Kentucky Alternate Assessment

Kentucky Academic Standards

Alternate Assessment Targets

Grade 6 Mathematics

Kentucky Academic Standards Purpose: KY Standards.Org

The *Kentucky Academic Standards (KAS)* Grades Primary-12 help ensure that all students across the commonwealth are focusing on a common set of standards and have opportunities to learn at a high level. This site provides administrators, teachers, parents, and other stakeholders in local districts with a basis for establishing and/or revising their curricula (for additional guidance, see **Kentucky Model Curriculum Framework**).

The instructional program should emphasize the development of students' abilities to acquire and apply the standards and assure appropriate accommodations are made for the diverse populations of students found within Kentucky schools. The resources found in this site specifies only the content for the required credits for high school graduation (program completion) and primary, intermediate, and middle-level programs leading up to these requirements. Schools and school districts are charged with identifying the content for elective courses and designing instructional programs for all areas.

The purpose of the Kentucky Academic Standards is to outline the minimum content knowledge required for all students before graduating or exiting Kentucky public high schools. Kentucky schools and districts are 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.

Alternate Assessment Targets: (not a standard)

An Alternate Assessment Target represents limits to a selected Kentucky Academic Standard. An Alternate Assessment Target may reduce parts of the standard with specific guidance to what an assessment item could represent. Not all Kentucky Academic Standards selected for assessments will have an Alternate Assessment Target and may display the language: "*No limitations. All parts of the Kentucky Academic Standard are eligible to be included as an assessment item.*" This would mean that the entire standard in its original form is reduced in depth and breadth and is eligible in its entirety to be used in the development of assessment items.

Standards for Mathematical Practice: (MP.1-MP.8)

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the National Council of Teachers of Mathematics (NCTM) process standards of problem solving, reasoning and proof, communication, representation and connections. The second are the strands of mathematical proficiency specified in the National Research Council's 2001 report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately) and productive disposition (habitual inclination to see mathematics as sensible, useful and worthwhile, coupled with a belief in diligence and one's own efficacy).

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

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

MP.2. Reason abstractly and quantitatively.

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

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

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

MP.4. Model with mathematics.

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

MP.5. Use appropriate tools strategically.

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

MP.6. Attend to precision.

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

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

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also are able to shift perspectives. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 - 3(x - y)2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

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

Mathematically proficient students notice if calculations are repeated and look both for general methods and shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y - 2)/(x - 1) = 3. Noticing the regularity in the way terms cancel when expanding (x - 1) (x + 1), (x - 1) (x2 + x + 1) and (x - 1) (x3 + x2 + x + 1) might lead to awareness of the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Clarifications:

The Clarification sections communicate expectations more clearly and concisely to teachers, parents, students and stakeholders through examples and illustrations.

Coherence:

- The Coherence/Vertical Alignment indicates a mathematics connection within and across grade levels.
- Coherence/Vertical Alignment is about math making sense. The standards are sequenced in a way that make mathematical sense and are based on the progressions for how students learn.
- The Coherence/Vertical Alignment component should help guide teachers when determining what standards students might need additional support with if they are struggling to understand certain content.

Grade 6 Mathematics Kentucky Academic Standards Assessed by Window

Window	Standard
1	KY.6.RP.1*
1	KY.6.NS.5
1	KY.6.NS.6*
1	KY.6.NS.7
1	KY.6.EE.5
1	KY.6.G.4

Window	Standard
2	KY.6.RP.1*
2	KY.6.NS.6*
2	KY.6.EE.2
2	KY.6.EE.6
2	KY.6.SP.3
2	KY.6.SP.5

*In mathematics, some standards are tested across both testing windows (in both Windows 1 and 2).

Math – Grade 6

DOMAIN		Standard Clarifications
Ratios & Proportional Relationships		Clarifications
KY.6.RP.1 Test Window 1 Test Window 2	Kentucky Academic Standard : Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. MP.2, MP.6 *Alternate Assessment Target: Limit to demonstrate the concept of ratio, use symbols "to" or ":". Limit numerator to 12 or less. Limit the denominator to less than 2, 3, 4, 5, 6, 8, 10, 12.*	Students use the concept of ratios as a comparison between related quantities; students also express these relationships in equivalent ratios in lowest terms, where appropriate. Coherence KY.5.NF.5→KY.6.RP.1
The Number System		Clarifications
KY.6.NS.5 Test Window 1	Kentucky Academic Standard : Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. MP.1, MP.2, MP.3 *Alternate Assessment Target: Limit to the use of numbers from negative 20 to 20.*	For example, positive and negative temperatures or elevations, with the understanding that zero means the freezing point Celsius of water or sea level. Coherence KY.6.NS.5→ KY.7.NS.1

KY.6.NS.6 Test Window 1 Test Window 2	Kentucky Academic Standard : Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes, using appropriate range and intervals, to represent points on the line and in the plane, that include negative numbers and coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize 0 is its own opposite and the opposite of a positive number is a negative, and the opposite of a negative number is a positive, such as $-(-3)=3$. b. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. c. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize the similarity between whole numbers, their negative opposites and their positions on a number line, ordered pairs differ only by signs and their locations on one or both axes. MP.2, MP.4 *Alternate Assessment Target: Limit full standard to integers from negative 10 to 10.*	a. Emphasis is on student understanding that every positive location on a number line has an opposite the same distance from zero in the negative direction and vice versa. Logically following from this is the fact that zero, as it has no positive or negative sign, is its own opposite. b. Emphasis is on generalizing patterns about where coordinates are located on a coordinate plane. c. The intent is for students to see a coordinate axis is the combination of a vertical number line and a horizontal number line. KY.6.EE.6 Coherence KY.5.G.1→KY.6.NS.6→KY.7.NS.1

KY.6.NS.7 Test Window 1	Kentucky Academic Standard : Understand ordering and absolute value of rational numbers a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. b. Write, interpret and explain statements of order for rational numbers in real-world contexts. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. d. Distinguish comparisons of absolute value from statements about order. MP.1. MP.2, MP.4 *Alternate Assessment Target: Limit full standard from negative 20 to 20.* *a. No further limitations* *b. No further limitations* *c. Limit absolute value to distance from zero* *d. Limit absolute value to distance from zero*	a. Interpret two numbers, including two negatives, as one is to the left or right (or above or below) the other on a number line diagram. b. Understand, as with 6.NS.7a, positive and negative rational numbers represent real-life situations and can be compared. c. Interpret a positive or negative direction from zero as an absolute value, or magnitude, to describe a real-life situation. d. Recognize a number's distance from zero can be compared to another number's distance from zero with a "less than" or "greater than" distinction. Coherence KY.5.NBT.3→KY.6.NS.7→KY.7.NS.1 KY.6.EE.8

Expressions and Equations		Clarifications
KY.6.EE.2 Test Window 2	**Kentucky Academic Standard :** Write, read and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. b. Identify parts of an expression using mathematical terms (sums, term, product, factor, quotient, coefficient); view one or more parts of an expression in a single entity. c. Evaluate expressions for specific values of their variables, including values that are non-negative rational numbers. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). **MP.1, MP.3, MP.4** *Alternate Assessment Target:* *a. No further limitations* *b. Limit to term and coefficient* *c. Limit to squared and cubed exponents*	For example, a. Express the calculation "y less than 5" as 5 – y. b. Describe the expression 2(8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. c. Use the formulas $V=s^3$ and $SA=6s^2$ to find the volume and surface area of a cube with sides of length $s=½$ meter. KY.5.OA.1 Coherence KY.5.OA.2→KY.6.EE.2
KY.6.EE.5 Test Window 1	**Kentucky Academic Standard :** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. **MP.1, MP.2, MP.7** *Alternate Assessment Target: Limit to equations or inequalities involving integers and decimals from negative 20 to 20.*	From a set of numbers, substitute values to choose which satisfy a given equation or inequality. An equation or inequality with no solutions from the list may be described as having no solutions or an empty set of solutions, given the set of possible values. Coherence KY.6.EE.5→KY.8.EE.8

KY.6.EE.6 Test Window 2	Kentucky Academic Standard : Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. MP.2, MP.6 *Alternate Assessment Target: Limit to expressions involving integers and decimals from negative 20 to 20.*	Represent an unknown quantity in real-world context appropriately with a variable and write an expression to show this. Coherence KY.6.EE.6→KY.7.EE.4
Geometry		Clarifications
KY.6.G.4 Test Window 1	Kentucky Academic Standard : Classify three-dimensional figures including cubes, prisms, pyramids, cones and spheres. MP.2, MP.3 *Alternate Assessment Target: No limitations. All parts of the Kentucky Academic Standard are eligible to be included as an assessment item.*	Emphasis is on classifying three-dimensional shapes and specifically the attributes of each shape that make it unique to its classification. Coherence KY.6.G.4→KY.7.G.6
Statistics and Probability		Clarifications
KY.6.SP.3 Test Window 2	Kentucky Academic Standard : 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 *Alternate Assessment Target: Limit to identifying if a situation calls for a measure of center or a measure of variation.*	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

KY.6.SP.5 Test Window 2	**Kentucky Academic Standard :** Summarize numerical data sets in relation to their context, such as by a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Determining quantitative measures of center (median and/or mean) to describe the distribution of numerical data. d. Describing distributions of numerical data qualitatively relating to shape (using terms such as cluster, mode(s), gap, symmetric, uniform, skewed-left, skewed-right and the presence of outliers) and quantitatively relating to spread/variability (using terms such as range and interquartile range). e. Relating the choice of measures of center and variability to the shape of the data distribution. **MP.3, MP.7** *Alternate Assessment Target:* *a. Limit to reporting observations* *b. Limit to describing the nature of attributes* *c. Limit to determining quantitative measures of center (mean, median, mode)* *d. Limit to spread/variability (range)* e. *Excluded from assessment*	a. Students understand larger numbers of observations create a more accurate statistical representation than smaller numbers of observations. b. Students describe how the data measured relates to answering a statistical question. c. Students know methods of finding measures of center, including finding median in non-ordered sets of data and a mean is a mathematical average. d. Students describe the shape of data by inspection using the terms listed and calculate the range and interquartile range of a set of data. e. Students recognize mean and range are appropriate measures for symmetrical data while the median and interquartile range may be better measures for skewed data. Coherence KY.6.SP.5→KY.7.SP.1

CONTACTS/RESOURCES

Kentucky Academic Standards for Mathematics

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