Math (Grade 5)

Course Description:

The curriculum for this course is developed from the Common Core State Standards for Mathematics. In fifth grade mathematics, the focus is on three critical areas of study. First, students will develop fluency with addition, subtraction, multiplication, and division of fractions. Second, students will extend division problems to two digit divisors, illustrate decimal fractions in the place value system, and develop understanding of operations with decimals to hundredths. Third, students will develop an understanding of volume.

Essential Understandings:

1. Numerical expressions build the relationship between numbers. (5.OA.A.1, 5.OA.A.2, 5.OA.B.3)
2. Relationships among numbers and number systems form the foundations of number sense and mathematics communication. (5.NBT.A.1, 5.NBT.A.2, 5.NBT.A.3, 5.NBT.A.4, 5.NBT.B.5, 5.NBT.B.6, 5.NBT.B.7)
   Fractions and decimals are used to represent a variety of rational numbers. (5.NF.A.1, 5.NFA.A.2, 5.NF.B.3, 5.NF.B.4, 5.NF.B.5, 5.NF.B.6, 5.NF.B.7)
3. Equivalent fractions are used to add and subtract fractions. (5.NF.A.1, 5.NFA.A.2, 5.NF.B.3, 5.NF.B.4, 5.NF.B.5, 5.NF.B.6, 5.NF.B.7)
4. Applying and extending previous understandings of multiplication and division are used to multiply and divide fractions. (NF.A.1, 5.NFA.A.2, 5.NF.B.3, 5.NF.B.4, 5.NF.B.5, 5.NF.B.6, 5.NF.B.7)
5. Measurement is used to describe the attributes of objects and events. (5.MD.A.1, 5.MD.B.2, 5.MD.C.3, 5.MD.C.4, 5.MD.C.5)
6. Relating volume to the operations of multiplication and addition is used to solve real world and mathematical problems. (5.MD.A.1, 5.MD.B.2, 5.MD.C.3, 5.MD.C.4, 5.MD.C.5)
7. Representing and interpreting data helps analyze information and develop critical thinking skills. (5.MD.A.1, 5.MD.B.2, 5.MD.C.3, 5.MD.C.4, 5.MD.C.5)
8. Describing and analyzing objects develops a foundation for understanding our physical environment. (5.G.A.1, 5.G.A.2, 5.G.B.3, 5.G.B.4)

Unit	Description of Unit and Learning Targets
Operations and Algebraic Thinking ● How does studying number patterns relate to numbers and operations? ● How does figuring out relationships between number patterns relate to writing number sentences?	Students will write and interpret numerical expressions using parentheses, brackets, or braces and write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them. Students will analyze patterns and relationships using two given rules, identify apparent relationships between corresponding terms, form ordered pairs consisting of corresponding terms from two patterns, and graph the ordered pairs on a coordinate plane. Learning Targets: ● I can write and figure out number sentences that have parentheses, brackets, and/or braces. ● I can correctly write number sentences using mathematical symbols and the order of operations correctly. ● I can understand number sentences and estimate their answers without actually calculating them. ● I can create two number patterns using two given rules. ● I can identify relationships between two number patterns. ● I can form ordered pairs using the relationship between two number patterns and graph them on a coordinate plane.
Number and Operations in Base Ten	Students will understand the place value system by recognizing 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. Students will explain patterns in the number of zeroes of the product when multiplying whole-numbers and decimal numbers. Students will read, write, and compare decimals to thousandths and round decimals to any place. Students will perform operations with multi-digit whole numbers and with decimals to hundredths by fluently multiplying and dividing multi-digit whole numbers and adding, subtracting, multiplying, and dividing decimals to hundredths.
● How can understanding the place value system help solve math equations with larger whole numbers? ● How can understanding the place value system help solve math equations with decimals to the hundredths?	<u>Learning Targets:</u> ● I can understand 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 the left. ● I can explain patterns of zeros in an answer when multiplying a number by powers of 10. ● I can explain patterns of decimal placement when a decimal is multiplied or divided by a power of 10. ● I can use whole-number exponents to show powers of 10. ● I can read, write, and compare decimals to thousandths. ● I can read and write decimals to thousandths using base-ten numbers, number names, and expanded form. ● I can compare two decimals to thousandths using the >, =, and < symbols correctly. ● I can use place value understanding to round decimals to any place. ● I can fluently multiply multi-digit whole numbers using the standard algorithm. ● I can find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using multiple strategies. ● I can add, subtract, multiply, and divide decimals to hundredths using multiple strategies.
Number and Operations - Fractions ● How are using equivalent (equal) fractions an effective strategy to add, subtract, multiply, and divide fractions? ● How are an understanding of multiplication and division effective strategies to add, subtract, multiply, and divide fractions?	Students will use equivalent fractions as a strategy to add and subtract fractions with unlike denominators (including mixed numbers). Students will solve word involving addition and subtraction of fractions. Students will apply and extend previous understandings of multiplication and division to multiply and divide fractions by interpreting fractions as division, multiplying fractions by whole numbers and fractions, interpreting multiplication as scaling (resizing), and dividing unit fractions by whole numbers. <u>Learning Targets:</u> ● I can add and subtract fractions with unlike denominators. ● I can solve word problems that involve addition and subtraction of fractions. ● I can use number sense and fractions that I know to estimate the reasonableness of answers to fraction problems. ● I can understand that fractions are really division problems. ● I can solve word problems where I need to divide whole numbers leading to answers that are fractions or mixed numbers. ● I can use what I know about multiplication to multiply fractions or whole numbers by a fraction. ● I can understand and show with models that multiplying a

	fraction by a whole number is the same as finding the product of the numerator and whole number and then dividing it by the denominator.
	● I can use unit squares to find the area of a rectangle with fractional side lengths and prove that it is the same as multiplying the side lengths (A = l x w).
	● I can think of multiplication as the scaling of a number (similar to a scale on a map.)
	● I can mentally compare the size of a product to the size of one of the factors by thinking about the other factor in the problem.
	● I can explain why multiplying a number by a fraction greater than 1 will result in a bigger number than the number I started with.
	● I can explain why multiplying a number by a fraction less than 1 will result in a smaller number than the number I started with.
	● I can relate the notion of equivalent fractions to the effect of multiplying a fraction by 1.
	● I can solve real world problems that involve multiplication of fractions and mixed numbers.
	● I can use what I know about division to divide fractions by whole numbers or whole numbers by fractions.
	● I can divide a fraction by a whole number (not 0) correctly.
	● I can divide a whole number by a fraction correctly.
	● I can use what I know about division problems involving fractions to solve real world problems.
Measurement and Data ● Why is it important to convert like measurement units within a given measurement system? ● Why is it important to represent and interpret data? ● Why is it important to understand the concept of measuring volume in geometry?	Students will convert like measurement units within a given measurement system and use these conversions in solving multi-step, real world problems. Students will represent and interpret data by making a line plot to display data set of measurements in fractions of a unit. Students will understand concepts of volume and relate volume to multiplication and to addition by recognizing volume as an attribute of solid figures, measuring volumes by counting unit cubes, and solving real world and mathematical problems involving volume. Learning Targets: ● I can convert different-sized measurements within the same measurement system. ● I can use measurement conversions to solve real-world problems. ● I can make a line plot to show a data set of measurements involving fractions. ● I can use addition, subtraction, multiplication and division of fractions to solve problems involving information presented on a line plot. ● I can recognize volume as a characteristic of solid figures and understand how it can be measured. ● I can understand a "unit cube" as a cube with side lengths of 1 unit and can use it to measure volume. ● I can understand that a solid figure filled with a number of unit cubes is said to have a volume of that many cubes. ● I can measure volume by counting unit cubes. ● I can solve real world problems involving volume by thinking about multiplication of addition. ● I can use unit cubes to find the volume of a right rectangular prism with whole number side lengths and prove that it is the same as multiplying the edge lengths (V = l x w x h).

	- I can solve real-world and mathematical problems involving volume of an object using the formulas V = l x w x h and V = b x h. - I can find the volumes of solid figures made up of two right rectangular prisms by adding the volumes of both. - I can solve real-world problems using what I know about adding the volumes of two right rectangular prisms.
Geometry How does graphing points on a coordinate plane solve real-world and mathematical problems?	Students will graph points on the coordinate plane to solve real world and mathematical problems using a pair of perpendicular number lines, called axes, to define a coordinate system. Students will represent real world and mathematical problems by graphing points and interpreting coordinate values of points in the context of the situation. Students will classify two-dimensional figures into categories based on their properties by understanding that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category and classifying two-dimensional figures in a hierarchy based on properties. Learning Targets: - I can understand a coordinate plane and ordered pairs of number coordinates on that plane. - I can graph ordered pairs of numbers on a coordinate plane using what I have learned about the x-axis and coordinate and the y-axis and coordinate. - I can represent real-world and mathematical problems by graphing points in the first quadrant of a coordinate plane. - I can understand coordinate values in the context of a real-world or mathematical problem. - I can classify two-dimensional figures into categories based on their properties.