

CONTENT AREA: Mathematics

GRADE LEVEL: 6

Standard Descriptions:

In grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting and using expressions and equations; and (4) developing understanding of statistical thinking.

(1) Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

(2) Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

(3) Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.

(4) Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center

in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile) range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected. Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces and relating the shapes to rectangles. Using these methods, students discuss, develop and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.

Blue: Standards 1 through 3 (TEST WINDOW 1)

Yellow: Standards 4 through 6 (TEST WINDOW 2)

Ratios and Proportional Relationships (RPR)	Understand ratio concepts and use ratio reasoning to solve problems.
The Number System (NS)	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
	Compute fluently with multi-digit numbers and find common factors and multiples.
	Apply and extend previous understandings of numbers to the system of rational numbers.

Expressions and Equations (EE)	Apply and extend previous understandings of arithmetic to algebraic expressions.
	Reason about and solve one-variable equations and inequalities.
	Represent and analyze quantitative relationships between dependent and independent variables.
Geometry (G)	Solve real-world and mathematical problems involving area, surface area and volume.
Statistics and Probability (SP)	Develop an understanding of statistical variability.
	Summarize and describe distributions.

Grade Level/ Content Area	Alternate K-PREP Statement Aligned KAS Standards	KAS Standard
Grade 6 Mathematics	(M-6.1) Fluently add and subtract multi-digit decimals using the standard algorithm.	KAS (6.NS.3) Fluently add, subtract, multiply and divide multi-digit decimals using the standard algorithm for each operation.
	(M-6.2) Use positive and negative numbers to represent quantities in real world contexts.	KAS (6.NS.5) Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and

		negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
	<p>(M-6.3)</p> <p>Evaluate numerical expressions involving whole number exponents.</p>	<p>KAS (6.EE.1)</p> <p>Write and evaluate numerical expressions involving whole-number exponents.</p>
	<p>(M-6.4)</p> <p>Identify when two expressions are equivalent.</p>	<p>KAS (6.EE.4)</p> <p>Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.</p>
	<p>(M-6.5)</p> <p>Find the area of polygons by composing into rectangles or decomposing into other shapes in the context of solving real-world problems.</p>	<p>KAS (6.G.1)</p> <p>Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.</p>
	<p>(M-6.6)</p> <p>Display numerical data in plots on a number line and histograms.</p>	<p>KAS (6.SP.4)</p> <p>Display numerical data in plots on a number line, including dot plots, histograms and box plots.</p>

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