Kentucky Alternate Assessment

Kentucky Academic Standards

Alternate Assessment Targets

Grade 3 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.

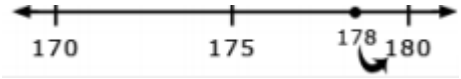
Grade 3 Mathematics Kentucky Academic Standards Assessed

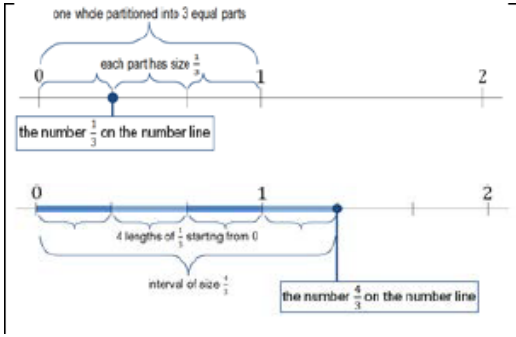
Window	Standard
1	KY.3.OA.1
1	KY.3.OA.2
1	KY.3.NBT.1
1	KY.3.NBT.2
1	KY.3.NF.1

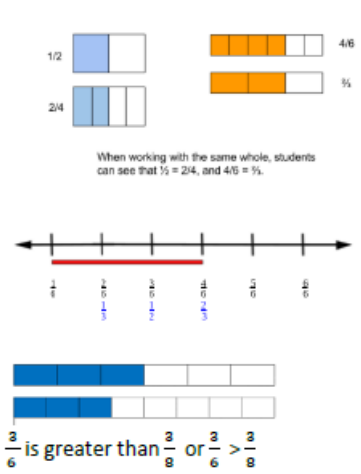
Window	Standard
2	KY.3.OA.3
2	KY.3.NF.3
2	KY.3.NF.2
2	KY.3.MD.1
2	KY.3.G.1

Math - Grade 3

DOMAIN		Standard Clarifications
	Operations & Algebraic Thinking	Clarifications
KY.3.OA.1 Window 1	Kentucky Academic Standard : Interpret and demonstrate products of whole numbers. MP.2, MP.5 *Alternate Assessment Target: Limit to models for multiplication situations with products within 100 [10 x 10].*	Students use models for multiplication situations. For example, students interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. Coherence KY.2.OA.4→KY.3.OA.1→KY.4.OA.1
KY.3.OA.2 Window 1	Kentucky Academic Standard : Interpret and demonstrate whole-number quotients of whole numbers, where objects are partitioned into equal shares (division-equal shares to all). MP.2, MP.5 *Alternate Assessment Target: Limit to models for division situations with quotients within 100.*	Students use models for division situations. For example, students interpret 56 ÷ 8 as the number of 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 object each. Coherence KY.3.OA.1→KY.3.OA.2→KY.5.NF.3
KY.3.OA.3 Window 2	Kentucky Academic Standard : Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays and measurement quantities, by using drawings and equations with a symbol for the unknown number to represent the problem. MP.1, MP.4 *Alternate Assessment Target: Limit to models for multiplication and division word problems with solutions within 100.*	Students flexibly model or represent multiplication and division situations or context problems (involving products and quotients up to 100). Note: Drawings need not show detail, but accurately represent the quantities involved in the task. See Table 2 in Appendix A. Coherence KY.3.OA.3→KY.4.OA.2

	Numbers & Operations in Base 10	Clarifications
KY.3.NBT.1 Window 1	**Kentucky Academic Standard :** Use place value understanding to round whole numbers to the nearest 10 or 100. MP.7 *Alternate Assessment Target: Limit to rounding whole numbers within 100 to the nearest 10.*	On a number line, students determine 178 rounded to nearest 10 is 180.  Coherence KY.2.NBT.1→KY.3.NBT.1→ KY.4.NBT.3
KY.3.NBT.2 Window 1	**Kentucky Academic Standard :** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations and/or the relationship between addition and subtraction. MP.2, MP.3 *Alternate Assessment Target: Limit to addition and subtraction of two 1-digit or 2-digit numbers.*	Students determine addition and subtraction strategies efficiently, accurately, flexibly and appropriately. Being fluent means students are able to choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and are able to explain their approaches and they are able to produce accurate answers efficiently. Note: Reaching fluency is an ongoing process that will take much of the year. KY.2.NBT.5 Coherence KY.2.NBT.7→KY.3.NBT.2→ KY.4.NBT4
	Numbers & Operations - Fractions	Clarifications
KY.3.NF.1 Window 1	**Kentucky Academic Standard :** Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$. MP.2, MP.7	Students name parts of the whole using fractions and explain the fraction is made up of unit fractions. Students describe the numerator and the denominator using pictures, numbers and words.

	Alternate Assessment Target: Limit denominator to 2, 3, 4 or 6.	$\frac{4}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$ Note: grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6 and 8. Coherence KY.2.G.3→KY.3.NF.1→ KY.4.NF.3
KY.3.NF.2 Window 2	Kentucky Academic Standard : Understand a fraction as a number on the number line; represent fractions on a number line. a. Represent a fraction $\frac{1}{b}$ (unit fraction) on a number line by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. • Recognize each part has size $\frac{1}{b}$. • a unit fraction, $\frac{1}{b}$ is located $\frac{1}{b}$ of a whole unit from 0 on the number line. b. Represent a non-unit fraction $\frac{a}{b}$ on a number line by marking off *a* lengths of $\frac{1}{b}$ (unit fractions) from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the non-unit fraction $\frac{a}{b}$ on the number line. MP.4 *Alternate Assessment Target: Limit full standard to recognize/identify fractions on a number line between 0 and 1; denominators limited to 2, 3, 4, 6.*	Students name parts of the whole using fractions and explain the fraction is made up of unit fractions. Students describe the numerator and the denominator using pictures, numbers and words. 46 = 16 + 16 + 16 + 16 Note: grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6 and 8.  Coherence KY.2.MD.6→ KY.3.NF.2→ KY.4.NF.3

KY.3.NF.3 Window 2	**Kentucky Academic Standard :** Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or same point on a number line. b. Recognize and generate simple equivalent fractions. Explain why the fractions are equivalent through writing or drawing. c. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions. **MP.2, MP.3** *Alternate Assessment Target: Limit full standard to simple equivalent fractions with different denominators limited to 2, 3, 4, 6 using rectangle and number line models.*	 Note: grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6 and 8. KY.4.NF.1 Coherence KY.3.NF.3→ KY.4.NF.5
	Measurement & Data	Clarifications
KY.3.MD.1 Window 2	**Kentucky Academic Standard :** Tell and write time to the nearest minute and measure elapsed time intervals in minutes. Solve word problems involving addition and subtraction of time intervals within and across the hour in minutes. **MP.4, MP.6, MP.1, MP.4** *Alternate Assessment Target: Limit to 5-minute intervals.*	Students solve elapsed time problems using strategies and tools such as clock models and number lines (seeing a clock as a number line). Coherence KY.2.MD.7→KY.3.MD.1→ KY.4.MD.2

	Geometry	Clarifications
KY.3.G.1 Window 2	Kentucky Academic Standard : Classify polygons by attributes. a. Recognize and classify polygons based on the number of sides and vertices (triangles, quadrilaterals, pentagons and hexagons). b. Recognize and classify quadrilaterals (rectangles, squares, parallelograms, rhombuses, trapezoids) by side lengths and understanding shapes in different categories may share attributes and the shared attributes can define a larger category. c. Identify shapes that do not belong to a given category or subcategory. MP.6, MP.7 *Alternate Assessment Target: Limit full standard to understanding that shapes in different categories may share attributes.* *a. No further limitations* *b. Limit to rectangles, squares and rhombuses* *c. No further limitations*	Students describe, analyze and compare properties of two–dimensional shapes. Coherence KY.2.G.1→KY.3.G.1→KY.4.G.2

RESOURCES

Kentucky Academic Standards for Mathematics

CONTACT INFORMATION

Kentucky Department of Education
Office of Assessment and Accountability
Division of Assessment and Accountability Support
(502) 564-4394

KDE DAC Information