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

The fifth-grade standards explore numerical expressions, continue with both decimals and fractions, and introduce volume and graphing on a coordinate plane. These topics are found in Math-U-See's Delta, Epsilon, and Zeta. 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.

KEY

Domain Name

Cluster

Standard # and Text from Common Core State Standards

#	Standard	Location in Math-U-See Curriculum	Comments
K.CC. – Counting and Cardinality			
Know number names and the count sequence. (MAJOR)			
1	Count to 100 by ones and by tens.	Counting to 100: Primer 14 (or Alpha 6)	Note that Math-U-See's method of counting begins with zero, not one.

Where in the Math-U-See Curriculum this standard is met.

Additional Insights

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#	Standard	Location in Math-U-See Curriculum	Comments
5.OA. – Operations and Algebraic Thinking			
	Write and interpret numerical expressions. (Additional)		
1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Parentheses: Epsilon 3G, 6G Brackets: Epsilon 15G Braces: Epsilon 22G	
2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7).* *Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*	Writing and Interpreting Numerical Expressions: Epsilon 3G	

	Analyze patterns and relationships. (Additional)		
3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*	Number Patterns on a Coordinate Graph: Epsilon 21G	
5.NBT. – Number and Operations in Base Ten (MAJOR)			
	Understand the place value system. (MAJOR)		
1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what is represents in the place to its left.	Place Value through Millions: Gamma 27, Delta 14 Billions, Trillions, and Expanded Notation: Delta 15	Place value is a foundational concept in the Math-U-See approach and is covered in every level of the curriculum. Gamma 27 and Delta 14 explicitly address this standard as written. See lessons listed for 1.NBT.2 and 2.NBT.3.
2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	Place Value and Exponents: Zeta 2 Decimal Numbers: Zeta 3	
3	Read, write, and compare decimals to thousandths.		
3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.	Fractions to Decimals to Percentages: Epsilon 29 Decimal Numbers with Expanded Notation: Zeta 3	Zeta 3 surpasses this standard by also covering place-value notation and exponential notation.
3b	Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	Comparing Decimals: Epsilon 29G	

4	Use place value understanding to round decimals to any place.	Comparing Decimals: Zeta 10G	
	Perform operations with multi-digit whole numbers and with decimals to hundredths. (MAJOR)		
5	Fluently multiply multi-digit whole numbers using the standard algorithm.	Epsilon Quick Reviews: 4D, 6D, 9D, 12D	This standard is mastered and surpassed in Gamma and is considered review. See lessons listed for 4.NBT.5.
6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	Epsilon Quick Reviews: 7D, 8D, 10D, 11D, 13D	This standard is mastered and surpassed in Delta and is considered review. See lessons listed for 4.NBT.6.
7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	Add Decimal Numbers: Zeta 4 Subtract Decimal Numbers: Zeta 5 Multiply All Decimals: Zeta 14 Dividing a Decimal by a Whole Number: Zeta 17 Dividing a Whole Number by a Decimal: Zeta 18 Dividing a Decimal by a Decimal: Zeta 20	Math-U-See surpasses this standard by including problems to the thousandths for each operation.
5.NF. – Number and Operations - Fractions			
	Use equivalent fractions as a strategy to add and subtract fractions. (MAJOR)		
1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b +c/d = (ad + bc)/bd.)*	Addition and Subtraction: Epsilon 5 Rule of Four: Epsilon 6 Addition and Subtraction with Mixed Numbers: Epsilon 18-22	A strength of Math-U-See is its emphasis on this algorithm, which is referred to as "The Rule of Four" in the curriculum.
2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	Fraction Sense: Epsilon 12G	Word problems are found in each lesson (and subsequent lessons in Systematic Review) that address addition and subtraction of fractions. See lessons listed for 5.NF.1. Epsilon Application and Enrichment 8G offers a creative activity for this concept by exploring musical notation.

	Apply and extend previous understandings of multiplication and division to multiply and divide fractions. (MAJOR)		
3	Interpret a fraction as division of the numerator by the denominator *(a/b = a ÷ b)*. Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*	Using Fractions to Divide Remainders: Delta 20 Fraction of a Number: Delta 27 or Epsilon 1 Fraction of One: Delta 29 or Epsilon 2	The first sentence of this standard is considered review, although more detail is given in the Epsilon lessons listed than in the corresponding Delta 27 and 29. Students are introduced to the parts of a fraction in Gamma 13 and to the symbolism of division as a fraction line in Delta 1. In Delta 20 students begin division leading to answers in the forms of fractions or mixed numbers. Note that if students have not been introduced to fraction symbolism by Gamma Appendix A and Application and Enrichment A1, it is better to present Delta 27 before Delta 20.
4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.		
4a	Interpret the product *(a/b × q)* as *a* parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.*	Fraction of a Number: Epsilon 1 Multiplying a Fraction by a Whole Number: Epsilon 9	Epsilon Application and Enrichment 9G is an excellent exercise for understanding this standard, and practice word problems are included.
4b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	Multiplying Fractions: Epsilon 9 Area with Fractional Side Lengths: Epsilon 17G	Math-U-See's Fraction Overlays demonstrate multiplication of fractions exactly as described in this standard.
5	Interpret multiplication as scaling (resizing) by:		
5a	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	Changing Area by Changing a Factor: Epsilon 14G	

5b	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.	Epsilon Application and Enrichment 9G compares multiplication by whole numbers to multiplication by a fraction.	
6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	Multiplying Mixed Numbers: Epsilon 25, including 25G	Word problems are found in each lesson (and subsequent lessons in Systematic Review) that address multiplication of fractions. See lessons listed for 5.NF.4.
7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.)		
7a	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.*	Dividing Fractions and Whole Numbers: Epsilon 10	Math-U-See surpasses this standard by also teaching fractions divided by fractions in Epsilon.
7b	Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.*	Dividing Fractions and Whole Numbers: Epsilon 10	Math-U-See surpasses this standard by also teaching fractions divided by fractions in Epsilon.
7c	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*	Division of Fractions: Epsilon 23G	Math-U-See surpasses this standard by also teaching fractions divided by fractions in Epsilon. Word problems are found in each lesson (and in Systematic Review in successive lessons) that address division of fractions. See lessons listed for 5.NF.7a-b.

5.MD. – Measurement and Data			
	Convert like measurement units within a given measurement system. (Supporting)		
1	Convert among different-sized standard measurement units within a given measurement system (e.g. convert 5 cm to 0.05 m), and use these conversion in solving multi-step, real world problems.	Epsilon Quick Reviews: 19D, 20D, 22D, 23D, 24D, 25D, 26D, 27D	Math-U-See includes conversion word problems with US customary units starting in Gamma. Metric measures are also introduced in Gamma. See comments for 3.MD.2 and 4.MD.1.
	Represent and interpret data. (Supporting)		
2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*	Line Plots: Epsilon 19G	Operations in this exercise include addition, subtraction, and multiplication of fractions as well as division of a fraction by a whole number.
	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. (MAJOR)		
3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.		
3a	A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.	Volume: Delta 26	Using the Math-U-See manipulatives helps students easily visualize unit cubes.
3b	A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.	Volume: Delta 26	
4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	Volume: Delta 26	Problems on Delta student worksheets 26A, 26B, and 26C serve as a transition to calculating volume without the individual cubic unit lines drawn in.
5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.		
5a	Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.	Volume: Delta 26, Epsilon 18G, Zeta 24G	This standard builds naturally from Math-U-See's presentation of a product/area as the multiplication of side lengths of a rectangle.

5b	Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.	Volume: Delta 26	Note that Math-U-See uses *B* for the base of a rectangular prism to distinguish from *b* as the base of a rectangle.
5c	Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	Volume: Epsilon 18G	
5.G. – Geometry			
	Graph points on the coordinate plane to solve real-world and mathematical problems. (Additional)		
1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axes and y-coordinate).	Coordinate Plane: Epsilon 20G, Zeta 16G	Zeta Application and Enrichment 16G mentions negative numbers (a sixth-grade standard) but does not use them in the graphing exercise.
2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.	Graphing Coordinates: Epsilon 21G	
	Classify two-dimensional figures into categories based on their properties. (Additional)		
3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*	Classifying Polygons: Epsilon 16G	
4	Classify two-dimensional figures in a hierarchy based on their properties.	Classifying Polygons: Epsilon 16G	