

## Course Guide to Essential Outcomes

### 5th Grade Mathematics

**Course Description:** 5th Grade Mathematics utilizes Common Core State Standards for Mathematics, employs *i-Ready Classroom Math* as a resource, and infuses identified effective math practices to meet student needs.

Adopted Course Primary Resource	Supplementary Resources
<ul style="list-style-type: none"> <li><i>i-Ready Classroom Math</i> (Curriculum Associates)</li> </ul>	<ul style="list-style-type: none"> <li>i-Ready Online Instruction - Math (Curriculum Associates)</li> <li>Building Fact Fluency Toolkit (Stenhouse) for fact fluency/number sense lessons</li> <li>Daily Fact Fluency (Hand2Mind)</li> </ul>

Domain	Cluster	Code	Common Core State Standard
Operations and Algebraic Thinking	Write and interpret numerical expressions.	5.OA.1	Use parentheses, brackets, or braces in numerical expressions and evaluate expressions with these symbols.
		5.OA.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 $2 \times (8 + 7)$ . Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$ , without having to calculate the indicated sum or product.
	Analyze patterns and relationships.	5.OA.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 and Operations in Base Ten	Understand the place value system.	5.NBT.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 it represents in the place to its left.
		5.NBT.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 positive integer exponents to denote powers of 10.
		5.NBT.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$ . b. Compare two decimals to thousandths based on meanings of the digits in each place, using $>$ , $=$ , and $<$ symbols to record the results of comparisons.
		5.NBT.4	Use place value understanding to round decimals to any place.
	Perform operations with multi-digit whole numbers and with decimals to hundredths.	5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
		5.NBT.6	Find whole-number quotients 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.
		5.NBT.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.
Number and Operations: Fractions	Use equivalent fractions as a strategy to add and subtract fractions.	5.NF.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, $a/b + c/d = (ad + bc)/bd$ .)
		5.NF.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. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$ by observing that $3/7 < 1/2$ .
	Apply and extend previous understandings of multiplication and	5.NF.3	Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). 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

	division to multiply and divide fractions.		two whole numbers does your answer lie?
		5.NF.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$ . For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$ . (In general, $(a/b) \times (c/d) = ac/bd$ .) b. 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.
		5.NF.5	Interpret multiplication as scaling (resizing), by: a. 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. b. 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.
		5.NF.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.
		5.NF.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Note: 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.) a. 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 & division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$ . b. 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 $20 \times (1/5) = 4$ . c. 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?
Measurement and Data	Convert like measurement units within a given measurement system.	5.MD.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 conversions in solving multi-step real world problems.
	Represent and interpret data.	5.MD.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.
	Geometric measurement--understand concepts of volume and relate volume to multiplication and to addition.	5.MD.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. 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. b. 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.
		5.MD.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
		5.MD.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. 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. b. 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. c. 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.
Geometry	Graph points on the coordinate plane to solve real-world and mathematical problems.	5.G.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-axis and y-coordinate).
		5.G.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.
	Classify	5.G.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all

	two-dimensional figures into categories based on their properties.		rectangles have four right angles and squares are rectangles, so all squares have four right angles.
		5.G.4	Classify two-dimensional figures in a hierarchy based on properties.
Mathematical Practices		<ul style="list-style-type: none"><li>• (MP1) Make sense of problems and persevere in solving them.</li><li>• (MP2) Reason abstractly and quantitatively.</li><li>• (MP3)Construct viable arguments and critique the reasoning of others.</li><li>• (MP4)Model with Mathematics</li><li>• (MP5)Use appropriate tools strategically.</li><li>• (MP6)Attend to precision.</li><li>• (MP7)Look for and make use of structure.</li><li>• (MP8)Look for and express regularity in repeated reasoning.</li></ul>	

Units of Study	Standards	Essential Vocabulary	Unit I Can Statements	Pacing
Unit 1 Whole Number Operations and Applications	5.MD.C.3a 5.MD.C.3b 5.MC.C.4 5.MD.C.5a 5.MD.C.5b 5.MD.C.5c 5.NBT.B.5 5.NBT.B.6	Cubic unit Plane figure Solid figure Unit cube Unit Square Volume Base (of a prism) Distributive property Inverse operations	<ul style="list-style-type: none"> <li>I will know that volume is the amount of space inside a three-dimensional figure. I will know that the number of unit cubes that fit inside a figure determines its volume.</li> <li>I can use what I know about finding the area of rectangles as the first step in calculating the volume of rectangular prisms.</li> <li>I can use place value, area models, and other strategies to multiply multi-digit numbers and divide by two-digit divisors.</li> </ul> <p>Fact Fluency Focus: Fraction/Decimal Operations</p>	Days: 27  Number sense instruction occurs 30 minutes weekly.
Unit 2 Decimals and Fractions	5.NBT.A.1 5.NBT.A.2 5.NBT.A.3a 5.NBT.A.3b 5.NBT.A.4 5.NBT.B.7 5.NF.A.1 5.NF.A.2	Base ten Thousandths Base (of a power) Exponent Power of 10 Expanded form Inequality	<ul style="list-style-type: none"> <li>I will know that place value in decimals follows the same base-ten patterns as whole numbers. I will know that place value will help me understand how many times more or less one decimal place is than another and will help me read, write, and round decimals.</li> <li>I can use what I know about patterns when multiplying by 10 to understand multiplying and dividing by powers of 10.</li> <li>I will know about adding and subtracting whole numbers to help me add and subtract decimals.</li> <li>I can use what I know about equivalent fractions to add and subtract fractions with unlike denominators.</li> </ul> <p>Fact Fluency Focus: Fraction/Decimal Operations</p>	Days: 37  Number sense instruction occurs 30 minutes weekly.
Terms 1, 2 and Semester 1 End				
Unit 4 Measurement, Data, and Geometry	5.MD.A.1 5.MD.B.2 5.G.B.3 5.G.B.4	Category Hierarchy Subcategory Tree diagram Venn diagram	<ul style="list-style-type: none"> <li>I can use division to convert from smaller to larger units of measurement within the same measurement system.</li> <li>I can use my understanding of operations on fractions to solve problems about data presented in line plots.</li> <li>I can classify two-dimensional figures into categories</li> </ul>	Days: 22  Number sense instruction occurs 30 minutes weekly.

		Trapezoid (exclusive) Trapezoid (inclusive)	and subcategories based on their properties.  Fact Fluency Focus: Fraction/Decimal Operations	
Unit 5 Algebraic Thinking and the Coordinate Plane	5.OA.A.1 5.OA.A.2 5.G.A.1 5.G.A.2 5.OA.B.3	Evaluate Grouping symbol Coordinate plane Ordered pair Origin X-axis X-coordinate Y-axis Y-coordinate Corresponding terms Terms	<ul style="list-style-type: none"><li>I will know that grouping symbols, such as braces, brackets, and parentheses, show the order in which parts of an expression should be evaluated. I will know how to use grouping symbols and the order of operations to allow me to correctly evaluate, write, and interpret expressions.</li><li>I will know that a coordinate plane is a two-dimensional space formed by two perpendicular number lines. I will know that the coordinate plane will help me graph and interpret points to solve real-world and mathematical problems.</li></ul> Fact Fluency Focus: Fraction/Decimal Operations	Days: 18  Number sense instruction occurs 30 minutes weekly.
Term 3 Ends				
Unit 3 More Decimals and Fractions	5.NBT.B.7 5.NF.B.3 5.NF.B.4a 5.NF.B.4b 5.NF.B.5a 5.NF.B.5b 5.NF.B.6 5.NF.B.7a 5.NF.B.7b 5.NF.B.7c	Scaling	<ul style="list-style-type: none"><li>I can use what I know about multiplying whole numbers to help me multiply decimals and fractions.</li><li>I can think of fractions as division expressions in which the numerator is divided by the denominator.</li><li>I will know that reasoning about the size of the factors helps me reason about the size of a product: how does a factor greater or less than 1 affect a product?</li><li>I can use relationships between multiplication and division to help me divide whole numbers by unit fractions and unit fractions by whole numbers.</li></ul> Fact Fluency Focus: Fraction/Decimal Operations	Days: 41  Number sense instruction occurs 30 minutes weekly.
Reteach & Enrich (Time Dependent)	Re-teach based on concepts students do not show proficiency on at the end of the year. Provide enrichment activities for students showing proficiency.			
Term 4/Semester 2 Ends				

Requirements:	Other Notes:
<ul style="list-style-type: none"> <li>Must have 160 minimum Math lessons in a school year.</li> <li>30 minutes of fact fluency/number sense weekly.</li> <li>Math talk opportunities weekly.</li> <li>Unit/chapter assessments are to be common among the teachers of the same course for discussion and analysis. <ul style="list-style-type: none"> <li>Student proficiency tracked by standard (learning targets/standards).</li> <li>A class should achieve at least 80% proficiency on a standards referenced unit/chapter assessment in order for the teacher to move on to a new unit of learning. Reteaching is in order if this mark is not met.</li> </ul> </li> <li>Each teacher will communicate to student families what will be covered in the class and how the parent can support the learning at home.</li> </ul>	

