicting the immediate/long-term effects of alcohol, tobacco and illegal drug usage and analyzing the impact on an individual's health~~
    - ~~recommending interventions (e.g., cease enabling activities), treatments (e.g., AA, outpatient therapy, group therapy) and other strategies (e.g., enhancing self-esteem, building skills for success) as forms of help for negative behaviors or addictions (e.g., drug addictions, eating disorders)~~

~~Big Idea: Nutrition (Health Education)~~

~~Proper nutrition is critical to good health. To maintain a healthy weight, good dietary habits and physical activity are essential. Nutritious foods are necessary for growth, development and maintenance of healthy bodies.~~

~~Academic Expectations~~

~~2.30~~ ~~Students evaluate consumer products and services and make effective consumer decisions.~~
~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~3.2~~ ~~Students will demonstrate the ability to maintain a healthy lifestyle.~~
~~3.5~~ ~~Students will demonstrate self-control and self-discipline.~~
~~5.1~~ ~~Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
~~5.4~~ ~~Students use decision-making process to make informed decisions among options.~~

~~High School Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~nutritional choices affect an individual's physical, mental, emotional and social well-being.~~
- ~~nutrients have a role in the development of an individual's health.~~
- ~~resources (e.g., Food Guide Pyramid, Dietary Guidelines for Americans, United States Department of Agriculture (USDA), National Dairy Council) are available to assist in making nutritional choices.~~
- ~~individuals, families and community values influence nutritional choices.~~

~~High School Skills and Concepts~~

~~Students will~~

- ~~create meal plans utilizing print and non-print resources (e.g., Food Guide Pyramid (FGP), Dietary Guidelines for Americans, United States Department of Agriculture (USDA), National Dairy council)~~
- ~~evaluate healthy nutritional practices (e.g., meal planning, food selection, reading labels, weight control, special nutritional needs) for a variety of dietary needs~~
- ~~analyze and evaluate the positive and negative impact of food selections on maintaining and promoting health~~
- ~~identify issues, problems and solutions related to extreme eating behaviors (overeating, obesity, anorexia, bulimia)~~
- ~~analyze factors (e.g., geography, family, cultural background, convenience, cost, advertising, friends, personal taste) that influence healthy food choices~~
- ~~evaluate the role of nutrients and food sources in the growth and development of healthy bodies~~
- ~~evaluate nutritional resources from home, school and community that provide valid health information~~

~~Big Idea: Safety (Health Education)~~

~~Accidents are a major cause of injury and death to children and adolescents. Unintentional injuries involving a motor vehicle, falls, drowning, fires, firearms and poisons can occur at home, school and work. Safe behavior protects a person from danger and lessens the effects of harmful situations.~~

~~Academic Expectations~~

- **~~2.31~~** ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
- **~~2.33~~** ~~Students demonstrate the skills to evaluate and use services and resources available in their community.~~
- **~~3.2~~** ~~Students will demonstrate the ability to maintain a healthy lifestyle.~~
- **~~4.3~~** ~~Students individually demonstrate consistent, responsive and caring behavior.~~
- **~~4.4~~** ~~Students demonstrate the ability to accept the rights and responsibilities for self and others.~~
- **~~5.1~~** ~~Students use skills such as analyzing, prioritizing, categorizing, evaluating and comparing to solve a variety of problems in real-life situations.~~
- **~~5.4~~** ~~Students use a decision-making process to make informed decisions among options.~~

~~High School Enduring Knowledge – Understandings~~

~~Students will understand that~~

- ~~safety practices and procedures help to prevent injuries and provide a safe environment.~~
- ~~community, state, federal and international resources are available to assist in hazardous situations.~~
- ~~proper procedures must be used in emergency situations.~~

~~High School Skills and Concepts~~

~~Students will~~

- ~~analyze how responsible use of machinery and motorized vehicles (e.g., all-terrain vehicle, motorcycle, automobile, personal watercraft) and firearms reduce the risk of accidents and save lives~~
- ~~identify and describe potential hazards in home and schools and explain how to prevent injuries~~
- ~~identify components of safety needed in developing a personal plan for emergency situations (e.g., weather, fire, tornado, lock down) at home or school~~
- ~~demonstrate proper first-aid procedures (e.g., CPR/rescue breathing) for responding to emergency situations (e.g., falls, drowning, choking, bleeding, shock, poisons, burns, temperature-related emergencies, allergic reactions, broken bones, overdose, heart attacks, seizures) and explain how they help reduce the severity of injuries and save lives~~
- ~~demonstrate refusal, negotiation and collaboration skills needed to avoid potentially harmful situations~~
- ~~identify and access the available local, state, federal and international health and safety agencies (e.g., World Health Organization, Peace Corp, Center for Disease Control and Prevention (CDC), Armed Forces) and explain the services they provide~~
- ~~use reliable safety resources and guidelines to help in avoiding injuries and dangerous situations (e.g., internet use, vehicles, firearms, watercraft)~~
- ~~demonstrate communications skills needed in emergency situations~~
- ~~explain safety practices needed when assuming responsibilities (e.g., child care, house-sitting, elderly care, pet care) in caring for animals, property and other individuals~~

~~Big Idea: Psychomotor Skills (Physical Education)~~

~~Cognitive information can be used to understand and enhance the development of motor skills such as movement sequences and patterns. Individuals who understand their bodies and how to perform various movements will be safer and more productive in recreation and work activities. Development of psychomotor skills contributes to the development of social and cognitive skills.~~

~~**Academic Expectations**~~

~~**2.31** Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~

~~**2.34** Students perform physical movements skills effectively in a variety of settings.~~

~~**2.35** Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~

~~**4.1** Students effectively use interpersonal skills.~~

~~**High School Enduring Knowledge – Understandings**~~

~~*Students will understand that*~~

- ~~movement concepts, principles, strategies and tactics apply to the learning and performance of physical activities.~~
- ~~motor skills and movement patterns allow individuals to perform a variety of physical activities and to achieve a degree of success that make the activities enjoyable.~~
- ~~basic and advance skills and tactics need to be refined, combined and varied in the development of specialized skills.~~

~~**High School Skills and Concepts**~~

~~*Students will*~~

- ~~identify and describe the mechanical principles (e.g., force, rotation, extension, leverage) that apply to movement skills in physical activities~~
- ~~analyze the contribution mechanical principles have in improving movement performance~~
- ~~explain how successful performance is impacted by physical, intellectual and emotional behaviors~~
- ~~provide examples of how basic technical skills can help overcome certain physical limitations (e.g., height, muscle development)~~
- ~~explain the role the body (e.g., muscles, bones) has in the performance of skills and tactics used in sports and other physical activities~~
- ~~recognize physical activity as an opportunity for positive social and group interaction~~
- ~~evaluate how an analysis of specialized movement patterns (e.g., golf club swing, shooting a basketball) and sequence evaluation (e.g., positioning, performing, follow through) can be used to detect and correct errors in performances~~

~~Big Idea: Lifetime Physical Wellness (Physical Education)~~

~~Lifetime wellness is health-focused. The health-related activities and content utilized are presented to help students become more responsible for their overall health status and to prepare each student to demonstrate knowledge and skills that promote physical activity throughout their lives. Physical education uses physical activity as a means to help students acquire skills, fitness, knowledge and attitudes that contribute to their optimal development and well-being. Physical, mental, emotional and social health is strengthened by regular involvement in physical activities.~~

~~Academic Expectations~~

~~2.31~~ ~~Students demonstrate the knowledge and skills they need to remain physically healthy and to accept responsibility for their own physical well-being.~~
~~2.34~~ ~~Students perform physical movements skills effectively in a variety of settings.~~
~~2.35~~ ~~Students demonstrate knowledge and skills that promote physical activity and involvement in physical activity throughout lives.~~
~~3.1~~ ~~Students demonstrate positive growth in self-concept through appropriate tasks or projects.~~
~~3.2~~ ~~Students demonstrate the ability to maintain a healthy lifestyle.~~
~~3.7~~ ~~Students demonstrate the ability to learn on one's own.~~
~~4.2~~ ~~Students use productive team membership skills.~~

~~High School Enduring Knowledge – Understandings~~
~~Students will understand that~~

- ~~leisure/recreational or competitive physical activities provide opportunities for self-expression, social interactions and can be enjoyable and challenging.~~
- ~~regular participation in health-enhancing and personally rewarding physical activities has physical, emotional/mental and social benefits.~~
- ~~techniques, strategies and practice are important for improving performance of sport skills.~~
- ~~adhering to rules and procedures, etiquette, cooperation and team work, ethical behavior and positive social interaction impacts the effective participation in sports and physical activities.~~
- ~~basic components of fitness impacts lifetime physical wellness.~~
- ~~principles and techniques are used to improve/maintain physical fitness levels throughout life.~~
- ~~an individual needs a personal plan for achieving and maintaining fitness goals.~~

~~Big Idea: Lifetime Physical Wellness (Physical Education) – Continued~~

~~High School Skills and Concepts~~
~~Students will~~

- ~~design and implement a personal lifetime leisure/recreational plan that includes challenging and enjoyable physical activities~~
- ~~evaluate the personal benefits derived from regular participation in leisure/recreational or competitive physical activities as it relates to the quality and quantity of life~~
- ~~analyze (e.g., through self-assessment) the relationship between and among effort, persistence, practice and improvement as they relate to skill development~~
- ~~evaluate the impact of techniques used to improve motor skills (e.g., self-evaluation, individualized coaching, feedback)~~
- ~~participate regularly in physical activity~~
- ~~when participating in a variety of physical activities, sports and games:~~
  - ~~identify and apply rules of behavior and fair play (e.g., accepting authoritative decisions, assessing one's own performance level, accepting skills and abilities of others through verbal and nonverbal actions for spectators and/or participants)~~
  - ~~analyze the value of rules, fair play, cooperation, sportsmanship, teamwork and conflict resolution~~
  - ~~develop and compare effectiveness of game strategies for offensive and defensive play~~
- ~~design, implement, assess and refine a personal fitness plan based on the FITT Principle (Frequency, Intensity, Type, Time)~~
- ~~compare and contrast lifetime activities (e.g., golf, tennis, walking, dance, yoga, swimming) that improve or maintain the components of fitness (muscular strength, muscular endurance, flexibility, body composition, cardio-respiratory endurance)~~
- ~~explain how the systems of the body (e.g., muscular, skeletal, nervous, respiratory, circulatory) respond to exercise~~
- ~~analyze and explain the relationships between caloric intake and caloric expenditure in relation to body composition, nutrition and physical activity~~

HIGH SCHOOL SCIENCE

The Kentucky Academic Standards for Science are written as a set of performance expectations that are assessable statements of what students should know and be able to do. An underlying assumption of these standards is that all students should be held accountable for demonstrating their achievement of all performance expectations. A coherent and complete view of what students should be able to do comes when the performance expectations are viewed in tandem with the contents of the foundation boxes that lie just below the performance expectations. These three boxes include the practices, core disciplinary ideas, and crosscutting concepts, derived from the National Research Council's *Framework for K12 Science Education* that were used to construct this set of performance expectations.

Science and Engineering Practices. The blue box on the left includes just the science and engineering practices used to construct the performance expectations in the box above. These statements are derived from and grouped by the eight categories detailed in the *Framework* to further explain the science and engineering practices important to emphasize in each grade band. Most sets of performance expectations emphasize only a few of the practice categories; however, all practices are emphasized within a grade band.

Disciplinary Core Ideas (DCIs). The orange box in the middle includes statements that are taken from the *Framework* about the most essential ideas in the major science disciplines that all students should understand during 13 years of school. Including these detailed statements was very helpful to the writing team as they analyzed and "unpacked" the disciplinary core ideas and sub-ideas to reach a level that is helpful in describing what each student should understand about each sub-idea at the end of grades 2, 5, 8, and 12. Although they appear in paragraph form in the *Framework*, here they are bulleted to be certain that each statement is distinct.

Crosscutting Concepts. The green box on the right includes statements derived from the *Framework's* list of crosscutting concepts, which apply to one or more of the performance expectations in the box above. Most sets of performance expectations limit the number of crosscutting concepts so as focus on those that are readily apparent when considering the DCIs; however, all are emphasized within a grade band. Aspects of the Nature of Science relevant to the standard are also listed in this box, as are the interdependence of science and engineering, and the influence of engineering, technology, and science on society and the natural world.

Connection Boxes

Three Connection Boxes, below the Foundation Boxes, are designed to support a coherent vision of the standards by showing how the performance expectations in each standard connect to other performance expectations in science, [~~as well as to the KAS standards in Mathematics and English/Language Arts~~]. The ***two [***~~three~~] boxes include:

- Connections to other DCIs in this grade level or band. This box contains the names of science topics in other disciplines that have related disciplinary core ideas at the same grade level. For example, both Physical Science and Life Science performance expectations contain core ideas related to Photosynthesis, and could be taught in relation to one another.

- Articulation of DCIs across grade levels. This box contains the names of other science topics that either 1) provide a foundation for student understanding of the core ideas in this set of performance expectations (usually at prior grade levels) or 2) build on the foundation provided by the core ideas in this set of performance expectations (usually at subsequent grade levels).

- ~~[Connections to the Kentucky Academic Standards in mathematics and English/Language Arts. This box contains the coding and names of pre-requisite or co-requisite Kentucky Academic Standards in English Language Arts & and Literacy and Mathematics that align to the performance expectations. An effort has been made to ensure that the mathematical skills that students need for science were taught in a previous year where possible.~~

HS. Structure and Properties of Matter

HS. Structure and Properties of Matter

Students who demonstrate understanding can:

HS-PS1-1. **Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.** [Clarification Statement: Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.] [Assessment Boundary: Assessment is limited to main group elements. Assessment does not include quantitative understanding of ionization energy beyond relative trends.]

HS-PS1-3. **Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.** [Clarification Statement: Emphasis is on understanding the strengths of forces between particles, and not on naming specific intermolecular forces (such as dipole-dipole). Examples of particles could include ions, atoms, molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [Assessment Boundary: Assessment does not include Raoult's law calculations of vapor pressure.]

HS-PS1-8. the **Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.** [Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.] [Assessment Boundary: Assessment does not include quantitative calculation of energy released. Assessment is limited to alpha, beta, and gamma radioactive decays.]

HS-PS2-6. of **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*** [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS1-8)
- Use a model to predict the relationships between systems or between components of a system. (HS-PS1-1)

Planning and Carrying Out Investigations
Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS1-3)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.
- Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1)
- The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-1)
- The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3),*(secondary to HS-PS2-6)*

PS1.C: Nuclear Processes
- Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process. (HSPS1-8)

PS2.B: Types of Interactions
- Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (HS-PS1-1),(HS-PS1-3),(HSPS2-6)

Crosscutting Concepts

Patterns
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1),(HS-PS1-3)

Energy and Matter
- In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved. (HS-PS1-8)

Structure and Function
- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-PS2-6)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-PS1-8); **HS.PS3.B** (HS-PS1-8); **HS.PS3.C** (HS-PS1-8); **HS.PS3.D** (HS-PS1-8); **HS.LS1.C** (HS-PS1-1); **HS.ESS1.A** (HS-PS1-8); **HS.ESS1.C** (HS-PS1-8); **HS.ESS2.C** (HS-PS1-3)

Articulation to DCIs across grade-bands: **MS.PS1.A** (HS-PS1-1),(HS-PS1-3),(HS-PS1-8),(HS-PS2-6); **MS.PS1.B** (HS-PS1-1),(HS-PS1-8); **MS.PS1.C** (HS-PS1-8); **MS.PS2.B** (HSPS1-3),(HS-PS2-6); **MS.ESS2.A** (HS-PS1-8)

HS. Structure and Properties of Matter - Continued

~~*[Kentucky Academic Standards Connections:*~~	
~~**RST.9-10.7**~~	~~Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. *(HS-PS1-1)*~~
~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-PS1-3),*(HS-PS2-6)*~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *(HS-PS2-6)*~~
~~**WHST.9-12.7**~~	~~Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HSPS1-3)~~
~~**WHST.11-12.8**~~	~~Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-PS1-3)~~
~~**WHST.9-12.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. *(HS-PS1-3)*~~
~~Mathematics –~~	
~~**MP.4**~~	~~Model with mathematics. (HS-PS1-8)~~
~~**HSN-Q.A.1**~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(HS-PS1-3)*,(HS-PS1-8),*(HS-PS2-6)*~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. (HS-PS1-8),*(HS-PS2-6)*~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *(HS-PS1-3),(HS-PS1-8),(HS-PS2-6)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

HS. Chemical Reactions

HS. Chemical Reactions

Students who demonstrate understanding can:

HS-PS1-2. **Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen.] [Assessment Boundary: Assessment is limited to chemical reactions involving main group elements and combustion reactions.]

HS-PS1-4. **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** [Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.] [Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.]

HS-PS1-5. **Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.** [Clarification Statement: Emphasis is on student reasoning that focuses on the number and energy of collisions between molecules.] [Assessment Boundary: Assessment is limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature.]

HS-PS1-6. **Refine the design of a chemical system byspecifying a change in conditions that would produce increased amounts of products at equilibrium.*** [Clarification Statement: Emphasis is on the application of Le Chatlier's Principle and on refining designs of chemical reaction systems, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants or removing products.] [Assessment Boundary: Assessment is limited to specifying the change in only one variable at a time. Assessment does not include calculating equilibrium constants and concentrations.]

HS-PS1-7. **Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.** [Clarification Statement: Emphasis is on using mathematical ideas to communicate the proportional relationships between masses of atoms in the reactants and the products, and the translation of these relationships to the macroscopic scale using the mole as the conversion from the atomic to the macroscopic scale. Emphasis is on assessing students' use of mathematical thinking and not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include complex chemical reactions.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS1-4) **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. • Use mathematical representations of phenomena to support claims. (HS-PS1-7) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Apply scientific principles and evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. (HS-PS1-5) • Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-PS1-2) • Refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-PS1-6)	**PS1.A: Structure and Properties of Matter** • The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-2) *(Note: This Disciplinary Core Idea is also addressed by HS-PS1-1.)* • A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart. (HS-PS1-4) **PS1.B: Chemical Reactions** • Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. (HSPS1-4),(HS-PS1-5) • In many situations, a dynamic and condition-dependent balance between a reaction and the reverse reaction determines the numbers of all types of molecules present. (HS-PS1-6) • The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2),(HS-PS1-7) **ETS1.C: Optimizing the Design Solution** • Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. *(secondary to HS-PS1-6)*	**Patterns** • Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-2),(HS-PS1-5) **Energy and Matter** • The total amount of energy and matter in closed systems is conserved. (HS-PS1-7) • Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HS-PS1-4) **Stability and Change** • Much of science deals with constructing explanations of how things change and how they remain stable. (HS-PS1-6) --- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-PS1-4),(HS-PS1-5); **HS.PS3.B** (HS-PS1-4),(HS-PS1-6),(HS-PS1-7); **HS.PS3.D** (HS-PS1-4); **HS.LS1.C** (HS-PS1-2),(HS-PS1-4),(HS-PS1-7); **HS.LS2.B** (HS-PS1-7); **HS.ESS2.C** (HS-PS1-2)

Articulation to DCIs across grade-bands: **MS.PS1.A** (HS-PS1-2),(HS-PS1-4),(HS-PS1-5),(HS-PS1-7); **MS.PS1.B** (HS-PS1-2),(HS-PS1-4),(HS-PS1-5),(HS-PS1-6),(HS-PS1-7); **MS.PS2.B** (HS-PS1-3),(HS-PS1-4),(HS-PS1-5); **MS.PS3.A** (HS-PS1-5); **MS.PS3.B** (HS-PS1-5); **MS.PS3.D** (HS-PS1-4); **MS.LS1.C** (HS-PS1-4),(HS-PS1-7); **MS.LS2.B** (HS-PS1-7); **MS.ESS2.A** (HS-PS1-7)

HS. Chemical Reactions – Continued

~~*[Kentucky Academic Standards Connections:*~~	
~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-PS1-5)~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS1-2),*(HS-PS1-5)*~~
~~**WHST.9-12.5**~~	~~Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-PS1-2)~~
~~**WHST.9-12.7**~~	~~Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. *(HSPS1-6)*~~
~~**SL.11-12.5**~~	~~Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-PS1-4)*~~
~~*Mathematics –*~~	
~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-PS1-5),(HS-PS1-7)~~
~~**MP.4**~~	~~Model with mathematics. *(HS-PS1-4)*~~
~~**HSN-Q.A.1**~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS1-2),*(HS-PS1-4)*,*(HS-PS1-5)*,(HS-PS1-7)~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. (HS-PS1-4),*(HS-PS1-7)*~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *(HS-PS1-2),(HS-PS1-4),(HS-PS1-5),(HS-PS1-7)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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HS. Forces and Interactions

HS. Forces and Interactions

Students who demonstrate understanding can:

HS-PS2-1. **Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.** [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

HS-PS2-2. **Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.** [Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.] [Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.]

HS-PS2-3. **Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*** [Clarification Statement: Examples of evaluation and refinement could include determining the success of a device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]

HS-PS2-4. **Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.** [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.] [Assessment Boundary: Assessment is limited to systems with two objects.]

HS-PS2-5. **Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.** [Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5)

Analyzing and Interpreting Data
Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HSPS2-1)

Using Mathematics and Computational Thinking
Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Theories and laws provide explanations in science. (HS-PS2-1), (HS-PS2-4)
- Laws are statements or descriptions of the relationships among observable phenomena. (HS-PS2-1),(HS-PS2-4)

Disciplinary Core Ideas

PS2.A: Forces and Motion

- Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1)
- Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (HS-PS2-2)
- If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (HS-PS2-2),(HS-PS2-3)

PS2.B: Types of Interactions

- Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (HS-PS2-4)
- Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (HS-PS2-4),(HS-PS2-5)

PS3.A: Definitions of Energy

- …and "electrical energy" may mean energy stored in a battery or energy transmitted by electric currents. *(secondary to HS-PS2-5)*

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. *(secondary to HS-PS2-3)*

ETS1.C: Optimizing the Design Solution

- Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. *(secondary to HS-PS2-3)*

Crosscutting Concepts

Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS2-1),(HS-PS2-5)
- Systems can be designed to cause a desired effect. (HS-PS2-3)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-PS2-4),(HS-PS2-5); **HS.PS3.C** (HS-PS2-1); **HS.PS4.B** (HS-PS2-5); **HS.ESS1.A** (HS-PS2-1),(HS-PS2-2),(HS-PS2-4); **HS.ESS1.B** (HS-PS2-4); **HS.ESS2.A** (HS-PS2-5); **HS.ESS1.C** (HS-PS2-1),(HS-PS2-2),(HS-PS2-4); **HS.ESS2.C** (HS-PS2-1),(HS-PS2-4); **HS.ESS3.A** (HS-PS2-4),(HS-PS2-5)

Articulation to DCIs across grade-bands: **MS.PS2.A** (HS-PS2-1),(HS-PS2-2),(HS-PS2-3); **MS.PS2.B** (HS-PS2-4),(HS-PS2-5); **MS.PS3.C** (HS-PS2-1),(HS-PS2-2),(HS-PS2-3); **MS.ESS1.B** (HS-PS2-4),(HS-PS2-5)

HS. Forces and Interactions - Continued

~~*[Kentucky Academic Standards Connections:*~~	
~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-PS2-1)*~~
~~**RST.11-12.7**~~	~~Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)~~
~~**WHST.9-12.7**~~	~~Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-PS2-3),(HSPS2-5)~~
~~**WHST.11-12.8**~~	~~Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. *(HS-PS2-5)*~~
~~**WHST.9-12.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. *(HS-PS2-1),(HS-PS2-5)*~~
~~*Mathematics –*~~	
~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)~~
~~**MP.4**~~	~~Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)~~
~~**HSN-Q.A.1**~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),*(HS-PS2-5)*~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. *(HS-PS2-1),(HS-PS2-2),(HS-PS2-4),(HS-PS2-5)*~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),*(HS-PS2-5)*~~
~~**HSA-SSE.A.1**~~	~~Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)~~
~~**HSA-SSE.B.3**~~	~~Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2-4)~~
~~**HSA-CED.A.1**~~	~~Create equations and inequalities in one variable and use them to solve problems. (HS-PS2-1),(HS-PS2-2)~~
~~**HSA-CED.A.2**~~	~~Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. *(HS-PS2-1),(HS-PS2-2)*~~
~~**HSA-CED.A.4**~~	~~Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *(HS-PS2-1),(HS-PS2-2)*~~
~~**HSF-IF.C.7**~~	~~Graph functions expressed symbolically and show key features of the graph, by in hand in simple cases and using technology for more complicated cases. *(HS-PS2-1)*~~
~~**HSS-ID.A.1**~~	~~Represent data with plots on the real number line (dot plots, histograms, and box plots). *(HS-PS2-1)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled “Disciplinary Core Ideas” is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

HS. Energy

HS. Energy

Students who demonstrate understanding can:

HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. [Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.] [Assessment Boundary: Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.]

HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). [Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.]

HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.* [Clarification Statement: Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, and generators. Examples of constraints could include use of renewable energy forms and efficiency.] [Assessment Boundary: Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.]

HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). [Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.] [Assessment Boundary: Assessment is limited to investigations based on materials and tools provided to students.]

HS-PS3-5. Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. [Clarification Statement: Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other.] [Assessment Boundary: Assessment is limited to systems containing two objects.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS3-2),(HSPS3-5)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS3-4)

Using Mathematics and Computational Thinking
Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
- Create a computational model or simulation of a phenomenon, designed device, process, or system. (HS-PS3-1)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence,

Disciplinary Core Ideas

PS3.A: Definitions of Energy
- Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (HSPS3-1),(HS-PS3-2)
- At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (HSPS3-2) (HS-PS3-3)
- These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space. (HS-PS3-2)

PS3.B: Conservation of Energy and Energy Transfer
- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1)
- Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-1),(HS-PS3-4)
- Mathematical expressions, which quantify how the stored energy in a system depends on its configuration (e.g. relative positions of charged particles, compression of a spring) and how kinetic energy depends on mass and speed, allow the concept of conservation of energy to be used to predict and describe system behavior. (HS-PS3-1)
- The availability of energy limits what can occur in any system. (HS-PS3-1)
- Uncontrolled systems always evolve toward more stable states— that is, toward more uniform energy distribution (e.g., water flows downhill, objects hotter than their surrounding environment cool down). (HS-PS3-4)

PS3.C: Relationship Between Energy and Forces
- When two objects interacting through a field change relative position, the energy stored in the field is changed. (HS-PS3-5)

PS3.D: Energy in Chemical Processes
- Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. (HS-PS3-3),(HS-PS3-4)

ETS1.A: Defining and Delimiting Engineering Problems
- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. *(secondary to HS-PS3-3)*

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (HS-PS3-5)

Systems and System Models
- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-PS3-4)
- Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. (HSPS3-1)

Energy and Matter
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HSPS3-3)
- Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems. (HS-PS3-2)

Connections to Engineering, Technology, And Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World
- Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (HS-PS3-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

prioritized criteria, and tradeoff considerations. (HSPS3-3)		• Science assumes the universe is a vast single system in which basic laws are consistent. (HSPS3-1)

Connections to other DCIs in this grade-band: **HS.PS1.A** (HS-PS3-2); **HS.PS1.B** (HS-PS3-1),(HS-PS3-2); **HS.PS2.B** (HS-PS3-2),(HS-PS3-5); **HS.LS2.B** (HS-PS3-1); **HS.ESS1.A** (HSPS3-1),(HS-PS3-4); **HS.ESS2.A** (HS-PS3-1),(HS-PS3-2),(HS-PS3-4); **HS.ESS2.D** (HS-PS3-4); **HS.ESS3.A** (HS-PS3-3)

Articulation to DCIs across grade-bands: **MS.PS1.A** (HS-PS3-2); **MS.PS2.B** (HS-PS3-2),(HS-PS3-5); **MS.PS3.A** (HS-PS3-1),(HS-PS3-2),(HS-PS3-3); **MS.PS3.B** (HS-PS3-1),(HS-PS3-3),(HS-PS3-4); **MS.PS3.C** (HS-PS3-2),(HS-PS3-5); **MS.ESS2.A** (HS-PS3-1),(HS-PS3-3)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-PS3-4)*~~

~~**WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. *(HS-PS3-3)*,(HSPS3-4),*(HS-PS3-5)*~~

~~**WHST.11-12.8** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-PS3-4),*(HS-PS3-5)*~~

~~**WHST.9-12.9** Draw evidence from informational texts to support analysis, reflection, and research. *(HS-PS3-4),(HS-PS3-5)*~~

~~**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-PS3-1),(HS-PS3-2),(HS-PS3-5)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. (HS-PS3-1),(HS-PS3-2),(HS-PS3-3),(HS-PS3-4),(HS-PS3-5)~~

~~**MP.4** Model with mathematics. (HS-PS3-1),(HS-PS3-2),(HS-PS3-3),*(HS-PS3-4)*,(HS-PS3-5)~~

~~**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS3-1),(HS-PS3-3)~~

~~**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. (HS-PS3-1),(HS-PS3-3)~~

~~**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS3-1),(HS-PS3-3)]~~

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HS. Waves and Electromagnetic Radiation

HS. Waves and Electromagnetic Radiation

Students who demonstrate understanding can:

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. [Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.] [Assessment Boundary: Assessment is limited to algebraic relationships and describing those relationships qualitatively.]

HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information. [Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.]

HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. [Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.] [Assessment Boundary: Assessment does not include using quantum theory.]

HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. [Clarification Statement: Emphasis is on the idea that photons associated with different frequencies of light have different energies, and the damage to living tissue from electromagnetic radiation depends on the energy of the radiation. Examples of published materials could include trade books, magazines, web resources, videos, and other passages that may reflect bias.] [Assessment Boundary: Assessment is limited to qualitative descriptions.]

HS-PS4-5. Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design. (HSPS4-2)

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. (HS-PS4-1)

Engaging in Argument from Evidence

Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed worlds. Arguments may also come from current scientific or historical episodes in science.

- Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (HS-PS4-3)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs.

- Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. (HS-PS4-4)
- Communicate technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HSPS4-5)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HSPS4-3)

Disciplinary Core Ideas

PS3.D: Energy in Chemical Processes

- Solar cells are human-made devices that likewise capture the sun's energy and produce electrical energy. *(secondary to HS-PS4-5)*

PS4.A: Wave Properties

- The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (HS-PS4-1)
- Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses. (HS-PS4-2),(HSPS4-5)
- [From the 3–5 grade band endpoints] Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.) (HS-PS4-3)

PS4.B: Electromagnetic Radiation

- Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. (HS-PS4-3)
- When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. (HS-PS4-4)
- Photoelectric materials emit electrons when they absorb light of a high-enough frequency. (HS-PS4-5)

PS4.C: Information Technologies and Instrumentation

- Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. (HS-PS4-5)

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS4-1)
- Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. (HS-PS4-4)
- Systems can be designed to cause a desired effect. (HS-PS4-5)

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-PS4-3)

Stability and Change

- Systems can be designed for greater or lesser stability. (HS-PS4-2)

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Science and engineering complement each other in the cycle known as research and development (R&D). (HSPS4-5)

Influence of Engineering, Technology, and Science on Society and the Natural World

- Modern civilization depends on major technological systems. (HS-PS4-2),(HSPS4-5)
- Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (HSPS4-2)

HS. Waves and Electromagnetic Radiation – Continued

Connections to other DCIs in this grade-band: **HS.PS1.C** (HS-PS4-4); **HS.PS3.A** (HS-PS4-4),(HS-PS4-5); **HS.PS3.D** (HS-PS4-3),(HS-PS4-4); **HS.LS1.C** (HS-PS4-4); **HS.ESS1.A** (HSPS4-3); **HS.ESS2.A** (HS-PS4-1); **HS.ESS2.D** (HS-PS4-3)

Articulation to DCIs across grade-bands: **MS.PS3.D** (HS-PS4-4); **MS.PS4.A** (HS-PS4-1),(HS-PS4-2),(HS-PS4-5); **MS.PS4.B** (HS-PS4-1),(HS-PS4-2),(HS-PS4-3),(HS-PS4-4),(HS-PS4-5); **MS.PS4.C** (HS-PS4-2),(HS-PS4-5); **MS.LS1.C** (HS-PS4-4); **MS.ESS2.D** (HS-PS4-4)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.9-10.8**~~	~~Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (HS-PS4-2),(HS-PS4-3),(HS-PS4-4)~~
~~**RST.11-12.1** inconsistencies~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or in the account. *(HS-PS4-2),(HS-PS4-3),(HS-PS4-4)*~~
~~**RST.11-12.7** question~~	~~Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a or solve a problem. *(HS-PS4-1)*,(HS-PS4-4)~~
~~**RST.11-12.8**~~	~~Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.(HS-PS4-2),(HS-PS4-3),(HS-PS4-4)~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *(HS-PS4-5)*~~
~~**WHST.11-12.8**~~	~~Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-PS4-4)~~
~~*Mathematics –*~~	
~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-PS4-1),(HS-PS4-3)~~
~~**MP.4**~~	~~Model with mathematics. (HS-PS4-1)~~
~~**HSA-SSE.A.1**~~	~~Interpret expressions that represent a quantity in terms of its context. (HS-PS4-1),*(HS-PS4-3)*~~
~~**HSA-SSE.B.3**~~	~~Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. *(HS-PS4-1),(HS-PS4-3)*~~
~~**HSA.CED.A.4**~~	~~Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *(HS-PS4-1),(HS-PS4-3)]*~~

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HS. Structure and Function

HS. Structure and Function

Students who demonstrate understanding can:

HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.]

HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.] [Assessment Boundary: Assessment does not include the cellular processes involved in the feedback mechanism.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world.
- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)

Planning and Carrying Out Investigations
Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-1)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods
- Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3)

Disciplinary Core Ideas

LS1.A: Structure and Function
- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1)
- All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)*
- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2)
- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)

Crosscutting Concepts

Systems and System Models
- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-2)

Structure and Function
- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1)

Stability and Change
- Feedback (negative or positive) can stabilize or destabilize a system. (HSLS1-3)

Connections to other DCIs in this grade-band: **HS.LS3.A** (HS-LS1-1)

Articulation across grade-bands: **MS.LS1.A** (HS-LS1-1),(HS-LS1-2),(HS-LS1-3); **MS.LS3.A** (HS-LS1-1); **MS.LS3.B** (HS-LS1-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS1-1)~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1)~~
~~**WHST.9-12.7**~~	~~Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)~~
~~**WHST.11-12.8**~~	~~Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. *(HS-LS1-3)*~~
~~**WHST.9-12.9**~~	~~Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS1-1)~~
~~**SL.11-12.5**~~	~~Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-LS1-2])*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

HS. Matter and Energy in Organisms and Ecosystems

HS. Matter and Energy in Organisms and Ecosystems

Students who demonstrate understanding can:

HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. [Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.] [Assessment Boundary: Assessment does not include specific biochemical steps.]

HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.] [Assessment Boundary: Assessment does not include the details of the specific chemical reactions or identification of macromolecules.]

HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.] [Assessment Boundary: Assessment should not include identification of the steps or specific processes involved in cellular respiration.]

HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. [Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.] [Assessment Boundary: Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration.]

HS-LS2-4. Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. [Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.] [Assessment Boundary: Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.]

HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. [Clarification Statement: Examples of models could include simulations and mathematical models.] [Assessment Boundary: Assessment does not include the specific chemical steps of photosynthesis and respiration.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HSLS1-5),(HS-LS1-7)
- Develop a model based on evidence to illustrate the relationships between systems or components of a system. (HS-LS2-5)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to support claims. (HS-LS2-4)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student generated sources of evidence consistent with scientific ideas, principles, and theories.

- Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS1-6),(HSLS2-3)

Connections to Nature of Science

Scientific Knowledge is Open to Revision in Light of New Evidence

- Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-3)

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms

- The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. (HS-LS1-5)
- The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells. (HS-LS1-6)
- As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. (HS-LS1-6),(HS-LS1-7)
- As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another and release energy to the surrounding environment and to maintain body temperature. Cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. (HS-LS1-7)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. (HSLS2-3)
- Plants or algae form the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward, to produce growth and release energy in cellular respiration at the higher level. Given this inefficiency, there are generally fewer organisms at higher levels of a food web. Some matter reacts to release energy for life functions, some matter is stored in newly made structures, and much is discarded. The chemical elements that make up the molecules of organisms pass through food webs and into and out of the atmosphere and soil, and they are combined and recombined in different ways. At each link in an ecosystem, matter and energy are conserved. (HS-LS2-4)
- Photosynthesis and cellular respiration are important components of the carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. (HS-LS2-5)

PS3.D: Energy in Chemical Processes

- The main way that solar energy is captured and stored on Earth is through the complex chemical process known as photosynthesis. *(secondary to HS-LS2-5)*

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows—within and between systems at different scales. (HS-LS2-5)

Energy and Matter

- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. (HS-LS1-5), (HS-LS1-6)
- Energy cannot be created or destroyed—it only moves between one place and another place, between objects and/or fields, or between systems.(HS-LS1-7),(HS-LS2-4)
- Energy drives the cycling of matter within and between systems. (HS-LS2-3)

HS. Matter and Energy in Organisms and Ecosystems – Continued

Connections to other DCIs in this grade-band: **HS.PS1.B** (HS-LS1-5),(HS-LS1-6),(HS-LS1-7),(HS-LS2-3),(HS-LS2-5); **HS.PS2.B** (HS-LS1-7); **HS.PS3.B** (HS-LS1-5),(HS-LS1-7),(HS-LS2-3),(HS-LS2-4); **HS.PS3.D** (HS-LS2-3),(HS-LS2-4); **HS.ESS2.A** (HS-LS2-3); **HS.ESS2.D** (HS-LS2-5)
Articulation across grade-bands: **MS.PS1.A** (HS-LS1-6); **MS.PS1.B** (HS-LS1-5),(HS-LS1-6),(HS-LS1-7),(HS-LS2-3); **MS.PS3.D** (HS-LS1-5),(HS-LS1-6),(HS-LS1-7),(HS-LS2-3),(HS-LS2-4),(HS-LS2-5); **MS.LS1.C** (HS-LS1-5),(HS-LS1-6),(HS-LS1-7),(HS-LS2-3),(HS-LS2-4),(HS-LS2-5); **MS.LS2.B** (HS-LS1-5),(HS-LS1-7),(HS-LS2-3),(HS-LS2-4),(HS-LS2-5); **MS.ESS2.A** (HSLS2-5); **MS.ESS2.E** (HS-LS1-6)
~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~ ~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS1-6),(HS-LS2-3)~~ ~~**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-6),(HS-LS2-3)~~ ~~**WHST.9-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6),(HS-LS2-3)~~ ~~**WHST.9-12.9** Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS1-6)~~ ~~**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-LS1-5),(HS-LS1-7)*~~ ~~*Mathematics –*~~ ~~**MP.2** Reason abstractly and quantitatively. (HS-LS2-4)~~ ~~**MP.4** Model with mathematics. *(HS-LS2-4)*~~ ~~**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-4)~~ ~~**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. *(HS-LS2-4)*~~ ~~**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-LS2-4)~~]

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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HS. Interdependent Relationships in Ecosystems

HS. Interdependent Relationships in Ecosystems

Students who demonstrate understanding can:

HS-LS2-1. **Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.** [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate and competition. Examples of mathematical comparisons could include graphs, charts, histograms, or population changes gathered from simulations or historical data sets.] [Assessment Boundary: Assessment does not include deriving mathematical equations to make comparisons.]

HS-LS2-2. **Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.** [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.] [Assessment Boundary: Assessment is limited to provided data.]

HS-LS2-6. **Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.** [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]

HS-LS2-7. **Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*** [Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.]

HS-LS2-8. **Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.** [Clarification Statement: Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.]

HS-LS4-6. **Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.*** [Clarification Statement: Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
- Use mathematical and/or computational representations of phenomena or design solutions to support explanations. (HSLS2-1)
- Use mathematical representations of phenomena or design solutions to support and revise explanations. (HS-LS2-2)
- Create or revise a simulation of a phenomenon, designed device, process, or system. (HS-LS4-6)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-LS2-7)

Engaging in Argument from Evidence
Engaging in argument from evidence in 9–12 builds from K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.
- Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS2-6)
- Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS2-8)

Connections to Nature of Science

Scientific Knowledge is Open to Revision in Light of New Evidence
- Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence. (HS-LS2-2)

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems
- Ecosystems have carrying capacities, which are limits to the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. (HS-LS2-1),(HS-LS2-2)

LS2.C: Ecosystem Dynamics, Functioning, and Resilience
- A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. (HS-LS2-2),(HS-LS2-6)
- Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. (HS-LS2-7)

LS2.D: Social Interactions and Group Behavior
- Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. (HS-LS2-8)

LS4.C: Adaptation
- Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (HS-LS4-6)

LS4.D: Biodiversity and Humans
- Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). *(secondary to HS-LS2-7)*

Crosscutting Concepts

Cause and Effect
- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS2-8),(HS-LS4-6)

Scale, Proportion, and Quantity
- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-LS2-1)
- Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. (HS-LS2-2)

Stability and Change
- Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6), (HSLS2-7)

HS. Interdependent Relationships in Ecosystems - Continued

- Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation. (HSLS2-6),(HS-LS2-8)

- Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. *(secondary to HS-LS2-7), (HS-LS4-6)*

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. *(secondary to HSLS2-7),(secondary to HS-LS4-6)*
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. *(secondary to HS-LS4-6)*

Connections to other DCIs in this grade-band: **HS.ESS2.D** (HS-LS2-7),(HS-LS4-6); **HS.ESS2.E** (HS-LS2-2),(HS-LS2-6),(HS-LS2-7),(HS-LS4-6); **HS.ESS3.A** (HS-LS2-2),(HS-LS2-7),(HS-LS4-6); **HS.ESS3.C** (HS-LS2-2),(HS-LS2-7),(HS-LS4-6); **HS.ESS3.D** (HS-LS2-2),(HS-LS4-6)

Articulation across grade-bands: **MS.LS1.**B (HS-LS2-8); MS**.LS2.A** (HS-LS2-1),(HS-LS2-2),(HS-LS2-6); **MS.LS2.C** (HS-LS2-1),(HS-LS2-2),(HS-LS2-6),(HS-LS2-7),(HS-LS4-6); **MS.ESS2.E** (HS-LS2-6); **MS.ESS3.A** (HS-LS2-1); **MS.ESS3.C** (HS-LS2-1),(HS-LS2-2),(HS-LS2-6),(HS-LS2-7),(HS-LS4-6); **MS.ESS3.D** (HS-LS2-7)

~~*[Kentucky Academic Standards*~~
~~*Connections: ELA/Literacy –*~~
~~**RST.9-10.8** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (HS-LS2-6),*(HS-LS2-7),(HS-LS2-8)*~~
~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-LS2-1),(HS-LS2-2)*,(HS-LS2-6),(HS-LS2-8)~~
~~**RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. *(HS-LS2-6),(HS-LS2-7),(HS-LS2-8)*~~
~~**RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS2-6),(HS-LS2-7),(HS-LS2-8)~~
~~**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS2-1),(HSLS2-2)~~
~~**WHST.9-12.5** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. *(HS-LS4-6)*~~
~~**WHST.9-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HSLS2-7),(HS-LS4-6)~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (HS-LS2-1),(HS-LS2-2),(HS-LS2-6),*(HS-LS2-7)*~~
~~**MP.4** Model with mathematics. *(HS-LS2-1),(HS-LS2-2)*~~
~~**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-LS2-1),(HS-LS2-2),*(HS-LS2-7)*~~
~~**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. *(HS-LS2-1),(HS-LS2-2),(HS-LS2-7)*~~
~~**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-LS2-1),(HS-LS2-2),*(HS-LS2-7)*~~
~~**HSS-ID.A.1** Represent data with plots on the real number line. *(HS-LS2-6)*~~
~~**HSS-IC.A.1** Understand statistics as a process for making inferences~~ about population parameters based on a random sample from that population. *(HS-LS2-6)*
~~**HSS-IC.B.6** Evaluate reports based on data. *(HS-LS2-6)]*~~

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HS. Inheritance and Variation of Traits

HS. Inheritance and Variation of Traits

Students who demonstrate understanding can:

HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. [Assessment Boundary: Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.]

HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. [Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.] [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]

HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. [Clarification Statement: Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits.] [Assessment Boundary: Assessment does not include Hardy-Weinberg calculations.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in 9-12 builds on K-8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. • Ask questions that arise from examining models or a theory to clarify relationships. (HS-LS3-1) **Developing and Using Models** Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-4) **Analyzing and Interpreting Data** Analyzing data in 9-12 builds on K-8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. • Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HS-LS3-3) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Make and defend a claim based on evidence about the natural world that reflects scientific knowledge, and student-generated evidence. (HS-LS3-2)	**LS1.A: Structure and Function** • All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins. (secondary to HS-LS3-1) *(Note: This Disciplinary Core Idea is also addressed by HS-LS1-1.)* **LS1.B: Growth and Development of Organisms** • In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells, with each parent cell passing identical genetic material (two variants of each chromosome pair) to both daughter cells. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. (HS-LS1-4) **LS3.A: Inheritance of Traits** • Each chromosome consists of a single very long DNA molecule, and each gene on the chromosome is a particular segment of that DNA. The instructions for forming species' characteristics are carried in DNA. All cells in an organism have the same genetic content, but the genes used (expressed) by the cell may be regulated in different ways. Not all DNA codes for a protein; some segments of DNA are involved in regulatory or structural functions, and some have no as-yet known function. (HS-LS3-1) **LS3.B: Variation of Traits** • In sexual reproduction, chromosomes can sometimes swap sections during the process of meiosis (cell division), thereby creating new genetic combinations and thus more genetic variation. Although DNA replication is tightly regulated and remarkably accurate, errors do occur and result in mutations, which are also a source of genetic variation. Environmental factors can also cause mutations in genes, and viable mutations are inherited. (HS-LS3-2) • Environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. Thus the variation and distribution of traits observed depends on both genetic and environmental factors. (HS-LS3-2),(HS-LS3-3)	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-LS3-1),(HS-LS3-2) **Scale, Proportion, and Quantity** • Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (HSLS3-3) **Systems and System Models** • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. (HS-LS1-4) --- ***Connections to Nature of Science*** **Science is a Human Endeavor** • Technological advances have influenced the progress of science and science has influenced advances in technology. (HSLS3-3) • Science and engineering are influenced by society and society is influenced by science and engineering. (HS-LS3-3)

Connections to other DCIs in this grave-band: **HS.LS2.A** (HS-LS3-3); **HS.LS2.C** (HS-LS3-3); **HS.LS4.B** (HS-LS3-3); **HS.LS4.C** (HS-LS3-3)

Articulation across grade-bands: **MS.LS1.A** (HS-LS1-4); **MS.LS1.B** (HS-LS1-4); **MS.LS2.A** (HS-LS3-3); **MS.LS3.A** (HS-LS1-4),(HS-LS3-1),(HS-LS3-2); **MS.LS3.B** (HS-LS3-1),(HS-LS3-2),(HS-LS3-3); **MS.LS4.C** (HS-LS3-3)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-LS3-1),(HS-LS3-2)*~~

~~**RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. *(HS-LS3-1)*~~

~~**WHST.9-12.1** Write arguments focused on discipline-specific content. (HS-LS3-2)~~

~~**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-LS1-4)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. (HS-LS3-2),(HS-LS3-3)~~

HS. Inheritance and Variation of Traits – Continued

~~**MP.4**~~	~~Model with mathematics. *(HS-LS1-4)*~~
~~**HSF-IF.C.7**~~	~~Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. *(HSLS1-4)*~~
~~**HSF-BF.A.1**~~	~~Write a function that describes a relationship between two quantities. *(HS-LS1-4)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

HS. Natural Selection and Evolution

HS. Natural Selection and Evolution

Students who demonstrate understanding can:

HS-LS4-1. **Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.** [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]

HS-LS4-2. **Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.** [Clarification Statement: Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.] [Assessment Boundary: Assessment does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.]

HS-LS4-3. **Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.** [Clarification Statement: Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations.] [Assessment Boundary: Assessment is limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.]

HS-LS4-4. **Construct an explanation based on evidence for how natural selection leads to adaptation of populations.** [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]

HS-LS4-5. **Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.** [Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.
- Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. (HS-LS4-3)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-LS4-2),(HS-LS4-4)

Engaging in Argument from Evidence
Engaging in argument from evidence in 9-12 builds on K-8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current or historical episodes in science.
- Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS4-5)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.
- Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-LS4-1)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-LS4-1)

Disciplinary Core Ideas

LS4.A: Evidence of Common Ancestry and Diversity
- Genetic information provides evidence of evolution. DNA sequences vary among species, but there are many overlaps; in fact, the ongoing branching that produces multiple lines of descent can be inferred by comparing the DNA sequences of different organisms. Such information is also derivable from the similarities and differences in amino acid sequences and from anatomical and embryological evidence. (HS-LS4-1)

LS4.B: Natural Selection
- Natural selection occurs only if there is both (1) variation in the genetic information between organisms in a population and (2) variation in the expression of that genetic information—that is, trait variation—that leads to differences in performance among individuals. (HS-LS4-2),(HS-LS4-3)
- The traits that positively affect survival are more likely to be reproduced, and thus are more common in the population. (HS-LS4-3)

LS4.C: Adaptation
- Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. (HS-LS4-2)
- Natural selection leads to adaptation, that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. (HS-LS4-3),(HS-LS4-4)
- Adaptation also means that the distribution of traits in a population can change when conditions change. (HS-LS4-3)
- Changes in the physical environment, whether naturally occurring or human induced, have thus contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline–and sometimes the extinction–of some species. (HS-LS4-5)
- Species become extinct because they can no longer survive and reproduce in their altered environment. If members cannot adjust to change that is too fast or drastic, the opportunity for the species' evolution is lost. (HS-LS4-5)

Crosscutting Concepts

Patterns
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HSLS41),(HS-LS4-3)

Cause and Effect
- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HSLS4-2),(HS-LS4-4),(HS-LS4-5)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (HS-LS4-1),(HSLS4-4)

HS. Natural Selection and Evolution – Continued

Connections to other DCIs in this grade-band: **HS.LS2.A** (HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5); **HS.LS2.D** (HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5); **HS.LS3.A** (HS-LS4-1); **HS.LS3.B** (HS-LS4-1),(HS-LS4-2) (HS-LS4-3),(HS-LS4-5); **HS.ESS1.C** (HS-LS4-1); **HS.ESS2.E** (HS-LS4-2),(HS-LS4-5); **HS.ESS3.A** (HS-LS4-2),(HS-LS4-5)
Articulation across grade-bands: **MS.LS2.A** (HS-LS4-2),(HS-LS4-3),(HS-LS4-5); **MS.LS2.C** (HS-LS4-5); **MS.LS3.A** (HS-LS4-1); **MS.LS3.B** (HS-LS4-1),(HS-LS4-2),(HS-LS4-3); **MS.LS4.A** (HS-LS4-1); **MS.LS4.B** (HS-LS4-2),(HS-LS4-3),(HS-LS4-4); **MS.LS4.C** (HS-LS4-2),(HS-LS4-3),(HS-LS4-4),(HS-LS4-5); **MS.ESS1.C** (HS-LS4-1); **MS.ESS3.C** (HS-LS4-5)
~~*[Kentucky Academic Standards*~~ ~~*Connections: ELA/Literacy –*~~ ~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-LS4-1)*,(HS-LS4-2),*(HS-LS4-3)*,(HS-LS4-4)~~ ~~**RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-LS4-5)~~ ~~**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *(HS-LS4-1)*, (HS-LS4-2),*(HS-LS4-3)*,(HS-LS4-4)~~ ~~**WHST.9-12.9** Draw evidence from informational texts to support analysis, reflection, and research. *(HS-LS4-1)*,(HS-LS4-2),*(HS-LS4-3)*,(HS-LS4-4),(HS-LS4-5)~~ ~~**SL.11-12.4** Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. *(HS-LS4-1),(HS-LS4-2)*~~ ~~*Mathematics –*~~ ~~**MP.2** Reason abstractly and quantitatively. *(HS-LS4-1)*,(HS-LS4-2),(HS-LS4-3),*(HS-LS4-4),(HS-LS4-5)*~~ ~~**MP.4** Model with mathematics. *(HS-LS4-2)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

HS. Space Systems

HS. Space Systems

Students who demonstrate understanding can:

HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. [Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11- year sunspot cycle, and non-cyclic variations over centuries.] [Assessment Boundary: Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.]

HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]

HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements. [Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.]

HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s).
- Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HSESS1-1)

Using Mathematical and Computational Thinking
Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
- Use mathematical or computational representations of phenomena to describe explanations. (HS-ESS1-4)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-ESS1-2)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.
- Communicate scientific ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-ESS1-3)

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-ESS1-2)

Disciplinary Core Ideas

ESS1.A: The Universe and Its Stars
- The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. (HSESS1-1)
- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (HS-ESS1-2),(HS-ESS1-3)
- The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe. (HS-ESS1-2)
- Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (HS-ESS1-2),(HS-ESS1-3)

ESS1.B: Earth and the Solar System
- Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (HS-ESS1-4)

PS3.D: Energy in Chemical Processes and Everyday Life
- Nuclear Fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. *(secondary to HS-ESS1-1)*

PS4.B Electromagnetic Radiation
- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. *(secondary to HS-ESS1-2)*

Crosscutting Concepts

Scale, Proportion, and Quantity
- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. (HS-ESS1-1)
- Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (HS-ESS1-4)

Energy and Matter
- Energy cannot be created or destroyed– only moved between one place and another place, between objects and/or fields, or between systems. (HS-ESS1-2)
- In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved. (HSESS1-3)

Connection to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (HSESS1-2),(HS-ESS1-4)

Connection to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and they will continue to do so in the future. (HS-ESS1-2)
- Science assumes the universe is a vast single system in which basic laws are consistent. (HS-ESS1-2)

Connections to other DCIs in this grade-band: **HS.PS1.A** (HS-ESS1-2),(HS-ESS1-3); **HS.PS1.C** (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-3); **HS.PS2.B** (HS-ESS1-4); **HS.PS3.A** (HS-ESS1-1),(HS-ESS1-2); **HS.PS3.B** (HS-ESS1-2); **HS.PS4.A** (HS-ESS1-2)

Articulation of DCIs across grade-bands: **MS.PS1.A** (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-3); **MS.PS2.A** (HS-ESS1-4); **MS.PS2.B** (HS-ESS1-4); **MS.PS4.B** (HS-ESS1-1),(HS-ESS1-2); **MS.ESS1.A** (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-3),(HS-ESS1-4); **MS.ESS1.B** (HS-ESS1-4); **MS.ESS2.A** (HS-ESS1-1); **MS.ESS2.D** (HS-ESS1-1)

HS. Space Systems – Continued

~~*[Kentucky Academic Standards Connections:*~~	
~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-ESS1-1),(HS-ESS1-2)*~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS1-2),*(HSESS1-3)*~~
~~**SL.11-12.4**~~	~~Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. *(HS-ESS1-3)*~~
~~*Mathematics –*~~	
~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-3),(HS-ESS1-4)~~
~~**MP.4**~~	~~Model with mathematics. (HS-ESS1-1),(HS-ESS1-4)~~
~~**HSN-Q.A.1** interpret~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and the scale and the origin in graphs and data displays. (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-4)~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS1-1),*(HS-ESS1-2)*,(HS-ESS1-4)~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-4)~~
~~**HSA-SSE.A.1**~~	~~Interpret expressions that represent a quantity in terms of its context. *(HS-ESS1-1),(HS-ESS1-2)*,(HS-ESS1-4)~~
~~**HSA-CED.A.2**~~	~~Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. *(HSESS1-1),(HS-ESS1-2),(HS-ESS1-4)*~~
~~**HSA-CED.A.4**~~	~~Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *(HS-ESS1-1),(HS-ESS1-2),(HS-ESS1-4)]*~~

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HS. History of Earth

HS. History of Earth

Students who demonstrate understanding can:

HS-ESS1-5. **Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.** [Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal rocks. Examples include evidence of the ages oceanic crust increasing with distance from mid-ocean ridges (a result of plate spreading) and the ages of North American continental crust increasing with distance away from a central ancient core (a result of past plate interactions).]

HS-ESS1-6. **Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.** [Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.]

HS-ESS2-1. **Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.** [Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).] [Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). • Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-ESS2-1) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion. (HS-ESS1-6) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Evaluate evidence behind currently accepted explanations or solutions to determine the merits of arguments. (HS-ESS1-5) -- ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** • A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence. (HS-ESS1-6) • Models, mechanisms, and explanations collectively serve as tools in the development of a scientific theory. (HS-ESS1-6)	**ESS1.C: The History of Planet Earth** • Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (HS-ESS1-5) • Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history. (HS-ESS1-6) **ESS2.A: Earth Materials and Systems** • Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. A deep knowledge of how feedbacks work within and among Earth's systems is still lacking, thus limiting scientists' ability to predict some changes and their impacts. (HS-ESS2-1) *(Note: This Disciplinary Core Idea is also addressed by HS-ESS2-2.)* **ESS2.B: Plate Tectonics and Large-Scale System Interactions** • Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. *(ESS2.B Grade 8 GBE) (secondary to HS-ESS1-5),(HS-ESS2-1)* • Plate movements are responsible for most continental and ocean-floor features and for the distribution of most rocks and minerals within Earth's crust. *(ESS2.B Grade 8 GBE)* (HS-ESS2-1) **PS1.C: Nuclear Processes** • Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials. *(secondary to HS-ESS1-5),(secondary to HS-ESS1-6)*	**Patterns** • Empirical evidence is needed to identify patterns. (HS-ESS1-5) **Stability and Change** • Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS1-6) • Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS2-1)

Connections to other DCIs in this grade-band: **HS.PS2.A** (HS-ESS1-6); **HS.PS2.B** (HS-ESS1-6),(HS-ESS2-1); **HS.PS3.B** (HS-ESS1-5); **HS.ESS2.A** (HS-ESS1-5)

Articulation of DCIs across grade-bands: **MS.PS2.B** (HS-ESS1-6),(HS-ESS2-1); **MS.LS2.B** (HS-ESS2-1); **MS.ESS1.B** (HS-ESS1-6); **MS.ESS1.C** (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1);
MS.ESS2.A (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1); **MS.ESS2.B** (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1); **MS.ESS2.C** (HS-ESS2-1); **MS.ESS2.D** (HS-ESS2-1)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-ESS1-5),(HS-ESS1-6)*~~

~~**RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ESS1-5),(HS-ESS1-6)~~

~~**WHST.9-12.1** Write arguments focused on discipline-specific content. (HS-ESS1-6)~~

~~**WHST.9-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS1-5)~~

~~**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-ESS2-1)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively. (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1)~~

~~**MP.4** Model with mathematics. (HS-ESS2-1)~~

~~**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and~~

HS. History of Earth – Continued

	~~interpret the scale and the origin in graphs and data displays. (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1)~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1)~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities (HS-ESS1-5),(HS-ESS1-6),(HS-ESS2-1)~~
~~**HSF-IF.B.5**~~	~~Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (HS-ESS1-6)~~
~~**HSS-ID.B.6**~~	~~Represent data on two quantitative variables on a scatter plot, and describe how those variables are related. (HS-ESS1-6)]~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
The section entitled "Disciplinary Core Ideas" is reproduced verbatim from A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas. Integrated and reprinted with permission from the National Academy of Sciences.

HS. Earth's Systems – Continued

HS. Earth's Systems

Students who demonstrate understanding can:

HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]

HS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]

HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]

HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth systems and life on Earth. [Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth's other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples of include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.] [Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). • Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-ESS2-3),(HS-ESS2-6) **Planning and Carrying Out Investigations** Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. • Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-ESS2-5) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. • Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-ESS2-2) **Engaging in Argument from Evidence** Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science. • Construct an oral and written argument or counterarguments based on data and evidence. (HS-ESS2-7) -- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence**	**ESS2.A: Earth Materials and Systems** • Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes (HSESS2-2) • Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. Motions of the mantle and its plates occur primarily through thermal convection, which involves the cycling of matter due to the outward flow of energy from Earth's interior and gravitational movement of denser materials toward the interior. (HS-ESS2-3) **ESS2.B: Plate Tectonics and Large-Scale System Interactions** • The radioactive decay of unstable isotopes continually generates new energy within Earth's crust and mantle, providing the primary source of the heat that drives mantle convection. Plate tectonics can be viewed as the surface expression of mantle convection. (HS-ESS2-3) **ESS2.C: The Roles of Water in Earth's Surface Processes** • The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks. (HS-ESS2-5) **ESS2.D: Weather and Climate** • The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-2) • Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (HS-ESS2-6),(HS-ESS2-7) • Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-6) **ESS2.E: Biogeology** • The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual co-evolution of Earth's	**Energy and Matter** • The total amount of energy and matter in closed systems is conserved. (HSESS2-6) • Energy drives the cycling of matter within and between systems. (HS-ESS2-3) **Structure and Function** • The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. (HS-ESS2-5) **Stability and Change** • Much of science deals with constructing explanations of how things change and how they remain stable. (HS-ESS2-7) • Feedback (negative or positive) can stabilize or destabilize a system. (HSESS2-2) -- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** • Science and engineering complement each other in the cycle known as research and development (R&D). Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise. (HS-ESS2-3) **Influence of Engineering, Technology, and Science on Society and the Natural World** • New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ESS2-2)

HS. Earth's Systems – Continued

• Science knowledge is based on empirical evidence. (HSESS2-3) • Science disciplines share common rules of evidence used to evaluate explanations about natural systems. (HS-ESS2-3) • Science includes the process of coordinating patterns of evidence with current theory. (HS-ESS2-3)	surface and the life that exists on it. (HSESS2-7) **PS4.A: Wave Properties** • Geologists use seismic waves and their reflection at interfaces between layers to probe structures deep in the planet. *(secondary to HS-ESS2-3)*	

Connections to other DCIs in this grade-band: **HS.PS1.A** (HS-ESS2-5),(HS-ESS2-6); **HS.PS1.B** (HS-ESS2-5),(HS-ESS2-6); **HS.PS2.B** (HS-ESS2-3); **HS.PS3.B** (HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-5); **HS.PS3.D** (HS-ESS2-3),(HS-ESS2-6); **HS.PS4.B** (HS-ESS2-2); **HS.LS1.C** (HS-ESS2-6); **HS.LS2.A** (HS-ESS2-7); **HS.LS2.B** (HS-ESS2-2),(HS-ESS2-6); **HS.LS2.C** (HSESS2-2),(HS-ESS2-7); **HS.LS4.A** (HS-ESS2-7); **HS.LS4.B** (HS-ESS2-7); **HS.LS4.C** (HS-ESS2-7); **HS.LS4.D** (HS-ESS2-2),(HS-ESS2-7); **HS.ESS3.C** (HS-ESS2-2),(HS-ESS2-5),(HS-ESS2-6); **HS.ESS3.D** (HS-ESS2-2),(HS-ESS2-6)

Articulation of DCIs across grade-bands: **MS.PS1.A** (HS-ESS2-3),(HS-ESS2-5),(HS-ESS2-6); **MS.PS1.B** (HS-ESS2-3); **MS.PS2.B** (HS-ESS2-3); **MS.PS3.A** (HS-ESS2-3); **MS.PS3.B** (HS-ESS2-3); **MS.PS3.D** (HS-ESS2-2),(HS-ESS2-6); **MS.PS4.B** (HS-ESS2-2),(HS-ESS2-5),(HS-ESS2-6); **MS.LS2.A** (HS-ESS2-7); **MS.LS2.B** (HS-ESS2-2),(HS-ESS2-6); **MS.LS2.C** (HSESS2-2),(HS-ESS2-7); **MS.LS4.A** (HS-ESS2-7); **MS.LS4.B** (HS-ESS2-7); **MS.LS4.C** (HS-ESS2-2),(HS-ESS2-7); **MS.ESS1.C** (HS-ESS2-7); **MS.ESS2.A** (HS-ESS2-2),(HS-ESS2-3),(HSESS2-5),(HS-ESS2-6),(HS-ESS2-7); **MS.ESS2.B** (HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-6); **MS.ESS2.C** (HS-ESS2-2),(HS-ESS2-5),(HS-ESS2-6),(HS-ESS2-7); **MS.ESS2.D** (HS-ESS2-2),(HS-ESS2-5); **MS.ESS3.C** (HS-ESS2-2),(HS-ESS2-6); **MS.ESS3.D** (HS-ESS2-2),(HS-ESS2-6)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-ESS2-2),(HS-ESS2-3)*~~
~~**RST.11-12.2**~~	~~Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. *(HS-ESS2-2)*~~
~~**WHST.9-12.1**~~	~~Write arguments focused on discipline-specific content. (HS-ESS2-7)~~
~~**WHST.9-12.7**~~	~~Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-ESS2-5)~~
~~**SL.11-12.5**~~	~~Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-ESS2-3)*~~

~~*Mathematics –*~~

~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-6)~~
~~**MP.4**~~	~~Model with mathematics. (HS-ESS2-3),(HS-ESS2-6)~~
~~**HSN-Q.A.1**~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-6)~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-3),(HS-ESS2-6)~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-2),(HS-ESS2-3),(HS-ESS2-5),(HS-ESS2-6)~~]

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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HS. Weather and Climate – Continued

HS. Weather and Climate

Students who demonstrate understanding can:

HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth systems result in changes in climate. [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]

HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. [Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).] [Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). • Use a model to provide mechanistic accounts of phenomena. (HS-ESS2-4) **Analyzing and Interpreting Data** Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. • Analyze data using computational models in order to make valid and reliable scientific claims. (HS-ESS3-5) --- ***Connections to Nature of Science*** **Scientific Investigations Use a Variety of Methods** • Science investigations use diverse methods and do not always use the same set of procedures to obtain data. (HS-ESS3-5) • New technologies advance scientific knowledge. (HS-ESS3-5) **Scientific Knowledge is Based on Empirical Evidence** • Science knowledge is based on empirical evidence. (HS-ESS3-5) • Science arguments are strengthened by multiple lines of evidence supporting a single explanation. (HS-ESS2-4), (HSESS3-5)	**ESS1.B: Earth and the Solar System** • Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. *(secondary to HS-ESS2-4)* **ESS2.A: Earth Materials and Systems** • The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (HS-ESS2-4) **ESS2.D: Weather and Climate** • The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-4),*(secondary to HS-ESS2-2)* • Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-4) **ESS3.D: Global Climate Change** • Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts. (HS-ESS3-5)	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-ESS2-4) **Stability and Change** • Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS3-5)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-ESS2-4); **HS.PS3.B** (HS-ESS2-4),(HS-ESS3-5); **HS.PS3.D** (HS-ESS3-5); **HS.LS1.C** (HS-ESS3-5); **HS.LS2.C** (HS-ESS2-4); **HS.ESS1.C** (HS-ESS2-4); **HS.ESS2.D** (HS-ESS3-5); **HS.ESS3.C** (HS-ESS2-4); **HS.ESS3.D** (HS-ESS2-4)

Articulation of DCIs across grade-bands: **MS.PS3.A** (HS-ESS2-4); **MS.PS3.B** (HS-ESS2-4),(HS-ESS3-5); **MS.PS3.D** (HS-ESS2-4),(HS-ESS3-5); **MS.PS4.B** (HS-ESS2-4); **MS.LS1.C** (HS-ESS2-4); **MS.LS2.B** (HS-ESS2-4); **MS.LS2.C** (HS-ESS2-4); **MS.ESS2.A** (HS-ESS2-4),(HS-ESS3-5); **MS.ESS2.B** (HS-ESS2-4); **MS.ESS2.C** (HS-ESS2-4); **MS.ESS2.D** (HS-ESS2-4),(HS-ESS3-5); **MS.ESS3.B** (HS-ESS3-5); **MS.ESS3.C** (HS-ESS2-4),(HS-ESS3-5); **MS.ESS3.D** (HS-ESS2-4),(HS-ESS3-5)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-ESS3-5)~~

~~**RST.11-12.2** Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. *(HS-ESS3-5)*~~

~~**RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ESS3-5)~~

~~**SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-ESS2-4)*~~

~~*Mathematics –*~~

~~**MP.2** Reason abstractly and quantitatively.(HS-ESS2-4),(HS-ESS3-5)~~

~~**MP.4** Model with mathematics. (HS-ESS2-4)~~

~~**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-ESS2-4),(HS-ESS3-5)~~

~~**HSN-Q.A.2** Define appropriate quantities for the purpose of descriptive modeling. (HS-ESS2-4),*(HS-ESS3-5)*~~

~~**HSN-Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-ESS2-4),(HS-ESS3-5)]~~

HS. Human Sustainability

HS. Human Impacts

Students who demonstrate understanding can:

HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. [Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]

HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.* [Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen.]

HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. [Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.] [Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.]

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.* [Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoengineering design solutions (such as altering global temperatures by making large changes to the atmosphere or ocean).]

HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.* [Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from a human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.] [Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Create a computational model or simulation of a phenomenon, designed device, process, or system. (HSESS3-3)
- Use a computational representation of phenomena or design solutions to describe and/or support claims and/or explanations. (HS-ESS3-6)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HS-ESS3-1)
- Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ESS3-4)

Engaging in Argument from Evidence
Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.

- Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations). (HS-ESS3-2)

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. *(secondary to HS-ESS3-6)*

ESS3.A: Natural Resources

- Resource availability has guided the development of human society. (HS-ESS3-1)
- All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2)

ESS3.B: Natural Hazards

- Natural hazards and other geologic events have shaped the course of human history; [they] have significantly altered the sizes of human populations and have driven human migrations. (HS-ESS3-1)

ESS3.C: Human Impacts on Earth Systems

- The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (HS-ESS3-3)
- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (HS-ESS3-4)

ESS3.D: Global Climate Change

- Through computer simulations and other studies, important discoveries are still being made about how the ocean, the atmosphere, and the biosphere interact and are modified in response to human activities. (HS-ESS3-6)

ETS1.B. Designing Solutions to Engineering Problems

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. *(secondary to HS-ESS3-2),(secondary to HS-ESS3-4)*

Crosscutting Concepts

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-ESS3-1)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. (HS-ESS3-6)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS3-3)
- Feedback (negative or positive) can stabilize or destabilize a system. (HSESS3-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Modern civilization depends on major technological systems. (HS-ESS3-1),(HSESS3-3)
- Engineers continuously modify these systems to increase benefits while decreasing costs and risks. (HS-ESS3-2),(HS-ESS3-4)
- New technologies can have deep impacts on society and the environment, including some that were not anticipated. (HS-ESS3-3)
- Analysis of costs and benefits is a critical aspect of decisions about technology. (HSESS3-2)

HS. Human Sustainability – Continued

		--- *Connections to Nature of Science* **Science is a Human Endeavor** • Scientific knowledge is a result of human endeavors, imagination, and creativity. (HS-ESS3-3) **Science Addresses Questions About the Natural and Material World** • Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions. (HS-ESS3-2) • Science knowledge indicates what can happen in natural systems—not what should happen. The latter involves ethics, values, and human decisions about the use of knowledge. (HS-ESS3-2) • Many decisions are not made using science alone, but rely on social and cultural contexts to resolve issues. (HS-ESS3-2)

Connections to other DCIs in this grade-band: **HS.PS1.B** (HS-ESS3-3); **HS.PS3.B** (HS-ESS3-2); **HS.PS3.D** (HS-ESS3-2); **HS.LS2.A** (HS-ESS3-2),(HS-ESS3-3); **HS.LS2.B** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-6); **HS.LS2.C** (HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **HS.LS4.D** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **HS.ESS2.A** (HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-6); **HS.ESS2.E** (HS-ESS3-3)

Articulation of DCIs across grade-bands: **MS.PS1.B** (HS-ESS3-3); **MS.PS3.D** (HS-ESS3-2); **MS.LS2.A** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.LS2.B** (HS-ESS3-2),(HS-ESS3-3); **MS.LS2.C** (HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **MS.LS4.C** (HS-ESS3-3); **MS.LS4.D** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.ESS2.A** (HS-ESS3-1),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6); **MS.ESS2.C** (HS-ESS3-6); **MS.ESS3.A** (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3); **MS.ESS3.B** (HS-ESS3-1),(HS-ESS3-4); **MS.ESS3.C** (HS-ESS3-2),(HS-ESS3 3),(HSESS3-4),(HS-ESS3-6); **MS.ESS3.D** (HS-ESS3-4),(HS-ESS3-6)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~

~~**RST.11-12.1**~~	~~Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-ESS3-1)*,(HS-ESS3-2),(HS-ESS3-4)~~
~~**RST.11-12.8**~~	~~Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (HS-ESS3-2),(HS-ESS3-4)~~
~~**WHST.9-12.2**~~	~~Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-ESS3-1)~~

~~*Mathematics –*~~

~~**MP.2**~~	~~Reason abstractly and quantitatively. (HS-ESS3-1),(HS-ESS3-2),(HS-ESS3-3),(HS-ESS3-4),(HS-ESS3-6)~~
~~**MP.4**~~	~~Model with mathematics. (HS-ESS3-3),(HS-ESS3-6)~~
~~**HSN-Q.A.1**~~	~~Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *(HS-ESS3-1)*,(HS-ESS3-4),(HS-ESS3-6)~~
~~**HSN-Q.A.2**~~	~~Define appropriate quantities for the purpose of descriptive modeling. *(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-6)*~~
~~**HSN-Q.A.3**~~	~~Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. *(HS-ESS3-1),(HS-ESS3-4),(HS-ESS3-6)]*~~

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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HS. Engineering Design

HS. Engineering Design

Students who demonstrate understanding can:

HS-ETS1-1. **Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.**

HS-ETS1-2. **Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.**

HS-ETS1-3. **Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.**

HS-ETS1-4. **Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.**

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

- Analyze complex real-world problems by specifying criteria and constraints for successful solutions. (HS-ETS1-1)

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 9-12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems. (HS-ETS1-4)

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.

- Design a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ETS1-2)
- Evaluate a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-ETS1-3)

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. (HS-ETS1-1)
- Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges also may have manifestations in local communities. (HS-ETS1-1)

ETS1.B: Developing Possible Solutions

- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (HS-ETS1-3)
- Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs. (HS-ETS1-4)

ETS1.C: Optimizing the Design Solution

- Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. (HSETS1-2)

Crosscutting Concepts

Systems and System Models

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows— within and between systems at different scales. (HS-ETS1-4)

Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology. (HS-ETS1-1) (HSETS1-3)

Connections to HS-ETS1.A: Defining and Delimiting Engineering Problems include:
Physical Science: HS-PS2-3, HS-PS3-3
Connections to HS-ETS1.B: Designing Solutions to Engineering Problems include:
Earth and Space Science: HS-ESS3-2, HS-ESS3-4, **Life Science:** HS-LS2-7, HS-LS4-6
Connections to HS-ETS1.C: Optimizing the Design Solution include:
Physical Science: HS-PS1-6, HS-PS2-3

Articulation of DCIs across grade-bands: **MS.ETS1.A** (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4); **MS.ETS1.B** (HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4); **MS.ETS1.C** (HSETS1-2),(HS-ETS1-4)

~~*[Kentucky Academic Standards Connections: ELA/Literacy –*~~
~~**RST.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-ETS1-1),*(HS-ETS1-3)*~~
~~**RST.11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. *(HS-ETS1-1)*,(HS-ETS1-3)~~
~~**RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (HS-ETS1-1),*(HS-ETS1-3)*~~
~~*Mathematics –*~~
~~**MP.2** Reason abstractly and quantitatively. (HS-ETS1-1),*(HS-ETS1-3),(HS-ETS1-4)*~~
~~**MP.4** Model with mathematics. (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4)]~~

HIGH SCHOOL SOCIAL STUDIES

Kentucky Academic Standards – Social Studies – High School

Districts and schools can arrange the essential high school social studies content within the three-credit requirement to best meet the needs of their students. A local board of education may substitute an integrated, applied, interdisciplinary, or higher level course for a required course if the alternative course provides rigorous content and addresses the same academic expectations.

The primary purpose of social studies is to help students develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world. The skills and concepts found throughout this document reflect this purpose by promoting the belief that students must develop more than an understanding of content. They must also be able to apply the content perspectives of the several academic fields of the social studies to personal and public experiences. By stressing the importance of both content knowledge and its application, the social studies curriculum in Kentucky provides a framework that promotes citizenship for all of our students.

The social studies content standards at the high school level are directly aligned with Kentucky's **Academic Expectations**. Social Studies standards are organized around five “Big Ideas” that are important to the discipline of social studies. The five Big Ideas in social studies are: Government and Civics, Cultures and Societies, Economics, Geography and Historical Perspective. The Big Ideas, which are more thoroughly explained in the pages that follow, are conceptual organizers that are the same at each grade level. This consistency ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of social studies. The understandings represent the desired results - what learning will focus upon and what knowledge students will be able to explain or apply. Understandings can be used to frame development of units of study and lesson plans.

Skills and concepts describe ways that students demonstrate their learning and are specific to each grade level. The skills and concepts for social studies are fundamental to social studies literacy and build on prior learning.

The social studies program includes strong literacy connections, active, hands-on work with concrete materials, and appropriate technologies. The social studies curriculum includes and depends on a number of different types of materials such as textbooks, non-fiction texts, biographies, autobiographies, journals, maps, newspapers, photographs and primary documents. Higher order thinking skills, such as compare, explain, analyze, predict, construct and interpret, are all heavily dependent on a variety of literacy skills and processes. For example, in social studies students must be able to understand specialized vocabulary, identify and comprehend key pieces of information within texts, determine what is fact and what is opinion, relate information across texts, connect new information to prior knowledge and synthesize the information to make meaning.

Although the social studies program for the high school is divided into five areas, each area is designed to interact with the others in an integrated fashion. Because of this integration, students are able to develop broad conceptual understandings in social studies. This style of learning reflects the developmental nature of children.

Big Idea: Government and Civics

The study of government and civics equips students to understand the nature of government and the unique characteristics of American representative democracy, including its fundamental principles, structure, and the role of citizens. Understanding the historical development of structures of power, authority, and governance and their evolving functions in contemporary U.S. society and other parts of the world is essential for developing civic competence. An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies.

Academic Expectations

2.14 Students understand the democratic principles of justice, equality, responsibility, and freedom and apply them to real-life situations.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

High School Enduring Knowledge – Understandings

Students will understand that

- people form governments to establish order, provide security and accomplish common goals. Governments in the world vary in terms of their sources of power, purposes and effectiveness.
- the Government of the United States, established by the Constitution, embodies the purposes, values and principles (e.g., liberty, justice, individual human dignity, the rules of law) of American representative democracy.
- the Constitution of the United States establishes a government of limited powers that are shared among different levels and branches. The provisions of the U.S. Constitution have allowed our government to change over time to meet the changing needs of our society.
- all citizens of the United States have certain rights and responsibilities as members of a democratic society.
- individual rights in a democracy may, at times, be in conflict with others' individual rights, as well as with the responsibility of government to protect the "common good."
- the United States does not exist in isolation; its democratic form of government has played and continues to play a considerable role in our interconnected world.
- the level of individual civic engagement in a democracy can impact the government's effectiveness.
- the development and ongoing functions of a political system (e.g., elections, political parties, campaigns, political identity and culture, the role of the media) is necessary for a democratic form of government to be effective.

Big Idea: Government and Civics – Continued

High School Skills and Concepts

Students will

- demonstrate an understanding (e.g., illustrate, write, model, present, debate) of the nature of government:
  - examine ways that democratic governments do or do not preserve and protect the rights and liberties of their constituents (e.g., U.N. Charter, Declaration of the Rights of Man, U.N. Declaration of Human Rights, U.S. Constitution)
  - compare purposes and sources of power of various forms of government in the world, and analyze their effectiveness in establishing order, providing security and accomplishing goals
  - evaluate the relationship between and among the U.S. government's response to contemporary issues and societal problems (e.g., education, welfare system, health insurance, childcare, crime) and the needs, wants and demands of its citizens (e.g., individuals, political action committees, special interest groups, political parties)
  - examine conflicts within and among different governments and analyze their impacts on historical or current events
- examine issues related to the intent of the Constitution of the United States and its amendments:
  - explain the principles of limited government (e.g., rule of law, federalism, checks and balances, majority rule, protection of minority rights, separation of powers) and how effective these principles are in protecting individual rights and promoting the "common good"
  - analyze how powers of government are distributed and shared among levels and branches, and how this distribution of powers works to protect the "common good" (e.g., Congress legislates on behalf of the people, the President represents the people as a nation, the Supreme Court acts on behalf of the people as a whole when it interprets the Constitution)
- investigate the rights of individuals (e.g., Freedom of Information Act, free speech, civic responsibilities in solving global issues) to explain how those rights can sometimes be in conflict with the responsibility of the government to protect the "common good" (e.g., homeland security issues, environmental regulations, censorship, search and seizure), the rights of others (e.g., slander, libel), and civic responsibilities (e.g., personal belief/responsibility versus civic responsibility)
- evaluate the impact citizens have on the functioning of a democratic government by assuming responsibilities (e.g., seeking and assuming leadership positions, voting) and duties (e.g., serving as jurors, paying taxes, complying with local, state and federal laws, serving in the armed forces)
- analyze and synthesize a variety of information from print and non-print sources (e.g., books, documents, articles, interviews, Internet, film, media) to research issues, perspectives and solutions to problems

Big Idea: Cultures and Societies

Culture is the way of life shared by a group of people, including their ideas and traditions. Cultures reflect the values and beliefs of groups in different ways (e.g., art, music, literature, religion); however, there are universals (e.g., food, clothing, shelter, communication) connecting all cultures. Culture influences viewpoints, rules and institutions in a global society. Students should understand that people form cultural groups throughout the United States and the World, and that issues and challenges unite and divide them.

Academic Expectations

2.16 Students observe, analyze, and interpret human behaviors, social groupings, and institutions to better understand people and the relationships among individuals and among groups.

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.

High School Enduring Knowledge – Understandings

Students will understand that

- culture is a system of beliefs, knowledge, institutions, customs/traditions, languages and skills shared by a group. Through a society's culture, individuals learn the relationships, structures, patterns and processes to be members of the society.
- social institutions (e.g., government, economy, education, religion, family) respond to human needs, structure society, and influence behavior within different cultures.
- interactions among individuals and groups assume various forms (e.g., compromise, cooperation, conflict, competition) and are influenced by culture.
- culture affects how people in a society behave in relation to groups and their environment.
- a variety of factors promote cultural diversity in a society, a nation, and the world.
- an appreciation of the diverse nature of cultures is essential in our global society.

High School Skills and Concepts

Students will

- demonstrate an understanding of the nature of culture:
  - analyze cultural elements of diverse groups in the United States (Reconstruction to present)
  - describe how belief systems, knowledge, technology, and behavior patterns define cultures
  - analyze historical perspectives and events in the modern world (1500 A.D. to present) and United States (Reconstruction to present) in terms of how they have affected and been affected by cultural issues and elements
- describe and compare how various human needs are met through interactions with and among social institutions (e.g., family, religion, education, government, economy) in the modern world (1500 A.D. to present) and the United States (Reconstruction to present)
- explain or give examples of how communications between groups can be influenced by cultural differences; explain the reasons why conflict and competition (e.g., violence, difference of opinion, stereotypes, prejudice, discrimination, genocide) developed as cultures emerged in the modern world (1500 A.D. to present) and in the United States (Reconstruction to present)
- describe how compromise and cooperation are characteristics that influence interaction (e.g., peace studies, treaties, conflict resolution) in the modern world (1500 A.D. to present) and the United States (Reconstruction to present)
- compare examples of cultural elements (e.g., beliefs, customs/traditions, languages, skills, literature, the arts) of diverse groups today to those of the past, using information from a variety of print and non-print sources (e.g., autobiographies, biographies, documentaries, news media, artifacts)

Big Idea: Economics

Economics includes the study of production, distribution and consumption of goods and services. Students need to understand how their economic decisions affect them, others, the nation and the world. The purpose of economic education is to enable individuals to function effectively both in their own personal lives and as citizens and participants in an increasingly connected world economy. Students need to understand the benefits and costs of economic interaction and interdependence among people, societies, and governments.

Academic Expectations

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

High School Enduring Knowledge – Understandings

Students will understand that

- the basic economic problem confronting individuals, societies and governments is scarcity; as a result of scarcity, economic choices and decisions must be made.
- economic systems are created by individuals, societies and governments to achieve broad goals (e.g., security, growth, freedom, efficiency, equity).
- markets (e.g., local, national, global) are institutional arrangements that enable buyers and sellers to exchange goods and services.
- all societies deal with questions about production, distribution and consumption.
- a variety of fundamental economic concepts (e.g., supply and demand, opportunity cost) affect individuals, societies and governments.
- our global economy provides for a level of interdependence among individuals, societies and governments of the world.
- the United States Government and its policies play a major role in the performance of the U.S. economy at both the national and international levels.
- in a global economy, interdependence results in economic conditions and policies in one nation affecting economic conditions in other nations.

Big Idea: Economics – Continued

High School Skills and Concepts

Students will

- demonstrate an understanding of the nature of limited resources and scarcity in the modern world (1500 A.D. to present) and the United States (Reconstruction to present):
  - explain how scarcity of resources necessitates choices at both the personal and societal levels, and explain the impact of those choices
  - explain how governments with limited budgets consider revenues, costs and opportunity when planning expenditures
  - describe how economic institutions (e.g., corporations, labor unions, banks, stock markets, cooperatives, partnerships) help to deal with scarcity
- compare and contrast economic systems (e.g., traditional, command, market, mixed), and evaluate their effectiveness in achieving broad social goals (e.g., freedom, efficiency, equity, security)
- analyze free enterprise systems, and explain strategies for maximizing profits based on different roles in the economy (e.g., producers, entrepreneurs, workers, savers and investors)
- describe relationships between and among markets (e.g., local, national, global) and exchange of goods and services:
  - explain factors that influence the supply and demand of products (e.g., supply—technology, cost of inputs, number of sellers; demand—income, utility, price of similar products, consumers' preferences)
  - describe how financial and non-financial incentives influence individuals differently (e.g., discounts, sales promotions, trends, personal convictions)
  - explain or model cause-effect relationships between the level of competition in a market and the number of buyers and sellers
  - research laws and government mandates (e.g., anti-trust legislation, tariff policy, regulatory policy) and analyze their purposes and effects in the United States and in the global marketplace
- investigate the production, distribution, and consumption of goods and services:
  - analyze changing relationships between and among business, labor and government (e.g., unions, anti-trust laws, tariff policy, price controls, subsidies, tax incentives), and examine the effects of those changing relationships on production, distribution and consumption in the United States
  - describe how different factors (e.g., new knowledge, technological change, investments in capital goods and human capital/resources) have increased productivity in the world
- explain results and issues related to interdependence of personal, national and international economic activities (e.g., natural resource dependencies, economic sanctions, environmental and humanitarian issues) in the modern world (1500 A.D. to present) and the United States (Reconstruction to present):
  - analyze how economies of nations around the world (e.g., China, India, Japan) affect and are affected by American economic policies

Big Idea: Geography

Geography includes the study of the five fundamental themes of location, place, regions, movement and human/environmental interaction. Students need geographic knowledge to analyze issues and problems to better understand how humans have interacted with their environment over time, how geography has impacted settlement and population, and how geographic factors influence climate, culture, the economy and world events. A geographic perspective also enables students to better understand the past and present and to prepare for the future.

Academic Expectations

2.19 Students recognize and understand the relationship between people and geography and apply their knowledge in real-life situations.

High School Enduring Knowledge – Understandings

Students will understand that

- patterns emerge as humans move, settle and interact on Earth's surface, and can be identified by examining the location of physical and human characteristics, how they are arranged, and why they are in particular locations. Economic, political, cultural and social processes interact to shape patterns of human populations, interdependence, cooperation and conflict.
- regions help us to see the Earth as an integrated system of places and features organized by such principles as landform types, political units, economic patterns and cultural groups. People vary in how they organize, interpret and use information about places and regions.
- human actions modify the physical environment and, in turn, the physical environment limits or promotes human activities.
- human and physical features of the Earth's surface can be identified by absolute and relative location.
- the use of maps, geographic tools, and mental maps helps interpret information, analyze patterns and spatial data, predict consequences and find/propose solutions to world problems.
- citizens in an interdependent global community impact their physical environments through the use of land and other resources.
- environmental changes and physical and human geographic factors have influenced world economic, political, and social conditions.
- many of the important issues facing societies involve the consequences of interactions between human and physical systems. Complex interrelationships between societies and their physical environments influence conditions locally, regionally and globally.

Big Idea: Geography – Continued

High School Skills and Concepts
Students will

- use a variety of geographic tools (e.g., maps, globes, charts, graphs, photographs, models, data bases, satellite images):
  - analyze the distribution of physical and human features on Earth's surface
  - interpret patterns and develop rationales for the location and distribution of Earth's human features (e.g., available transportation, location of resources and markets, individual preference, centralization versus dispersion)
- investigate regions of the Earth's surface using information from print and non-print sources (e.g., books, films, periodicals, Internet, geographic tools, news media):
  - interpret how places and regions serve as meaningful symbols for individuals and societies (e.g., Jerusalem, Vietnam Memorial, Ellis Island, the Appalachian region)
  - analyze pros and cons of physical (e.g., climate, mountains, rivers) and human characteristics (e.g., interstate highways, urban centers, workforce) of regions in terms of human activity
  - evaluate reasons for stereotypes (e.g., all cities are dangerous and dirty; rural areas are poor) associated with places or regions
  - explain how cultural differences and perspectives sometimes result in conflicts in the modern world (1500 A.D. to present) and United States (Reconstruction to present)
- describe movement and settlement patterns in the modern world (1500 A.D. to present) and United States (Reconstruction to present):
  - analyze the causes of movement and settlement (e.g., famines, military conflicts, climate, economic opportunity) and their impacts in different places and at different times in history
  - explain how technology has facilitated the movement of goods, services and populations, increased economic interdependence, and influenced development of centers of economic activity (e.g., cities, interstate highways, airports, rivers, railroads, computers, telecommunications)
- investigate interactions among human activities and the physical environment in the modern world (1500 A.D. to present) and United States (Reconstruction to present):
  - describe human strategies (e.g., transportation, communication, technology) used to overcome limits of the physical environment
  - interpret and analyze possible global effects (e.g., global warming, destruction of the rainforest, acid rain) of human modifications to the physical environment (e.g., deforestation, mining), perspectives on the use of natural resources (e.g., oil, water, land), and natural disasters (e.g., earthquakes, tsunamis, floods)

Big Idea: Historical Perspective

History is an account of events, people, ideas, and their interaction over time that can be interpreted through multiple perspectives. In order for students to understand the present and plan for the future, they must understand the past. Studying history engages students in the lives, aspirations, struggles, accomplishments and failures of real people. Students need to think in an historical context in order to understand significant ideas, beliefs, themes, patterns and events, and how individuals and societies have changed over time in Kentucky, the United States and the World.

Academic Expectations

2.20 Students understand, analyze, and interpret historical events, conditions, trends, and issues to develop historical perspective.

High School Enduring Knowledge – Understandings

Students will understand that

- history is an account of human activities that is interpretive in nature, and a variety of tools (e.g., primary and secondary sources, data, artifacts) are needed to analyze historical events.
- history is a series of connected events shaped by multiple cause-effect relationships, tying past to present.
- geography and natural resources have a significant impact on historical perspectives and events.
- advances in research, science and technology have a significant impact on historical events, American society, and the global community.

High School Understandings (specific to United States History, from Reconstruction to the Present)

- U.S. History can be analyzed by examining significant eras (Reconstruction, Industrialization, Progressive Movement, World War I, Great Depression and the New Deal, World War II, Cold War, Contemporary United States) to develop chronological understanding and recognize cause-and- effect relationships and multiple causation.
- U.S. History has been impacted by significant individuals and groups.
- each era in the history of the United States has social, political and economic characteristics.
- the role of the United States in the global community has evolved into that of a world power.

High School Understandings (specific to World Civilizations History, 1500 A.D. to the Present)

- world civilizations (e.g., African, Asian, European, Latin American, Middle Eastern) can be analyzed by examining significant eras (Renaissance, Reformation, Age of Exploration, Age of Revolution, Nationalism and Imperialism, Technological Age, 21st Century) to develop chronological understanding and recognize cause-effect relationships and multiple causation.
- world civilizations share common characteristics (e.g., government, belief system, economy) and have been impacted by significant individuals and groups.
- each era in the history of the world has social, political and economic characteristics.
- an increasingly interdependent world provides challenges and opportunities.

Big Idea: Historical Perspective – Continued

High School Skills and Concepts
Students will

- demonstrate an understanding of the interpretative nature of history using a variety of tools (e.g., primary and secondary sources, Internet, timelines, maps, data):
  - investigate and analyze perceptions and perspectives (e.g., gender, race, region, ethnic group, nationality, age, economic status, religion, politics, geographic factors) of people and historical events in the modern world (world civilizations, U.S. history)
  - examine multiple cause-effect relationships that have shaped history (e.g., showing how a series of events are connected)
- analyze how the United States participates with the global community to maintain and restore world peace (e.g., League of Nations, United Nations, Cold War politics, Persian Gulf War), and evaluate the impact of these efforts
- research issues or interpret accounts of historical events in U.S. history using primary and secondary sources (e.g., biographies, films, periodicals, Internet resources, textbooks, artifacts):
  - compare, contrast and evaluate the approaches and effectiveness of Reconstruction programs
  - explain how the rise of big business, factories, mechanized farming, and the labor movement have impacted the lives of Americans
  - examine the impact of massive immigration (e.g., new social patterns, conflicts in ideas about national unity amid growing cultural diversity) after the Civil War
  - explain and evaluate the impact of significant social, political and economic changes (e.g., imperialism to isolationism, industrial capitalism, urbanization, political corruption, initiation of reforms) during the Progressive Movement, World War I and the Twenties
  - evaluate how the Great Depression, New Deal policies, and World War II transformed America socially and politically at home (e.g., stock market crash, relief, recovery, reform initiatives, increased role of government in business, influx of women into workforce, rationing) and reshaped its role in world affairs (emergence of the U.S. as economic and political superpower)
  - analyze economic growth in America after WWII (e.g., suburban growth), struggles for racial and gender equality (e.g., Civil Rights Movement), the extension of civil liberties, and conflicts over political issues (e.g., McCarthyism, U.S. involvement in Vietnam)

Big Idea: Historical Perspective – Continued

- research issues or interpret accounts of historical events in world history using primary and secondary sources (e.g., biographies, films, periodicals, Internet resources, textbooks, artifacts):
  - explain how ideas of the Classical Age (e.g., humanism, developments in art and architecture, literature, political theories, rediscovery of Greco-Roman philosophies) impacted people's perspectives during the Renaissance and Reformation
  - analyze how new ideas and technologies of the Age of Exploration by Europeans brought great wealth to the absolute monarchies and resulted in political, economic and social changes (e.g., disease, religious ideas, technologies, new plants/animals, forms of government) to the other regions of the world
  - investigate how political, social and cultural revolutions (e.g., French, Industrial, Bolshevik, Chinese) brought about changes in science, thought, government, or industry and had long-range impacts on the modern world
  - examine how nationalism, militarism, expansionism and imperialism led to conflicts (e.g., World War I, Japanese aggression in China and the Pacific, European imperialism in Africa, World War II) and the rise of totalitarian governments (e.g., Communism in Russia, Fascism in Italy, Nazism in Germany)
  - analyze the impact of the rise of both the United States and the Soviet Union to superpower status following World War II, development of the Cold War, and the formation of new nations in Africa, Asia, Eastern Europe, and the Middle East
  - examine how countries around the world have addressed the challenges of rapid social, political and economic changes during the second half of the 20th century (e.g., population growth, diminishing natural resources, environmental concerns, human rights issues, technological and scientific advances, shifting political alliances, globalization of the economy)

HIGH SCHOOL TECHNOLOGY

Kentucky Academic Standards – Technology – High School

Technology use in the 21st century has become a vital component of all aspects of life. For students in Kentucky to be contributing citizens, they must receive an education that incorporates technology literacy at all levels. Technology literacy is the ability of students to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century. The Technology Kentucky Academic Standards provides a framework for integrating technology into all content areas. It reflects the basic skills required for each student to be competitive in the global economy.

For students to gain the technology competencies, it is essential that they have access to technology during the school day in all grade levels. Instruction should provide opportunities for students to gain and demonstrate technology skills that build primary through grade 12.

The technology content standards should be integrated into each curricular discipline. The purpose of integrating technology is to help students make useful connections between what they learn in each content area and the real world. Technology knowledge, concepts and skills should be interwoven into lessons or units and taught in partnership with other content areas. Technology lends itself to curriculum integration and team teaching. Technology can enhance learning for all students, and for some it is essential for access to learning.

The technology content standards are organized by grade spans: primary, intermediate, middle, and high. Throughout high school, students continue to develop and demonstrate the skills gained from primary, intermediate and middle grade levels. The technology Kentucky Academic Standards at the high level includes more opportunities for students to apply technology in their course work, thus becoming more adept in using technology. As the high school curriculum demands more complicated learning tasks, students discover more advanced capabilities in applications. Students will develop an appreciation for the capabilities of technology resources and an understanding of how these can be used for career and lifelong learning. By the end of high school, students will apply technology across all curriculum areas and demonstrate competencies needed for high school graduation.

The technology content standards at the high school grade span are directly aligned with Kentucky's **Academic Expectations**. Technology standards are organized around three Big Ideas that are important to the discipline of technology. The three Big Ideas in technology are: **1) Information, Communication and Productivity; 2) Safety and Ethical/Social Issues;** and **3) Research, Inquiry/Problem-Solving and Innovation**. The Big Ideas are conceptual organizers for technology. Each grade level span ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of *Enduring Knowledge/Understandings* that represent overarching generalizations linked to the Big Ideas of Technology. The understandings represent the desired results--what learning will focus upon and what knowledge students will be able to explain or apply. *Understandings* can be used to frame development of units of study and lesson plans.

Skills and Concepts describe ways that students demonstrate their learning and are specific to each grade level span. The skills and concepts for technology are fundamental to technology literacy, safe use and inquiry. The skills and concepts build on prior learning.

Big Idea: Information, Communication and Productivity

Students demonstrate a sound understanding of the nature and operations of technology systems. Students use technology to learn, to communicate, increase productivity and become competent users of technology. Students manage and create effective oral, written and multimedia communication in a variety of forms and contexts.

Academic Expectations

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.
1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.
3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.
6.1 Students connect knowledge and experiences from different subject areas.
6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences.

High Enduring Knowledge – Understandings
Students will understand that

- proficient use of emerging technology is needed for competitive entry into the workforce.
- technology allows the exchange of information and ideas to enable participation in the global society.
- collaborative online projects impact life-long learning and global interactions.
- productivity tools are used effectively and efficiently to enhance lifelong learning.

High Concepts and Skills - Information
Students will

- apply, consolidate and extend the skills, knowledge and experiences acquired earlier to exhibit competence in the use of technology
- use appropriate technology terminology
- apply basic care and maintenance when using technology
- explore and analyze the impact of current and emerging technology

High Concepts and Skills – Communication
Students will

- use technology to communicate in a variety of modes (e.g., audio, speech to text, print, media)
- participate in electronic communities (e.g., virtual learning) as learners, initiators, contributors and mentors
- use online collaboration and interactive projects (e.g., email, videoconferencing) to communicate with others (e.g., experts, mentors)
- select and use appropriate technology to collect, analyze present information

High Concepts and Skills – Productivity
Students will

- use and apply a repertoire of technology skills regularly in the preparation of content assignments and authentic projects
- use a variety of formats (web publishing, oral presentations, journals and multimedia presentations) to summarize and communicate the results
- create professional electronic products (e.g., resumes, letters of applications, portfolios) for employment and post-secondary education

Big Idea: Safety and Ethical/Social Issues

Students understand safe and ethical/social issues related to technology. Students practice and engage in safe, responsible and ethical use of technology. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits and productivity.

Academic Expectations

2.17 Students interact effectively and work cooperatively with the many ethnic and cultural groups of our nation and world.
3.6 Students demonstrate the ability to make decisions based on ethical values.
4.3 Students individually demonstrate consistent, responsive, and caring behavior.
4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
4.5 Students demonstrate an understanding of, appreciation for, and sensitivity to a multi-cultural and world view.

High Enduring Knowledge – Understandings

Students will understand that

- interactive technology projects and online courses enhance learning to ensure global awareness.
- acceptable social technology practices is essential to post-secondary career choices.
- ethical use of technology is necessary to ensure safety, privacy and legal issues.
- new technology development and deployment creates social, cultural, political and economic issues that requires citizens to make informed decisions.
- positive attitudes and practices towards technology support lifelong learning.
- assistive technology supports learning to ensure equitable access to a productive life.

High Concepts and Skills – Safety

Students will

- explain the importance of safe Internet use (e.g., iSafe skills)
- apply safe behavior when using technology

High Concepts and Skills – Ethical Issues

Students will

- describe intellectual property issues related to technology
- practice responsible, ethical and safe behavior (e.g., security, privacy, passwords, personal information virus protection and iSafe skills) while using technology and adhering to the Acceptable Use Policy (AUP) as well as other state and federal laws
- investigate basic issues related to responsible use of technology and describe personal consequences of inappropriate use
- use legal and ethical practices when completing digital projects/schoolwork and credit all participants for their contribution to the work
- investigate software piracy, its impact on the technology industry and possible repercussions to individuals and/or the school district

High Concepts and Skills – Social Issues

Students will

- forecast the impact of technological products and systems in a global society
- use appropriate etiquette when interacting with global environments (e.g., video conferencing, IM)
- analyze economic, political and cultural issues influenced by the development and use of technology
- investigate how technology supports their interests and career opportunities
- engage with technology to support lifelong learning (e.g., online courses, online assessments, interactive video conferencing)
- describe/ explain how assistive technology supports learning to ensure equitable access to a productive life
- explain how emerging technology is exponential and shapes economic factors and cultural influences

Big Idea: Research, Inquiry/Problem-Solving and Innovation

Students understand the role of technology in research and experimentation. Students engage technology in developing solutions for solving problems in the real world. Students will use technology for original creation and innovation.

Academic Expectations

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

2.3 Students identify and analyze systems and the ways their components work together or affect each other.

5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.

5.2 Students use creative thinking skills to develop or invent novel, constructive ideas or products.

5.4 Students use a decision-making process to make informed decisions among options.

5.5 Students use problem-solving processes to develop solutions to relatively complex problems.

6.1 Students connect knowledge and experiences from different subject areas.

High Enduring Knowledge – Understandings

Students will understand that

- technology supports critical thinking skills used in inquiry/problem solving to make informed decisions for independent learning.
- technology can assist in researching, analyzing and evaluating information obtained from a variety of sources to answer an essential question across all content areas.
- technology supports research and development to solve problems and produce results in authentic situations.
- ideas, solutions and designs (e.g., intellectual property) created through technology are used in a knowledge-based economy.

Big Idea: Research, Inquiry/Problem-Solving and Innovation – Continued

High Skills and Concepts – Research
Students will

- apply a research process model (e.g., Big6, Research Cycle) to conduct online research
- select and evaluate appropriateness of information (authenticity) from a variety of resources, including online research databases, online catalogs/virtual library and web sites to answer the essential questions
- evaluate the accuracy and appropriateness of electronic information and correctly note the appropriate citations (e.g., APA, MLA)
- organize information that is collected using a variety of tools (e.g., spreadsheet, database, saved files)
- manipulate data using charting tools and graphic organizers (e.g., concept mapping, flow charting and outlining software) to connect ideas and organize information
- express and synthesize digital information collected in research effectively and accurately to produce original work (e.g., desktop-published or word-processed report, multimedia presentation, engineering design)

High Skills and Concepts – Inquiry/Problem-solving
Students will

- select and apply technology in content learning to solve authentic problems and make informed decisions
- apply teamwork and critical thinking strategies to solve technology problems
- explain how technology can be used for problem solving and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software)
- analyze and troubleshoot software and hardware problems
- investigate and apply expert systems and simulations in real-world situations
- identify open-ended, unresolved problems and select and use appropriate technology to develop solutions
- explore how inquiry/problem-solving impact science, technology, engineering and mathematics (STEM) (e.g., design, programming, robotics)

High Skills and Concepts – Innovation
Students will

- use technology to express creativity in all content areas
- design, develop, publish and present original innovative products (e.g., Web pages, video, robotics, online content)
- produce an innovative product or system using an engineering design process
- collaborate with peers, experts and others to develop solutions and innovative products (e.g., design/CAD, troubleshooting, helpdesk, models, systems)
- recognize that innovative ideas, products and skills lead to intellectual property and copyrights
- describe how technological innovation leads to entrepreneurial opportunities

HIGH SCHOOL VOCATIONAL STUDIES

Kentucky Academic Standards – Vocational Studies – High School

Students in the high school vocational studies program develop an understanding of career planning as well as consumer decision-making and financial literacy that will foster life-long learning. The vocational studies program at the high school level develops a career plan. All content teachers are responsible for providing instruction in the vocational studies area. Students need to know the demands of a career and how it will affect their multiple roles in life. While in high school, they should focus on acquiring the knowledge and skills necessary for making successful transitions to college, technical school, military service, and/or work. Students must exhibit those attributes that are valued by employers and demonstrate the techniques for marketing themselves, which will serve them throughout life in a rapidly changing technological society.

The content in vocational studies addresses strategies for choosing and preparing a career, skills and work habits that lead to success in future schooling and work, and skills such as interviewing, writing résumés, and completing applications that are needed for acceptance into college, or other post-secondary training or to the workforce. Vocational studies at this level enable students to acquire the consumer skills and planning of careers. The challenge is to empower students to make a successful transition from school to the world of work, from job to job, across the career life span, and to be productive citizens.

The vocational studies content standards at the high school level are directly aligned with Kentucky's **Academic Expectations**. The vocational studies standards are organized around five "Big Ideas" that are important to the discipline of vocational studies. These big ideas are: Consumer Decisions, Financial Literacy, Career Awareness/Exploration/Planning, Employability Skills, and Communication/Technology. The Big Ideas are conceptual organizers for vocational studies and are the same at each grade level. This ensures students have multiple opportunities throughout their school careers to develop skills and concepts linked to the Big Ideas.

Under each Big Idea are statements of Enduring Knowledge/Understandings that represent overarching generalizations linked to the Big Ideas of vocational studies. The understandings represent the desired results- that focus on learning, and the knowledge students will have to explain or apply. Understandings can be used to frame development of units of study and lessons plans.

Skills and concepts describe the ways students demonstrate their learning and are specific to each grade level. The skills and concepts for Vocational Studies are fundamental to career planning and builds on prior learning.

Academic Expectations 2.36, 2.37 and 2.38 bring forward the career planning in Vocational Studies. Vocational Studies provide a connection to Kentucky's Learning Goals 3 (become self-sufficient individuals) and Learning Goal 4 (become responsible group members). These connections provide a comprehensive link between essential content, skills and abilities important to learning.

Big Idea: Consumer Decisions

Individual and families need to make consumer decisions due to the numerous products/services on the market, multiple advertising techniques, and the need to make responsible financial management decisions. Accessing and assessing consumer information, comparing and evaluating products and services, provides basis for making effective consumer decisions. Consumer decisions influence the use of resources and the impact they have on the community and environment.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions. Students demonstrate the skills to evaluate and use services and resources available in their community.

4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.

5.4 Students use a decision-making process to make informed decisions among options.

High School Enduring Knowledge – Understandings

Students will understand that

- social factors and economic principles impact consumer decisions.
- consumer decisions are impacted by the global economy, national trends, societal issues, family and economic principles.
- culture, media and technology can influence consumer decisions.
- consumer management practices relating to the human, economic, and environmental resources are needed to meet the goals for individuals and families.
- consumer advocacy groups impact consumer's rights and responsibilities.
- consumer actions influence the use of resources and the impact they have on the environment.
- a variety of print and electronic resources are available in the home, school, and community that provide health and safety information.

Big Idea: Consumer Decisions – Continued

High School Skills and Concepts
Students will

- evaluate social factors and economic principles and their impact on consumer decisions by:
    - explaining how buying and selling practices impact consumer decisions
    - examining the use of economic principles and resources in making choices to satisfy needs and wants of individuals and families
    - comparing and contrasting the selection of goods and services by applying effective consumer strategies
    - recognizing the relationship between supply and demand and their role in meeting consumer needs
- analyze consumer decisions and how they impact the global economy, national trends, societal issues, family and economic principles by:
    - analyzing interrelationship between the economic system and consumer actions
    - explaining practices that will assist families to achieve and maintain economic self-sufficiency
- investigate how culture, media and technology impact the family and consumer decision making by:
    - comparing and evaluating products and services based on major factors (e.g. price, quality, availability, warranties, comparison shopping, impulse buying, features, peer pressure, culture, technology) when making consumer decisions
    - analyzing and evaluating ways consumer's buying practices are influenced by peer pressure, desire for status and advertising techniques (e.g., jingles/slogans, plain folks, magic ingredients, facts and figures, glittering generalities, endorsement/testimonial, bandwagon, snob appeal, emotional appeal, free gifts/rewards)
    - comparing and contrasting the relationship of the environment to family and consumer resources
- evaluate management practices (e.g., budgeting, time management, decision-making) of individual and families relating to food, clothing, shelter, health care, recreation and transportation
- examine economic impacts of laws and regulations that pertain to consumers and providers of services and explain how consumer rights and responsibilities are protected (e.g., government agencies, consumer protection agencies, consumer action groups)
- evaluate consumer actions (e.g., reuse, reduce, recycle, choosing renewable energy sources, using biodegradable packaging materials, composting) and analyze how these actions impact the environment (e.g., conserving resources, reducing water, air, and land pollution, reducing solid waste, conserving energy, greenhouse effect, slowing global warming) by:
    - describing the influence of environmental factors that positively and negatively affect health
    - researching local, state, national and international environmental issues that address consumption for conservation and waste management practices
- use print and electronic resources from home, school, and community that provide accurate and relevant health information

Big Idea: Financial Literacy

Financial literacy provides knowledge so that students are responsible for their personal economic well-being. As consumers, individuals need economic knowledge as a base for making financial decisions impacting short and long term goals throughout one's lifetime. Financial literacy will empower students by providing them with the knowledge, skills and awareness needed to establish a foundation for a future of financial responsibility and economic independence.

Academic Expectations

2.30 Students evaluate consumer products and services and make effective consumer decisions.
2.33 Students demonstrate the skills to evaluate and use services and resources available in their community.
5.4 Students use a decision-making process to make informed decisions among options.

High School Enduring Knowledge – Understandings

Students will understand that

- management of financial resource practices is needed to meet goals of individuals and families across the life span.
- saving plans (e.g., investments, savings accounts, stocks, bonds) and budgets are economic practices in making financial decisions.
- financial institutions (e.g., banks, brokerage firms, credit unions) provide consumer services that help in achieving financial goals.
- career choice and lifestyle impacts an individual's financial future.
- usage of credit involves risks and responsibilities for an individual's financial future.

High School Skills and Concepts

Students will

- analyze financial management practice, including budgeting, banking (e.g., check writing, balancing a checking account), savings and investments (e.g., advantages and disadvantages of savings accounts, stocks, bonds, mutual funds, certificates of deposit, IRAs, 401Ks) and explain their importance in achieving short and long-term financial goals by:
    - describing the risks and responsibilities associated with using credit (e.g., use of debit and credit cards, establishing and maintaining good credit, cause and effect of bankruptcy)
- create and evaluate a personal spending/savings plan determined by an individual's short- and long-term financial goals
- compare an electronic means of transfer (e.g., debit cards, ATM, automatic deposits/payments) offered by various financial institutions
- develop financial goals for the future based on one's lifestyle expectations and career choices

Big Idea: Career Awareness, Exploration, Planning

Career awareness, exploration and planning gives students the opportunity to discover the various career areas that exist and introduce them to the realities involved with the workplace. Many factors need to be considered when selecting a career path and preparing for employment. Career awareness, exploration and planning will enable students to recognize the value of education, learn how to plan for careers and integrate academic subjects.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work. Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
5.4 Students use a decision-making process to make informed decision among options.

High School Enduring Knowledge – Understandings
Students will understand that

- career choices impact life-long earning potential, career opportunities and job satisfaction.
- jobs/careers reflect both individual and societal needs and vary within communities and regions.
- resources are available in planning for an occupation in a career cluster.
- academic and technical skills in a variety of jobs are transferable and have commonalities.
- an Individual Learning Plan (ILP) is an academic and career planning tool.
- the transition process is continuous and focuses on post school outcomes.
- life-long learning in a global society is important for personal and professional growth.

High School Skills and Concepts
Students will

- analyze and evaluate why people need to work and how a person's career choice impacts lifelong earning potential, career opportunities, and job satisfaction
- explain how jobs/careers reflect both individual and societal needs by:
  - comparing and contrasting the many factors (e.g., family, environment, location) that must be considered when selecting and preparing for employment or a career path
- analyze the direct relationship of academic/technical skills, extracurricular activities, and community experiences to career preparation by:
  - researching career choice through the use of technology
  - evaluating job and career opportunities (e.g., veterinarian, sales associate, interior designer, meteorologist, physical therapist) in career clusters (e.g., Agriculture, Arts & Humanities, Business & Marketing, Communications, Construction, Education, Health Science, Human Services, Information Technology, Manufacturing, Public Services, Science & Mathematics, Social Sciences, Transportation) that vary within and among communities and regions
- create an educational plan that can impact their future career opportunities by:
  - accessing and evaluating resources for locating job/career information career paths related to interests, aptitude (e.g., academic skills), and abilities
  - updating and maintaining an Individual Learning Plan (ILP) to explore self-knowledge and academic aptitude and understand that career paths should relate to your individual traits (e.g., interests, abilities, learning styles, achievements, career goals)
  - explaining with examples postsecondary options (e.g., community technical colleges, 4-year colleges, military service) used when developing career goals that are included in the Individual Learning Plan (ILP)
- analyze how the changing roles of individuals and the workplace relate to the new opportunities for careers in a global society
- analyze how life-long learning in a global society is important for personal and professional growth

Big Idea: Employability Skills

Employability skills will focus on student's competencies with their work habits and academic/technical skills that will impact an individual's success in school and workplace. School-to-work transition skills will help students develop interpersonal skills and positive work habits.

Academic Expectations

2.36 Students use strategies for choosing and preparing for a career.
2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.
2.38 Students demonstrate skills such as interviewing, writing résumé and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.
3.6 Students demonstrate the ability to make decisions based on ethical values.

High School Enduring Knowledge – Understandings

Students will understand that

- interpersonal skills impact individual's career choice and success in the workplace.
- employability skills are important to achieve success in the workplace.
- academic and technical skills prepare them for obtaining, maintaining, advancing and changing employment.
- team skills are essential in achieving success in the workplace.

Big Idea: Employability Skills – Continued

High School Skills and Concepts
Students will

- analyze how interpersonal skills impact individual's career choice and success in the workplace by:
  - identifying effective group interaction strategies (e.g., communicating effectively, conflict resolution, compromise) to develop team skills (e.g., goal-setting, questioning, dividing work)
  - analyzing and evaluating the role of each participant's contribution in a team setting
  - evaluating the importance of working cooperatively with people of diverse backgrounds and abilities to achieve success in the workplace
  - designing a plan for working cooperatively with others by contributing ideas, suggestions and efforts to complete a task
  - explaining how effective verbal and nonverbal communication skills impacts work-related situations
- evaluate how employability skills are important to achieve success in the workplace by:
  - demonstrating leadership skills by participating in co/extra-curricular activities, home, school and community
  - analyzing the leadership qualities of a successful person and explain how the qualities described are essential to successful employment in any career (e.g., self-directed, effective at time management, problem-solving skills, positive attitude)
  - evaluating personal attitudes and work habits that support career retention and advancement
  - describing consequences for actions when disobeying rules and routines at the workplace
  - explaining the role of authority in school and the workplace
  - explaining the importance of developing good work ethics/habits (e.g., initiative, time management, respect, self-discipline, problem-solving) that support career retention and advancement
- examine how academic and technical skills prepare them for obtaining, maintaining, advancing and changing employment by:
  - using technology to research job/careers in the community
  - explaining how success in an academic course of study could contribute to the achievement and success in employment (e.g., Physical Education/Personal Trainer, ~~Arts and Humanities~~ Visual and Performing Arts/Musician)
  - explaining how success in an technical course of study could contribute to the achievement and success in employment (e.g. Information Technology/Programmer, Communications/Broadcast Technician)
  - demonstrating the relationship between academic achievement and how it effects success in the workplace by creating or evaluating an Individual Learning Plan (ILP)

Big Idea: Communication/Technology

Special communication and technology skills are needed for success in schooling and in the workplace. Students will be able to express information and ideas using a variety of technologies in various ways.

Academic Expectations

1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

2.37 Students demonstrate skills and work habits that lead to success in future schooling and work.

2.38 Students demonstrate skills such as interviewing, writing resumes, and completing applications that are needed to be accepted into college or other postsecondary training or to get a job.

High School Enduring Knowledge – Understandings

Students will understand that

- scientific and technological advancements can impact careers in the global economy.
- technology skills can enhance learning and be used in developing a career plan.
- communication and technological skills are used to seek, obtain and change jobs/careers.

High School Skills and Concepts

Students will

- describe how job market changes have resulted from scientific advancements and the increase use of technology in the global economy
- evaluate the purpose of technology tools (e.g., satellite, automated phone systems, on-line courses, computer-aided drafting (CAD), graphing calculators, spreadsheets, databases, Internet, on-line banking) and multi-media (Internet, digital camera, teleconferencing, debit/credit cards) and analyze how these impact productivity in homes, schools and jobs by:
  - demonstrating how to work cooperatively and collaboratively with peers when using technology in the workplace
  - explaining how technology provides access to information and resources at home, school and the workplace
  - practicing social/work etiquette needed when using telephone/cell phone, Internet and email at home, school and in the workplace
  - continuing to update the Individual Learning Plan (ILP) to provide a focus for transitioning to post school outcomes
  - describing the role of technology within a community in maintaining safe and healthy living environment
  - assessing the availability of emerging technology and the impact that it has on individuals, families, and workplace
- explain how communication and technological skills are used to seek, obtain and change jobs/careers by:
  - examining effective speaking and listening skills used in a job interview
  - applying skills used to seek, obtain, maintain, and change jobs/careers and transition to postsecondary opportunities: conducting a job search, writing letters, completing an application, securing a letter of reference, preparing a résumé, applying interview techniques, and using proper procedures when changing jobs

ADDITIONAL CURRICULUM EXPERIENCES

Military Science (Junior Reserve Officers Training Corps)

Kentucky high schools are accountable for helping students make a successful transition to work, postsecondary studies and the military. Courses in the military science program or Junior Reserve Officers Training Corps (ROTC) provide high school students with opportunities to develop leadership and management skills they can carry into adult life.

The Junior ROTC program offers training that develops a student’s citizenship, self-discipline, character, team-building skills and respect for authority in a democratic society. Students also gain an understanding of national security requirements.

Career counseling and communications skills are combined with problem-solving and logical thinking to aid students in pursuing career paths or choices in the military or other occupations. Integration of knowledge with other content areas, such as mathematics, science, social studies, health and physical education is encouraged.

Field experiences, close-order drill, marksmanship training, uniform inspections and ceremonies also are part of the military science program curriculum. The program also stresses hygiene, physical fitness, first-aid and survival skills, and a healthy lifestyle.

Students in these programs receive an introduction to the organization of specific military branches. Four military science programs may be offered in Kentucky high schools: Air Force, Army, Marine and Navy Junior ROTC. The content in each program varies with the nature of the military branch.

World Language

All Kentucky students are expected to be able to communicate effectively in a second language, according to Academic Expectation 2.28. Postsecondary education often expects entering students to have a basic competency in at least one world language. Kentucky students also are expected to be able to demonstrate interculturality: to be able to interact effectively and work cooperatively with the diverse ethnic and cultural groups of our nation and world, interpreting and adapting to different cultures' perspectives, practices and products across languages.

Competency in at least one other world (foreign) language is a vital skill in today's global society. World Language is a term that refers to any language that is not the student's mother tongue. This language could be, for example, American Sign Language, Arabic, Chinese, French, German, Greek, Italian, Japanese, Latin, Spanish and English for Limited English Proficient (LEP) students.

World language learning experiences prepare Kentucky students:

- to enter postsecondary studies with skills on par with students from other states and countries
- to compete in the global marketplace and ensure Kentucky's international and economic vitality
- to interact with Kentucky's increasingly multilingual and multicultural population
- to participate as global citizens in a diverse intercultural and plurilingual society

One of the most important factors influencing development of language proficiency is the amount of time devoted to working in the language. Developing second language skills at the expected level of competency suggests an early start in well-articulated sequences of learning.

All language learning programs should focus on developmentally appropriate experiences that build communicative and cultural competence, support first language literacy, reinforce the core content, offer students meaningful opportunities beyond the classroom, and present an inclusive approach to culture.

In preschool, kindergarten and primary grades, an emphasis is typically placed on the development of oral language and literacy skills in the second language. Instruction is most effective if delivered in the target language while engaging children in language acquisition activities that include conversation, music, games, Total Physical Response and hands-on projects.

Research shows that early language learning increases cognitive development in areas of critical thinking, problem solving, creativity, conceptualization and reasoning. Early language learning also develops literacy skills that transfer to and reinforce the student's first language.

Middle level programs build on this early language learning experience by focusing on language production; increasing content-related, inquiry-based, integrated and thematic learning; introducing career topics and service-learning activities that connect students to the community; and, when possible, allowing students to layer on the learning of yet another language. Language learning at the middle level has been shown to increase students' positive attitudes toward cultural diversity, to facilitate the acquisition of subsequent languages and to build English language skills.

In high school, a variety of language learning opportunities exist to meet diverse student needs. These may include access to a range of study from beginning level through Advanced Placement courses, virtual or distance learning courses, units of study in technical areas (i.e., Spanish for agriculture or medicine, business German), work experience (i.e., in a migrant worker day care facility), dual credit courses (i.e., ~~Arts and Humanities~~ Visual and Performing Arts content taught in French at the third- or fourth-year level or in postsecondary courses), international study trips, and performance-based credit.

SPECIAL CONSIDERATIONS

ADDITIONAL TOPICS

Children and Youth with Disabilities

Kentucky expects all students to achieve at high levels and holds schools accountable for providing standards-based curricula and learning experiences that ensure this achievement. Kentucky's Learning Goals and Academic Expectations define a broad framework of what all students, including students with disabilities, should know and be able to do as a result of progressing through an educational course of study in Kentucky's schools. *Kentucky Academic Standards for Kentucky Schools P-12* is written to be inclusive of all students. The document contains the minimum content standards for each subject area – primary through high school – including the high school graduation requirements.

A comprehensive curriculum framework, or course of study for children and youth with disabilities, is based on Kentucky's learning goals, academic expectations, the content standards in the *Kentucky Academic Standards* and each school's curricula. This course of study also addresses other educational needs that result from the student's disability. The course of study enables students with disabilities to access and participate in the general curriculum. Schools extend and modify curricula for students with disabilities to facilitate attainment of Kentucky's learning goals, academic expectations, the required content standards and each individual student's Individual Education Program (IEP) goals and objectives.

Children and youth with educational disabilities, as defined by federal statutes and regulations, as well as Kentucky Revised Statues and Administrative Regulations, need specially designed instruction. For a student with educational disabilities, the Admissions and Release Committee (ARC) or 504 Committee develops a student's IEP or 504 Plan to support the student's opportunity to learn, to assist a student with disabilities to access the general education curriculum, achieve performance or achievement standards and attain the content standards designed for all students.

The IEP and 504 Plan identify the specially designed instruction, research-based instructional strategies, any special services and accommodations, extensions and modifications needed by an individual student to make sure the student has the supports needed to learn and to earn a diploma or a Certificate of Work Readiness and Employability Program for Students with Disabilities. The IEP and 504 Plan, however, are not a comprehensive curriculum. They are a support system.

For students with disabilities, achieving high levels of learning and being prepared for postsecondary education, work and the community requires alignment of a student's course of study with the knowledge, concepts and skills for each required content area outlined in the *Kentucky Academic Standards*. Highly qualified teachers, as defined by state and federal statutes and regulations, must deliver curriculum content. Therefore, planning, designing and delivering the curriculum must be a collaborative effort between general education and special education teachers to assure appropriate instruction for students with disabilities.

At all levels (primary, intermediate, middle level and high school), the curriculum, coursework and standards for students with disabilities shall be aligned with *Kentucky's Academic Expectations*, the content standards outlined in the *Kentucky Academic Standards,* and the student's IEP or 504 Plan.

Students with disabilities pursue a course of study leading to a standard diploma or a Certificate of Work Readiness and Employability Program for Students with Disabilities. A brief synopsis of these courses of study follows.

Standard Diploma Course of Study Program
Schools are to provide students with disabilities the opportunity and necessary instructional supports and accommodations to progress through a course of study leading to a standard diploma. Courses include the required content standards as outlined in the *Kentucky Academic Standards* for each content area. Students with disabilities who earn the required high school credits through successful completion of content area and elective coursework as described in the *Kentucky Academic Standards* and consistent with 704 KAR 3:305 shall be awarded a diploma.

Certificate Program for Students with Disabilities
Until the graduating class of 2012, schools and districts may continue to provide a course of study leading to a certificate recognizing the achievement of students with disabilities whose disabilities preclude a course of study leading to a standard high school diploma. Beginning with the graduating class of 2012, schools and districts shall provide a course of study leading to a certificate. This certificate shall verify a student's successful preparation for transition from high school to work. Districts and schools may provide a course of study leading to such a certificate to students prior to the graduating class of 2012.

For a student whose disability precludes a course of study leading to a standard diploma consistent with the requirements of 704 KAR 3:305, a student's ARC shall determine eligibility for the alternative course of study by documenting that the following criteria are met:

- The student's demonstrated cognitive disability and adaptive behavior itself prevent completing the regular course of study leading to a standard diploma, even with program modifications, adaptations and extended school services;
- The student's current adaptive behavior requires extensive direct instruction in multiple settings to apply and generalize functional and work-readiness skills in school, work, home and community environments;
- The student's inability to complete the course of studies is not the result of excessive or extended absences nor the result of visual or auditory disabilities; specific learning disabilities; emotional behavioral disabilities; or social, cultural or socioeconomic differences;
- The student, when instructed solely or primarily through school-based instruction, is unable to apply academic skills at a minimal competency level in natural settings; and
- The student is unable to acquire, maintain and generalize skills without intensive, frequent and individualized community-based instruction

The ARC makes the decision that a student is eligible for the alternative course of study only after a thorough review and documentation that the student meets the criteria stated above. The ARC must clearly document the decision in the student's records and reflect the course of study in the student's IEP. This decision is reviewed annually by the student's ARC to make sure the decision is still appropriate and that there have not been changes that would enable the student to pursue a standard diploma and achieve the content and performance standards of the standard curriculum/course of study.

At all levels (primary, intermediate, middle level and high school), the curriculum, coursework and standards for students pursuing a work-readiness and employability certificate shall be aligned with *Kentucky's Academic Expectations*, the content standards outlined in the *Kentucky Academic Standards* and the student's IEP. The course of study may be adjusted and based on a narrower breadth, depth and complexity of content standards and reflect alternative performance or achievement standards. It must promote access to the standard/general curriculum and provide the opportunity for students to be involved in and to progress in the general education curriculum regardless of where instructional services are provided. The course of study, including the content and achievement standards, must be challenging for the eligible students with disabilities, must support individual growth and must build on the individual student's present level of performance.

There are a variety of ways a student with significant disabilities pursuing this course of study may access the standard/general curriculum. Some options include students participating in:

- curricular activities in the same way as other students
- the same activities but different levels than other students
- the same activities but different educational goals that are embedded into the classroom activities and routines
- a different activity with different goals but related to the classroom activities

Typically this course of study includes a range of curricular options critical to successful transition based on the general/standard curriculum and such life domains as career/vocational (e.g., job exploration, job skills, career and transition planning), recreation/leisure, communication and personal management (e.g., community and daily living). Instruction and student learning is in the context of real-life applications that students experience at school, in the home and community or on the job.

Students with disabilities who complete this course of study are not eligible for a standard diploma as defined in 704 KAR 3:305.

Programs for Students with Limited English Proficiency (LEP)

Kentucky offers equal educational opportunities for all students identified as Limited English Proficient (LEP) across all grade levels, primary through grade 12, as outlined by Title VI of the federal Civil Rights Act of 1964, and Title I and Title III of the federal No Child Left Behind Act of 2001. The term “limited English proficient” is used for a student aged 3 through 21 who was not born in the United States or whose native language is a language other than English or who comes from an environment where a language other than English has significantly affected the student’s ability to meet Kentucky’s proficient level of achievement on state assessments or the student’s ability to achieve success in classrooms where the language of instruction is English.

Schools and districts must provide students with limited English proficiency the educational opportunities to meet the same standards for academic performance expected for all Kentucky children and to participate in the same range of course offerings and content as all Kentucky students. A comprehensive curriculum framework or course of study for students with limited English proficiency will promote language and cognitive development and include consideration of a student’s native language and cultural background.

To ensure that students with limited English proficiency have access to the school’s curriculum, an alternative language program that is recognized by experts in the field may be provided. The alternative language program should effectively implement the educational theory adopted by the school and demonstrate success in helping students overcome language barriers.

School personnel are allowed flexibility in designing the educational program, interventions and instructional strategies necessary to meet the unique needs of students with limited English proficiency based on proven practices in second language acquisition. Models for delivering the course of study may include alternative language programs: English as a Second Language (ESL), sheltered instruction in English or content-based programs, structured immersion programs, bilingual programs and modified general education classes. Other models that meet the above Office for Civil Rights criteria also may be considered.

Schools shall provide students with limited English proficiency the opportunity and necessary instructional and program supports, including necessary accommodations, to progress through a course of study leading to a high school diploma. Students with limited English proficiency may pursue a course of study in an alternative language program leading to a high school diploma if the alternative course of study includes the minimum rigorous content standards defined in the *Kentucky Academic Standards* for each content area. In high school programs, English as a Second Language may be offered for credit in accordance with these requirements.

Students with limited English proficiency may pursue a course of study leading to a diploma in one or a combination of the following ways:

- completion of at least 22 credits as described in 704 KAR 3:305 and the *Kentucky Academic Standards*; or
- completion of 22 credits based on submission by a local board of education of an integrated, applied, interdisciplinary, or higher level course for a required course if the alternative course provides rigorous content and addresses the same academic expectations and same applicable components of 703 KAR 4:060. For the graduating class of 2012 a technical/occupational course may also be considered as an alternative.

Programs for the Gifted and Talented

Kentucky offers educational services for all students across all grade levels, primary through grade 12, who are identified as gifted and talented as outlined in Kentucky Revised Statute (KRS) 157.230 (Programs for Exceptional Children). “Gifted and talented” is defined as a student identified as possessing potential or demonstrated ability to perform at an exceptionally high level in general intellectual aptitude, specific academic aptitude, creative or divergent thinking, psychosocial or leadership skills, and/or the visual or performing arts.

Students who are gifted and talented have special learning needs that are commonly addressed through curricula modifications such as differentiation, resource services or advanced placement courses. A student, primary through grade 12, who is identified as possessing gifted characteristics, behaviors or talents shall be provided services articulated with the general education program. They include curricular and instructional experiences matched to the specific interests, needs, age and abilities of the student and accommodate the different types of giftedness. Differentiation may require modifying the complexity, depth, and pace of the curriculum. These services and learning experiences are designed to supplement and build on the required content standards, including the enduring knowledge, concepts and skills for each content area in the Kentucky Academic Standards. They are generally differentiated to meet the needs of the student, often providing opportunities for students to enrich comprehension of the curriculum, construct multiple connections among content areas and pursue content deeply. These experiences also provide for continuous progress. For students in the primary program, services shall be provided within the framework of the primary program and the primary talent pool.

For students in grades 4-12 who are formally identified, districts and schools must provide service options outlined in a student’s Gifted Student Services Plan (GSSP) consistent with the requirements of 703 KAR 3:285.

Career and Technical Education

Career and Technical Education is an essential component of the high school curriculum. It is critical in meeting the needs of all students in academic achievement, career exploration, career preparation and leadership development. Career and Technical Education assists schools in providing students with skills necessary for a successful transition to postsecondary education, the work place or military and a desire for lifelong learning in a global society.

High-quality career and technical programs prepare students for further study at the postsecondary level in a technical field or for successful entry into the work force after high school graduation. These programs are in the areas of Agriculture, Business, Family and Consumer Sciences, Health Science, Information Technology, Industrial Education, Marketing, Pathway to Careers and Technology Education.

The major components of Career and Technical Education programs include the following:

- career advising and guidance to help all students develop the state-required Individual Learning Plan
- career pathways in which sequences of rigorous, academic, and career and technical courses are aligned with career clusters and linked to postsecondary education
- occupational Skill Standards and Assessments to identify and measure skills determined most critical by business and industry (Industry-recognized occupational skill standard certificates endorsed by business and industry will be awarded to students who meet certification requirements.)
- instructional content aligned with academic expectations and state or national occupational skill standards recognized by business and industry
- Career and Technical Student Organizations (CTSO), which are integral parts of the specific program areas and available to all students enrolled
- work-based learning opportunities such as cooperative education or internships relevant to the programs in which students are enrolled and to their career goals
- real-world contextual learning experiences that provide students with increased opportunities to apply academic content within a career area
- opportunity for students to earn certificates upon completing four credits in a career major or completion of specified tasks within a career area

High school graduation requirements allow for interdisciplinary or applied courses to substitute for specific academic courses required for graduation. This option provides high schools the opportunity to offer courses that have the same academic rigor and include the required content standards for specific content areas as traditional courses but deliver the content through more contextual, hands-on approaches.

Several interdisciplinary courses that meet the high school graduation requirements have been developed in Career and Technical Education. Any high school, career and technical center, or area technology center would be eligible to offer interdisciplinary courses.

Career and Technical Student Organizations provide a unique program of career and leadership development for middle level and high school students enrolled or who have been enrolled in Career and Technical Education programs. A CTSO is a powerful instructional tool when integrated into the classroom by a Career and Technical Education teacher committed to the development of the total student. Organized activities provide opportunities for students to gain personal and leadership skills that help make them more employable, prepare them to become productive citizens and assist them in assuming positive roles in home and community.