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; and
- 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, the humanities, social studies, English/language arts, health, 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; and
  - 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, and
- 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 (LSAC), the Kentucky Board of Education (KBE) 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 content standards for 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., science, 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.

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 VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – Visual and Performing Arts – Primary Level

Grades K-3

The 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). b. Explore different ways to do basic locomotor and non-locomotor movements by changing at least one of the elements of 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. b. Explore a variety of locomotor and non-locomotor movements by experimenting with and changing the elements of dance.	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. b. Combine a variety of movements while manipulating the elements of dance.	a. Experiment with a variety of self-identified stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences) for movement. 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. b. Demonstrate tempo contrasts with movements that match to tempo of sound stimuli.	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. b. Relate quick, moderate and slow movements to duration in time. Recognize steady beat and move to varying tempi of steady beat.	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. 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.	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. 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. b. Make changes to the content, form, or presentation of media artworks and share results.	a. Create, capture, and assemble media arts content for media arts productions, identifying basic principles, such as pattern and repetition. b. Practice and identify the effects of making changes to the content, form, or presentation, in order to refine and finish media artworks.	a. Construct and assemble content for unified media arts productions, identifying and applying basic principles, such as positioning and attention. b. Test and describe expressive effects in altering, refining, and completing media artworks.	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. 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 purpose.	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 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.

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?			
Kindergarten **MU:Cr1.1.K**	**1st** **MU:Cr1.1.1**	**2nd** **MU:Cr1.1.2**	**3rd** **MU:Cr1.1.3**
a. With guidance, explore and experience music concepts (such as beat and melodic contour).	a. With limited guidance, create musical ideas (such as answering a musical question) for a specific purpose.	a. Improvise rhythmic and melodic patterns and musical ideas for a specific purpose.	a. Improvise rhythmic and melodic ideas, and describe connection to specific purpose and context (such as personal and social).
b. With guidance, generate musical ideas (such as movements or motives).	b. With limited guidance, generate musical ideas in multiple tonalities (such as major and minor) and meters (such as duple and triple).	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).	b. Generate musical ideas (such as rhythms and melodies) within a given tonality and/or meter.

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. b. With guidance, use suggested strategies in rehearsal to improve the expressive qualities of music.	a. With limited guidance, apply personal, teacher, and peer feedback to refine performances. b. With limited guidance, use suggested strategies in rehearsal to address interpretive challenges of music.	a. Apply established criteria to judge the accuracy, expressiveness, and effectiveness of performances. b. Rehearse, identify and apply strategies to address interpretive, performance, and technical challenges of music.	a. Apply teacher-provided and collaboratively-developed criteria and feedback to evaluate accuracy of ensemble performances. 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).	a. Propose potential choices characters could make in a guided drama experience (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).	a. Create roles, imagined worlds, and improvised stories in a drama/theatre work.
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).	b. Collaborate with peers to conceptualize costumes and props 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).	b. Imagine and articulate ideas for costumes, props and sets for the environment and characters in a drama/theatre work.
	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).	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).	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). b. Identify similarities and differences in sounds and movements in a guided drama experience (e.g., process drama, story drama, creative drama). c. Collaborate to imagine multiple representations of a single object 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). b. Use and adapt sounds and movements 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).	a. Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work. b. Participate and contribute to physical and vocal exploration in an improvised or scripted drama/theatre work. c. Practice and refine design and technical choices to support a devised or scripted 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 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?</td></tr>
<tr><th>Kindergarten
TH:Pr4.1.K.</th><th>1st
TH:Pr4.1.1.</th><th>2nd
TH:Pr4.1.2.</th><th>3rd
TH:Pr4.1.3.</th></tr>
<tr><td>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).</td><td>a. Describe a story's character actions and dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>a. Interpret story elements in a guided drama experience (e.g., process drama, story drama, creative drama).</td><td>a. Apply the elements of dramatic structure to a story and create a drama/theatre work.</td></tr>
<tr><td></td><td>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).</td><td>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).</td><td>b. Investigate how movement and voice are incorporated into drama/theatre work.</td></tr>
</table>

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.

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?			
Kindergarten TH:Pr6.1.K.	**1st TH:Pr6.1.1.**	**2nd TH:Pr6.1.2.**	**3rd TH:Pr6.1.3.**
With prompting and support, use voice and sound in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).	With prompting and support, use movement and gestures to communicate emotions in a guided drama experience (e.g., process drama, story drama, creative drama).	Contribute to group guided drama experiences (e.g., process drama, story drama, creative drama) and informally share with peers.	Practice drama/theatre work and share reflections individually and in small groups.

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?			
Kindergarten TH:Re7.1.K.	**1st TH:Re7.1.1.**	**2nd TH:Re7.1.2.**	**3rd TH:Re7.1.3.**
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).	Recall choices made in a guided drama experience (e.g., process drama, story drama, creative drama).	Recognize when artistic choices are made in a guided drama experience (e.g., process drama, story drama, creative drama).	Understand why artistic choices are made 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?

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.

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?			
Kindergarten TH:Cn10.1.K.	**1st TH:Cn10.1.1.**	**2nd TH:Cn10.1.2.**	**3rd TH:Cn10.1.3.**
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).	Identify character emotions in a guided drama experience (e.g., process drama, story drama, creative drama) and relate it to personal experience.	Relate character experiences to personal experiences in a guided drama experience (e.g., process drama, story drama, creative drama).	Use personal experiences and knowledge to make connections to community and culture 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?			
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).	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).	a. Identify similarities and differences in stories from multiple cultures 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. With prompting and support, tell a short story in dramatic play or 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).	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).	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 environments.	Speculate about processes an artist uses to create a work of art.

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 SCIENCE

The *Kentucky Academic Standards for Science* is 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 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. The **two** 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).

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)		

*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	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. • 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)	**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)*	**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)

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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'ssurface. [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 overtime. [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)

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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	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. • 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)	**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)	**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)

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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 bymimicking 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	Disciplinary Core Ideas	Crosscutting Concepts
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)	**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)	**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)

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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)

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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 bytheir 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 bereversed 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)

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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

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)

Disciplinary Core Ideas

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)*

Crosscutting Concepts

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)

*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.

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	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 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)	**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)*	**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)

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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 objectsdown.]

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	Disciplinary Core Ideas	Crosscutting Concepts
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)	**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)	**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)

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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	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. • 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)	**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)	**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)

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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 incommon 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	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 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)	**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)	**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)

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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	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 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)	**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.)*	**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)

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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:*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
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)	**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)	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)
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)		

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)

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 – the 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 VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – Visual and Performing Arts – Intermediate Level

Grades 4 and 5

The 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 conveymeaning

   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.

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?	
4th **DA:Pr4.1.4**	**5th** **DA:Pr4.1.5**
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.	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.

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.	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. Execute techniques that extend movement range, build strength, and develop endurance. Explain the relationship between execution of technique, safe body-use, and healthful nutrition.	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. 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.	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.

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?	
4th **DA:Re8.1.4**	**5th** **DA:Re8.1.5**
Relate movements, ideas, and context to decipher meaning in a dance using basic dance terminology.	Interpret meaning in a dance based on its movements. Explain how the movements communicate 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?	
4th **DA:Re9.1.4**	**5th** **DA:Re9.1.5**
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.	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.

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.

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?	
4th **TH:Cr1.1.4.**	**5th** **TH:Cr.1.1.5.**
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.	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

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?	
4th **TH:Cr2.1.4.**	**5th** **TH:Cr2.1.5.**
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.	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.

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.

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?	
4th **VA:Cr1.1.4**	**5th** **VA:Cr1.1.5**
Brainstorm multiple approaches to a creative art or design problem.	Combine ideas to generate an innovative idea for art-making.

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?	
4th **VA:Cr1.2.4**	**5th** **VA:Cr1.2.5**
Collaboratively set goals and create artwork that is meaningful and has purpose to the makers.	Identify and demonstrate diverse methods of artistic investigation to choose an approach for beginning a work of art.

<table>
<tr><td>Discipline: Visual Arts</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">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?</td></tr>
<tr><td>4th
VA:Cr2.1.4</td><td>5th
VA:Cr2.1.5</td></tr>
<tr><td>Explore and invent art-making techniques and approaches.</td><td>Experiment and develop skills in multiple art-making techniques and approaches through practice.</td></tr>
</table>

<table>
<tr><td>Discipline: Visual Arts</td><td>Artistic Process: Creating</td></tr>
<tr><td colspan="2">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?</td></tr>
<tr><td>4th
VA:Cr2.2.4</td><td>5th
VA:Cr2.2.5</td></tr>
<tr><td>When making works of art, utilize and care for materials, tools, and equipment in a manner that prevents danger to oneself and others.</td><td>Demonstrate quality craftsmanship through care for and use of materials, tools, and equipment.</td></tr>
</table>

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 SCIENCE

The *Kentucky Academic Standards for Science* is 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 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. The ***two*** 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).

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 ofenergy.]

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	Disciplinary Core Ideas	Crosscutting Concepts
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)	**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)*	**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)

*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

4. Waves: Waves and Information

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.]

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 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)	**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)*	**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)

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)

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)

*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)

*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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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 occurswhen 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	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. (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)	**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)	**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)

*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	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. • 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)	**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)	**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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

5. Earth's Systems

<table>
<tr><th colspan="3">5. Earth's Systems</th></tr>
<tr><td colspan="3">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.</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><th>Science and Engineering Practices</th><th>Disciplinary Core Ideas</th><th>Crosscutting Concepts</th></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 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)</td><td>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)</td><td>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)</td></tr>
<tr><td colspan="3">Connections to other DCIs in fifth grade: N/A</td></tr>
<tr><td colspan="3">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)</td></tr>
</table>

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.
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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 byEarth 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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

3-5. Engineering Design

<table>
<tr><td colspan="3">3-5. Engineering Design</td></tr>
<tr><td colspan="3">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.</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><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 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)</td><td>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)</td><td>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)</td></tr>
<tr><td colspan="3">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</td></tr>
<tr><td colspan="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)</td></tr>
</table>

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 – the 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., 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 21st 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 VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – Visual and Performing Arts – Middle Level

Grades 6-8

The 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.	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.	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. 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.	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.	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.	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.	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. Explore or invent a system to record a dance sequence through writing, symbols, or a form of media technology.	b. Investigate a recognized system to document a dance sequence by using words, symbols, or media technologies.	b. Experiment with aspects of a recognized system to document a section of a dance by using words, 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 and appropriately apply them to technique exercises and dance phrases.	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 what dancers must do to perform them clearly.	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 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.	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).	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. Apply basic anatomical knowledge, proprioceptive feedback, spatial awareness, and nutrition to promote safe and healthful strategies when warming up and dancing.	b. Utilize healthful practices and sound nutrition in dance activities and everyday life. Discuss benefits of practices and how choices enhance performance.	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 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. Document self-improvements over time.	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 expectations based on information gained from observations).	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 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-performance, accept notes from choreographer and make corrections as needed and apply to future performances.	a. Recommend changes to and adapt movements to performance area. Use performance etiquette and performance practices during class, rehearsal and performance. Maintain journal documenting these efforts. Post-performance, accept notes from choreographer and apply corrections to future performances.	a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Use performance etiquette and 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. 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.	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.	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.	a. Compare, contrast, and discuss patterns of movement and their relationships in dance.	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 dance genres, styles, or cultural movement practices. Use genre-specific dance terminology.	b. Compare and contrast how the elements of dance are used in a variety of genres, styles, or cultural movement practices. Use genre-specific dance terminology.	b. Explain how the elements of dance are used in a variety of genres, styles, or cultural 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 from a genre, style, or cultural movement practice and develop artistic criteria to critique the dance using genre-specific dance terminology.	a. Compare artistic intent, content and context from dances to examine the characteristics of genre, style, or cultural movement practice. Based on the comparison, refine artistic criteria using genre-specific dance terminology.	a. Use artistic criteria to determine what makes an 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.	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.	a. Relate connections found between different dances and discuss the relevance of the connections to the development of one's personal perspectives.
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.	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.	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 brainstorming.	Produce a variety of ideas and solutions for media artworks through application of chosen inventive processes, such as concept modeling and prototyping.	Generate ideas, goals, and solutions for original media artworks through application of focused creative processes, such as divergent 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 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.	a. Coordinate production processes to integrate content and components for determined purpose and 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.	a. Implement production processes to integrate content and stylistic conventions for determined 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 performance	Integrate multiple contents and forms into unified media arts productions that convey consistent perspectives and narratives, such as an interactive video game.	Integrate multiple contents and forms into unified media arts productions that convey specific themes or ideas, such as interdisciplinary 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.	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.	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. Develop a variety of creative and adaptive innovation abilities, such as testing constraints, in developing solutions within and through media arts productions.	b. Exhibit an increasing set of creative and adaptive innovation abilities, such as exploratory processes, in developing solutions within and through media arts productions.	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 and techniques in standard and experimental ways in constructing media artworks.	c. Demonstrate adaptability using tools and techniques in standard and experimental ways to achieve an assigned purpose in constructing media artworks.	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.	a. Access, evaluate and use internal and external resources to inform the creation of media artworks, such as experiences, interests, research, and exemplary works.	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 show how media artworks form new meanings, situations, and cultural experiences, such as historical events.	b. Explain and show how media artworks form new meanings and knowledge, situations, and cultural experiences, such as learning, and new information.	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.	a. Evaluate their own work, applying selected criteria such as appropriate application of elements of music including style, form, and use of sound sources.	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 making revisions to the music based on evaluation criteria and feedback from their teacher.	b. Describe the rationale for making revisions to the music based on evaluation criteria and feedback from others (teacher and peers).	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.	a. Explain and demonstrate the structure of contrasting pieces of music selected for performance and how elements of music are used.	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, read and identify by name or function standard symbols for rhythm, pitch, articulation, and dynamics.	b. When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch articulation, dynamics, tempo, and form.	b. When analyzing selected music, sight-read in treble or bass clef simple rhythmic, melodic, and/or harmonic notation.
c. Identify how cultural and historical context inform performances.	c. Identify how cultural and historical context inform performances and result in different music interpretations.	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.	a. Perform the music with technical accuracy and stylistic expression to convey the creator's intent.	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 and purpose.	b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue, purpose, and context.	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.	a. Classify and explain how the elements of music and expressive qualities relate to the structure of contrasting pieces.	a. Compare how the elements of music and expressive qualities relate to the structure within programs of music.
b. Identify the context of music from a variety of genres, cultures, and historical periods.	b. Identify and compare the context of music from a variety of genres, cultures, and historical periods.	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?		
6th **VA:Cr1.1.6**	**7th** **VA:Cr1.1.7**	**8th** **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?		
6th **VA:Cr1.2.6**	**7th** **VA:Cr1.2.7**	**8th** **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 materials, tools, and equipment.	Demonstrate awareness of ethical responsibility to oneself and others when posting and sharing images and other materials through the Internet, social media, and other communication formats.	Demonstrate awareness of practices, issues, and ethics of appropriation, fair use, 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 accordingly.	Reflect on and explain important information about personal artwork in an artist statement or another format.	Apply relevant criteria to examine, reflect on, and plan revisions for a work of art or 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 displaying works of art, analyzing exhibit space, the needs of the viewer, and the layout of the exhibit.	Based on criteria, analyze and evaluate methods for preparing and presenting art.	Collaboratively prepare and present selected theme-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 people live around the world and what they value.	Explain how the method of display, the location, and the experience of an artwork influence how it is perceived and valued.	Explain how a person's aesthetic choices are 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, characteristics of form and structure, and use of media to identify ideas and mood conveyed.	Interpret art by analyzing art-making approaches, the characteristics of form and structure, relevant contextual information, subject matter, and use of media to identify ideas and mood conveyed.	Interpret art by analyzing how the interaction of subject matter, characteristics of form and structure, use of media, art-making approaches, and 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 could be investigated in art- making.	Individually or collaboratively create visual documentation of places and times in which people gather to make and experience art or design in the community.	Make art collaboratively to reflect on and reinforce positive aspects of group 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 SCIENCE

The *Kentucky Academic Standards for Science* is 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 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. The ***two*** 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).

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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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

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)

Disciplinary Core Ideas

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)*

Crosscutting Concepts

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

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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	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 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)	**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)	**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)

*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. 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 multiple variables 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)

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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. **Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth 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. **Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem 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.(secondaryto07-LS1-7)

LS1.C: Organization for Matter and Energy Flow in Organisms
Plants, algae (including phytoplankton), and manymicroorganisms 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

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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)

*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. 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 technologiesleadingtothese scientificdiscoveries.]

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 andmethods.
Gather, read, andsynthesizeinformation 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 thereforegenes)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 eachother.(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

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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 HardyWeinberg 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

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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 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)

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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 atridges 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)

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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 energythat 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)		

*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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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

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 bymultiple 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)

Disciplinary Core Ideas

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)

Crosscutting Concepts

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

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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

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Kentucky Department of Education

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.

BigIdea: Research, Inquiry/Problem-Solvingand 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 – the 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 – the 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 Studentsuseadecision-makingprocesstomakeinformeddecisionamongoptions.

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, Visual and Performing Arts, 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 – the 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, Visual and Performing Arts, 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., 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; and
    - 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; and
- 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 VISUAL AND PERFORMING ARTS

Kentucky Academic Standards – 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 conveymeaning

   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 elevenoverarching 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. 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.	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. 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.	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. 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 performance goals and justify reasons for selecting particular practice strategies.	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.

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. 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. 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.	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 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. 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.	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 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. 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 cultural movement practices within its cultural context to communicate intent. Use genre-specific dance terminology.	b. Analyze and compare the movement patterns and their relationships in a variety of genres, styles, or cultural movement practices and explain how their differences impact communication and intent within a cultural context. Use genre-specific dance terminology.	b. Explain how dance communicates aesthetic and cultural values in a variety of 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 methods to formulate multiple ideas, develop artistic goals, and problem solve in media arts creation processes.	Strategically utilize generative methods to formulate multiple ideas, refine artistic goals, and increase the originality of approaches in media arts creation processes.	Integrate aesthetic principles 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. 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. 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. 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 unified media arts productions, considering the reaction and interaction of the audience, such as experiential design.	Integrate various arts, media arts forms, and academic content into unified media arts productions that retain thematic integrity and stylistic continuity, such as transmedia productions.	Synthesize various arts, media arts forms and academic content into unified media arts productions that retain artistic fidelity across platforms, such as

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. 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. 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. 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 (MA:Pr6.1.I)	**HS Accomplished (MA:Pr6.1.II)**	**HS Advanced (MA:Pr6.1.III)**
a. Design the presentation and distribution of collections of media artworks, considering combinations of artworks, formats, and audiences.	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.	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. Evaluate and implement improvements in presenting media artworks, considering personal and local impacts, such as the benefits for self and others.	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.	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 (MA:Re7.1.I)	**HS Accomplished (MA:Re7.1.II)**	**HS Advanced (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.	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.	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 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.	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.	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. 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).	a. Assemble and organize multiple sounds or musical ideas to create initial expressive statements of selected sonic events, memories, images, concepts, texts, or storylines. 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).	a. Assemble and organize multiple sounds or extended musical ideas to create initial expressive statements of selected extended sonic experiences or abstract ideas. 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 how the interpretive choices reflect the creators' intent.	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 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. b. Using established criteria and feedback, identify the way(s) in which performances convey the elements of music, style, and mood. c. Identify and implement strategies for improving the technical and expressive aspects of multiple works.	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. b. Using established criteria and feedback, identify the ways in which performances 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 varied works.	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 ways in which performances use compositional techniques and convey the formal design, style, and historical/cultural context of the 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.	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.	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 the way(s) in which critiquing others' work and receiving feedback from others can be applied in the personal creative process.	b. Describe ways in which critiquing others' work and receiving feedback from others have been specifically applied in the personal creative process.	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.

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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.	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.	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 understanding of expressive intent by connecting with an audience through prepared and improvised performances.	b. Demonstrate an understanding of intent as a means for connecting with an audience through prepared and improvised performances.	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.	a. Investigate historical and cultural conventions and their impact on the visual composition of 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. Explore the impact of technology on design choices in a drama/theatre work.	b. Understand and apply technology to design solutions for a drama/theatre work.	b. Create a complete design for a drama/theatre work that incorporates all elements of technology.
c. Use script analysis to generate ideas about a character that is believable and authentic in a drama/theatre work.	c. Use personal experiences and knowledge to develop a character that is believable and authentic in a drama/theatre work.	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.

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?

HS Proficient	**HS Accomplished**	**HS Advanced**
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.	a. Discover how unique choices shape believable and sustainable drama/ theatre work.	a. Apply reliable research of directors' styles to form unique choices for a directorial concept in a drama/theatre work.
b. Shape character choices using given circumstances in a 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.	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.	a. Develop detailed supporting evidence and criteria to reinforce artistic choices, when participating in or observing a 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. Identify and compare cultural perspectives and contexts that may influence the evaluation of a drama/theatre work.	b. Apply concepts from a drama/theatre work for personal realization about cultural perspectives and understanding.	b. Use new understandings of cultures and contexts to shape personal responses to drama/theatre work.
c. Justify personal aesthetics, preferences, and beliefs through participation in and observation of a drama/theatre work.	c. Debate and distinguish multiple aesthetics, preferences, and beliefs through participation in and observation of 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.

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?

HS Proficient **TH:Re9.1.I.**	**HS Accomplished** **TH:Re9.1.II.**	**HS Advanced** **TH:Re9.1.III.**
a. Examine a drama/ theatre work using supporting evidence and criteria, while considering art forms, history, culture, and other disciplines.	a. Analyze and assess a drama/theatre work by connecting it to art forms, history, culture, and other disciplines using supporting evidence and criteria.	a. Research and synthesize cultural and historical information related to a drama/theatre work to support or evaluate artistic choices.
b. Consider the aesthetics of the production elements in a drama/theatre work.	b. Construct meaning in a drama/theatre work, considering personal aesthetics and knowledge of production elements while respecting others' interpretations.	b. Analyze and evaluate varied aesthetic interpretations of production elements for the same drama/theatre work.
c. Formulate a deeper understanding and appreciation of a drama/ theatre work by considering its specific purpose or intended audience.	c. Verify how a drama/theatre work communicates for a specific purpose and audience.	c. Compare and debate the connection between a drama/theatre work and contemporary issues that may impact audiences.

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.	a. Formulate creative choices for a devised or scripted drama/theatre work based on theatre research about the selected topic.	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. Use basic theatre research methods to better understand the social and cultural background of a drama/theatre work.	b. Explore how personal beliefs and biases can affect the interpretation of research data applied in drama/theatre work.	b. Present and support an opinion about the social, cultural, and historical understandings of a drama/theatre work, based on critical research.

<table>
<tr><td colspan="3">Discipline: Visual Arts</td><td colspan="3">Artistic Process: Creating</td></tr>
<tr><td colspan="6">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><th colspan="2">HS Proficient
VA:Cr1.1.I</th><th colspan="2">HS Accomplished
VA:Cr1.1.II</th><th colspan="2">HS Advanced
VA:Cr1.1.III</th></tr>
<tr><td colspan="2">Use multiple approaches to begin creative endeavors.</td><td colspan="2">Individually or collaboratively formulate new creative problems based on student’s existing artwork.</td><td colspan="2">Visualize and hypothesize to generate plans for ideas and directions for creating art and design that can affect social change.</td></tr>
</table>

<table>
<tr><td colspan="3">Discipline: Visual Arts</td><td colspan="3">Artistic Process: Creating</td></tr>
<tr><td colspan="6">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><th colspan="2">HS Proficient
VA:Cr1.2.I</th><th colspan="2">HS Accomplished
VA:Cr1.2.II</th><th colspan="2">HS Advanced
VA:Cr1.2.III</th></tr>
<tr><td colspan="2">Shape an artistic investigation of an aspect of present-day life using a contemporary practice of art or design.</td><td colspan="2">Choose from a range of materials and methods of traditional and contemporary artistic practices to plan works of art and design.</td><td colspan="2">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.</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?		
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 SCIENCE

The *Kentucky Academic Standards for Science* is 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 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. The ***two*** 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).

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 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 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

*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. 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

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)

Disciplinary Core Ideas

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)*

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-PS1-2),(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)

*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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

HS. Energy

HS. Energy

Students who demonstrate understanding can:

HS-PS3-1. energy meaning **Create a computational model to calculate the change in the energy of one component in a system when the change in of the other component(s) and energy flows in and out of the system are known.** [Clarification Statement: Emphasis is on explaining the 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. of **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 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. for **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 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. the to **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 system (second law of thermodynamics).** [Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking 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. objects **Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between 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)		

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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)

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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	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. • 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)	**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)	**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)

*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 identificationofmacromolecules.]

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)

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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)		

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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

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)

Disciplinary Core Ideas

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)

Crosscutting Concepts

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)

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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)

*The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

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 theuniverse. (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)

*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. 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)

*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. 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)

*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. 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

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)

Disciplinary Core Ideas

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)

Crosscutting Concepts

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)

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)		

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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	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. • 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)	**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)	**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)

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 tolearning.

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 and Students demonstrate an understanding of, appreciation for, and sensitivity to a multi-cultural 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 – the 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, Visual and Performing Arts, 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, 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, and 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., 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.