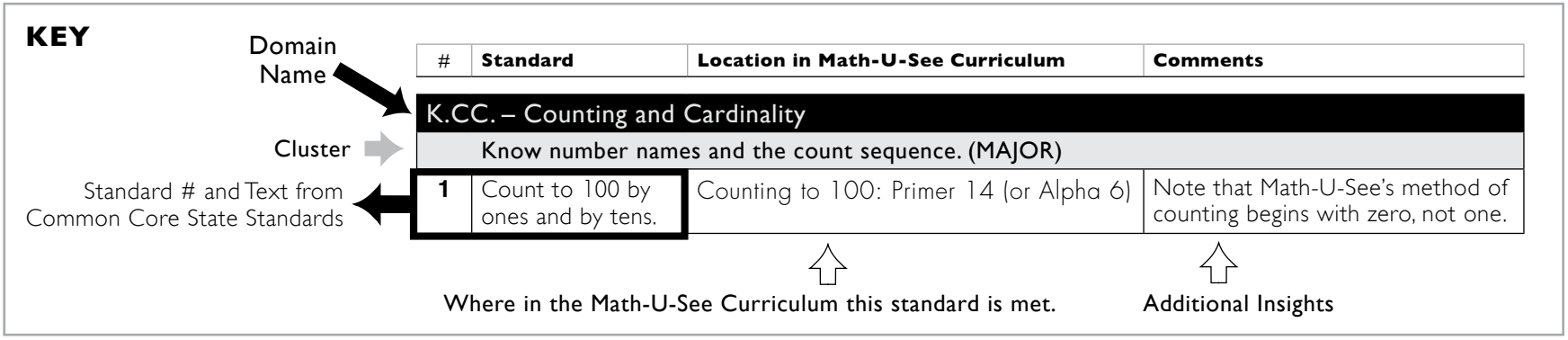
Math-U-See® Correlation with the Common Core State Standards for Mathematical Content for Sixth Grade

The sixth-grade standards continue exploring fractions and decimals. They also introduce ratios, common factors, negative numbers, exponents, one-variable equations and inequalities, and fundamentals of statistics. These topics are primarily found in Math-U-See's Epsilon and Zeta, although some material is review from Delta or earlier. The use of the Fraction Overlays helps students visualize how the multiplication and division of fractions work and focuses students on conceptual understanding rather than rote memorization of procedures. The Decimal Inserts help students visualize and master decimals and the related place-value concepts.



#	Standard	Location in Math-U-See Curriculum	Comments
6.RP. – Ratios and Proportional Relationships			
	Understand ratio concepts and use ratio reasoning to solve problems. (MAJOR)		
1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	This standard is introduced in Zeta 11G and reinforced in 12G–14G.	Note that ratios are briefly discussed in Zeta 6, but they are covered in detail in Zeta Application and Enrichment 11G–14G.
2	Understand the concept of a unit ratio a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*	This standard is introduced in Zeta 11G, developed more fully in 12G, and reinforced in 13G and 14G.	

3	Use a ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.		Word problems employing ratios are found throughout Zeta 11G–14G.
3a	Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	Equivalent Ratios: Zeta 13G and 18G	
3b	Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*	Unit Rates: Zeta 12G and 14G	
3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	Finding a Percentage: Zeta 11	Word problems for this standard can be found in the student worksheets starting in Zeta Lesson 11.
3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying and dividing quantities.	Conversion Factors: Zeta 14G	
6.NS. – The Number System			
	Apply and extend previous understandings of multiplication and division to divide fractions by fractions. (MAJOR)		
1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b)÷ (c/d) = ad/dc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*	Division of Fractions: Zeta Quick Reviews 14D and 15D	This standard is covered in Epsilon and is considered review. See comments for 5.NF.7a-c.
	Compute fluently with multi-digit numbers and find common factors and multiples. (Additional)		
2	Fluently divide multi-digit numbers using the standard algorithm.	Division: Epsilon Quick Reviews 7D, 8D, 11D, 13D	This standard is covered in Delta and is considered review. See comments for 4.NBT.6.

3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Add Decimal Numbers: Zeta 4 Subtract Decimal Numbers: Zeta 5 Multiply Decimals: Zeta 9–10, 14, Dividing Decimals: Zeta 17–18, 20	
4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4(9 + 2).*	Greatest Common Factor: Epsilon 11–13; Zeta 3G Least Common Multiple: Zeta 5G Distributive Property: Zeta 3G, 4G	
	Apply and extend previous understandings of numbers to the system of rational numbers. (MAJOR)		
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.	Numbers and Number Lines: Zeta 15G Negative Numbers: Zeta 16G	
6	Understand a rational number as a point on the number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.		
6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.	Numbers and Number Lines: Zeta 15G Negative Numbers: Zeta 16G	
6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	Coordinate Graphing: Zeta 17G, 18G	Zeta Application and Enrichment 16G reviews coordinate graphs, which are introduced in Epsilon 20G.
6c	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.	Numbers and Number Lines: Zeta 15G Negative Numbers: Zeta 16G Coordinate Graphing: Zeta 17G, 18G	

7	Understand ordering and absolute value of rational numbers.		
7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.*	Numbers and Number Lines: Zeta 15G Negative Numbers: Zeta 16G	
7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3°C > –7°C to express that –3°C is warmer than –7°C.*	Numbers and Number Lines: Zeta 15G Negative Numbers: Zeta 16G	
7c	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. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.*	Absolute Value: Zeta 15G, 16G	
7d	Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*	Absolute Value: Zeta 15G, 16G	
8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Coordinate Graphing: Zeta 21G	Math-U-See surpasses this standard by also having students calculate the area of a polygon graphed on a coordinate plane.
6.EE. – Expressions and Equations			
	Apply and extend previous understandings of arithmetic to algebraic expressions. (MAJOR)		
1	Write and evaluate numerical expressions involving whole-number exponents.	Exponents: Zeta 1	
2	Write, read, and evaluate expressions in which letters stand for numbers.		
2a	Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*	Starting in Zeta 19 students are required to write their calculations in expression form.	As early as Primer and Alpha, students have been exposed to letters as symbols representing numbers, and in word problems they have been encouraged – though not required – to write their calculations in expression form.

2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, 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.*	Expression Terminology: Zeta 1G, Zeta 19	
2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.*	Area of Circle: Epsilon 27 or Zeta 16	
3	Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3(2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*	Distributive Property: Zeta 3G, 4G	In Zeta 2G and 5G students evaluate expressions (involving properties of operations) for equivalence.
4	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.*	Expressions: Zeta 2G, 4G, 5G	Math-U-See emphasizes evaluating for equivalence starting in Primer and Alpha.
	Reason about and solve one-variable equations and inequalities. (MAJOR)		
5	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.	Equivalent Expressions: Zeta 5G	

6	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.	Variables: Zeta 22G	Students have been solving for an unknown since Alpha, and variables in equations have been used since Gamma. In Zeta, variables and constants are distinguished.
7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	Fractional Coefficients: Epsilon 28 Fractional Constants: Epsilon 30 Decimal Coefficients: Zeta 19 Decimal Constants: Zeta 22	Students have been solving for an unknown in the x + p = q form since Alpha and for px = q form since Gamma where all are whole numbers.
8	Write an inequality of the form $x > c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	Inequalities and Number Lines: Zeta 24G	
	Represent and analyze quantitative relationships between dependent and independent variables. (MAJOR)		
9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.*	Variables: Zeta 22G	
6.G. –Geometry			
	Solve real-world and mathematical problems involving area, surface area, and volume. (Supporting)		
1	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.	Delta 9 teaches area of triangles and parallelograms by decomposing into triangles and other shapes and composing into rectangles. Delta 13 does the same with trapezoids.	Students master in Delta the skills necessary for problems of this type.

2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of the right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	Volume: Epsilon Quick Review 17D and 18D	Volume of prisms is mastered in Delta and is considered review. In order to cover this standard fully, be sure to assign the following word problems: Epsilon 27D #15, 28F #18, and 30D #18.
3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	Coordinate Graphing: Zeta 16G and 21G	Math-U-See surpasses this standard by also having students calculate the area of a polygon graphed on a coordinate plane.
4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	Surface Area: Zeta 23G	
6.SP. – Statistics and Probability			
	Develop understanding of statistical variability. (Additional)		
1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *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 variability in students' ages.*	Statistics: Zeta 25G Designing Experiments and Interpreting Data: Zeta 26G	
2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	Statistics: Zeta 25G Distribution of Data: Zeta 27G	
3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	Statistics: Zeta 25G Distribution of Data: Zeta 27G	

	Summarize and describe distributions. (Additional)		
4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Dot Plots: Zeta 6G, 25G, 28G Histograms: 9G Box Plots: Zeta 29G	Bar graphs are reviewed in Zeta 8G.
5	Summarize numerical data sets in relation to their context such as by:		
5a	Reporting the number of observations.	Designing Experiments and Interpreting Data: Zeta 26G	
5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	Designing Experiments and Interpreting Data: Zeta 26G	
5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern with reference to the context in which the data were gathered.	Mean, Median, and Mode: Zeta 25, including 25G; Zeta 27G Interquartile Range: Zeta 28G Mean Absolute Derivation: Zeta 27G	
5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	Designing Experiments and Interpreting Data: Zeta 26G	