

Kentucky Academic Standards for Mathematics

Kentucky Board of Education

August 2, 2018



Standards and Regulation

- **704 KAR 8:040** Kentucky Academic Standards for Mathematics.
- This administrative regulation adopts into law the *Kentucky Academic Standards for Mathematics*.



KAS for Mathematics Timeline Overview

- ▶ **December/January** – Open standards for public comment/feedback
- ▶ **January** – Initial Mathematics Advisory Panel (AP) meetings
- ▶ **February** – Initial Mathematics Review and Development Committee (RDC) meetings
- ▶ **March/April** – Mathematics AP meet for review and revision; Mathematics RDC meet for review and revision
- ▶ **May** – Open draft Mathematics standards for public comment/feedback
- ▶ **June** – Mathematics AP and RDC finalize draft Mathematics Standards
- ▶ **July** – Interim Joint Committee on Education reviews draft standards
- ▶ **July** – Standards/Assessment Review and Process Committee reviews draft standards
- ▶ **August** – First reading by Kentucky Board of Education
- ▶ **October** – Second reading by Kentucky Board of Education

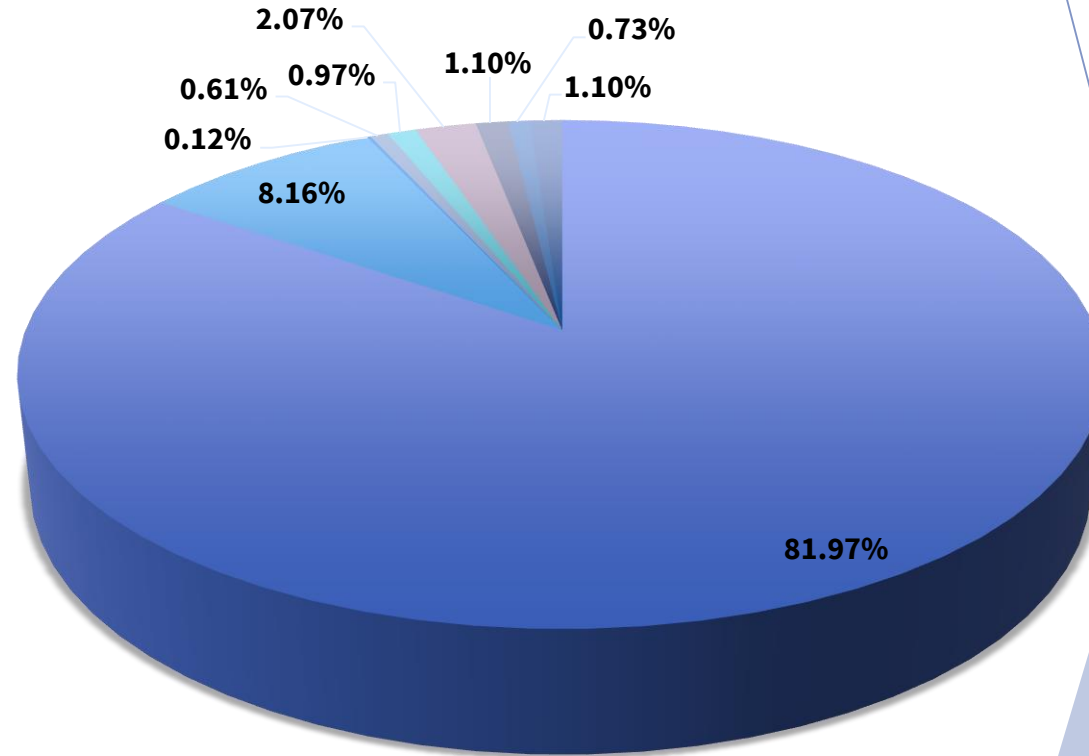


Public Comment Period: Survey Details and Respondent Roles



Respondent Role: Mathematics

- Teacher (673, 81.97%)
- Administrator (67, 8.16%)
- Public School Student (1, 0.12%)
- State Education Agency (5, 0.61%)
- Retired Teacher (8, 0.97%)
- Parent/Guardian (17, 2.07%)
- Institution of Higher Education (9, 1.10%)
- Business/Community Member (6, 0.73%)
- Other (9, 1.10%)



- 821 people participated in the survey
- Approximately 84% of Kentucky counties were represented with respondents

Public Comment Period: Standard Ratings



Number of Standards (by Grade Level) to Receive Each Range of Agreement

Grade Level	100%	90-99.99%	80-89.99%	70-79.99%	<70%	Total Comments
Kindergarten	0	12	10	1	0	192
Grade 1	0	14	7	0	0	121
Grade 2	0	19	2	0	0	95
Grade 3	2	16	7	0	0	127
Grade 4	1	23	4	0	0	127
Grade 5	2	26	3	0	0	81
Grade 6	0	21	9	0	0	146
Grade 7	1	17	6	1	0	87
Grade 8	2	24	1	0	0	53
High School	0	66	46	1	1	1231
Calculus	0	46	2	0	0	243

Draft Kentucky Academic Standards for Mathematics



Kentucky Academic Standards for Mathematics: Kindergarten Overview

Counting/Cardinality (CC)	Operations/Algebraic Thinking (OA)	Number and Operations in Base Ten (NBT)	Measurement and Data (MD)	Geometry (G)
<ul style="list-style-type: none">● Know number names and the count sequence.● Count to tell the number of objects.● Compare numbers.	<ul style="list-style-type: none">● Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	<ul style="list-style-type: none">● Work with numbers 11-19 to gain foundations for place value.	<ul style="list-style-type: none">● Describe and compare measurable attributes.● Classify objects and count the number of objects in each category.● Identify coins by name.	<ul style="list-style-type: none">● Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres).● Analyze, compare, create and compose shapes.

In Grade K, instructional time should focus on two critical areas:

1. Representing and comparing whole numbers, initially with sets of objects

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

2. Describing shapes and space

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

Note: More learning time in Kindergarten should be devoted to number than to other topics.

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Statistics and Probability	
Standards for Mathematical Practice	
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics.	MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning.
Cluster: Develop understanding of statistical variability.	
Standards	Clarifications
KY.6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. MP.1, MP.3, MP.6	For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates a variety of values with associated variability in students’ ages. Coherence KY.5.MD.2→KY.6.SP.1→KY.7.SP.1
KY.6.SP.2 Understand that a set of numerical data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape. MP.2, MP.6, MP.7	Students distinguish between graphical representations which are skewed or approximately symmetric; use a measure of center to describe a set of data. Coherence KY.5.MD.2→KY.6.SP.2→KY.7.SP.3
KY.6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number to describe a typical value, while a measure of variation describes how the values in the distribution vary. MP.2, MP.5, MP.6	Emphasis is on the sensitivity of measures of center to changes in the data, such as mean is generally much more likely to be pulled towards an extreme value than the median. Additionally, measures of variation (range, interquartile range) describe the data by giving a sense of the spread of data points. Coherence KY.6.SP.3→KY.7.SP.4
Attending to the Standards for Mathematical Practice	
Students recognize a question such as “What did I eat for breakfast?” is not a statistical question, whereas “What is the most popular breakfast in my school?” will elicit data they can measure precisely (MP.6) and draw conclusions based on that data (MP.3). After collecting data, by creating a distribution of that data, students recognize data generally follows a structure and can be described in terms of that structure (MP.7). By accurately calculating the mean (or any other statistical measure), students are now more precise in describing data, going from, for example, describe the rainfall for the month as “about average” to “the rainfall this month is slightly higher than the mean of the last 10 years and within the interquartile range for that data.” (MP.6)	

Public Comment Period: Framework Overview (Agree/Strongly Agree)

- ▶ Standards are easy to identify. (93.13%)
- ▶ Cluster headings are easily identified. (85.95%)
- ▶ Clarification section is useful. (93.31%)
- ▶ Standards for mathematical practice section is useful. (86.34%)
- ▶ Placement of standards for mathematical practice is convenient and useful. (85.72%)
- ▶ Coherence links are useful and convenient. (81.89%)
- ▶ Framework is user-friendly. (87.8%)



Draft *Kentucky Academic Standards* *Mathematics*



Questions?