SENECA VALLEY SCHOOL DISTRICT

CURRICULUM

Course Title:	**Mathematics**
Course Number:	
Grade Level(s):	**3**
Periods Per Week:	**5**
Length of Period:	**70 Minutes**
Length of Course:	**Full Year**
Credits:	
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Date:	**October 16, 2013**

COURSE DESCRIPTION:

This course is the developmental study of mathematical concepts and applications for third grade students. Mathematics at this grade level will continue the solid foundation previously developed in whole numbers, addition, subtraction, multiplication and division. Third grade curriculum will take previously mastered concepts and support students' ability to learn and apply more demanding mathematical concepts and procedures. Tasks are infused into the third grade curriculum with the intent of providing opportunity for the students to practice applying mathematical ways of thinking to real world issues and challenges.

COURSE OUTLINE	OBJECTIVES (PA standard)			

The following outline provides a general overview of the course content, not a chronological timetable. The weeks denoted for each area provide an idea for the overall time spent working with a given topic throughout the school year.

Numbers and Operations Numbers and Operations in Base Ten (M03.A-T.1.1) Apply place value strategies to solve problems.	**M03.A-T.1.1.1** (*Round two- and three- digit whole numbers to the nearest ten or hundred, respectively.)* • Calculate, measure, and apply the rule to round two- and three- digit numbers to the nearest ten and hundred • Apply place value understanding to round two-digit whole numbers to the nearest ten or hundred. • Apply place value understanding to round three-digit whole numbers to the nearest ten or hundred. • Use written and verbal communication to explain how to round two-and three- digit numbers to the nearest ten and hundred. **M03.A-T.1.1.2** (*Add two- and three- digit whole numbers (limit sums from 100 to 1,000), and/or subtract two- and three- digit numbers from three-digit whole numbers.)* • Apply place value understanding to add two-digit whole numbers with sums from 100 through 1,000 • Apply place value understanding to add three-digit whole numbers with sums from 100 through 1,000 • Apply place value understanding to subtract two-digit whole numbers • Apply place value understanding to subtract three-digit whole numbers • Explain verbally and in writing the steps that are used to solve a two- and three- digit addition problem • Explain verbally and in writing the steps that are used to solve a two- and three- digit subtraction problem • Illustrate and explain how to add and subtract two- and three- digit whole numbers (e.g. manipulatives, paper/pencil) **M03.A-T.1.1.3** (*Multiply one-digit whole numbers by two-digit multiples of 10 from 10 through 90)* • Establish and extend a pattern of one- digit whole numbers by multiples of ten • Understand and explain multiplication as the			

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	combining of equal groups. • Identify the number of groups, the number in each group, and the product in a multiplication problem. • Generalize and explain the relationship among skip counting, repeated addition, and multiplication. **M03.A-T.1.1.4** (*Order a set of whole numbers from least to greatest or greatest to least up through 9,999; limit sets to no more than four numbers*) • Organize and order a set of four numbers from greatest to least or least to greatest up through 9,999 • Compare and contrast numbers of unequal value up through 9,999			
Numbers and Operations—Fractions (M03.A-F.1.1) Develop and apply number theory concepts to compare quantities and magnitudes of fractions and whole Explain verbally and in writing the steps that are used to solve a two- and three- digit addition problem numbers.	**M03.A-F.1.1.1** *Demonstrate that when a whole or set is partitioned into y equal parts, the fraction 1/y represents 1 part of the whole and/or the fraction x/y represents x equal parts of the whole (limit the denominators to 2,3,4, 6, and 8; limit numerators to whole numbers less than the denominator; no simplification)* • Demonstrate the concept of a whole partitioned into y equal parts. • Demonstrate the concept of a set partitioned into y equal parts. • Illustrate and explain a unit fraction (1/y) as part of a whole and as part of a set. • Illustrate and explain the concept of x/y where x= parts of the whole and y=the denominators of 2, 3, 4, 6, and 8. • Illustrate and explain the concept of a fraction that equals one whole. (e.g. 2/2=1, 3/3=1)			

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	M03.A-F.1.1.2 *Represent fractions on a number line (limit the denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; no simplification necessary)* • Organize and order fractions as part of a number line. • Recognize the location of a fraction on a number line. • Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 and partitioning into b equal parts. • Explain and compare fractions by reasoning about their size. **M03.A-F.1.1.3** *Recognize and generate simple equivalent fractions (limit the denominators to 1,2,3,4,6, and 8; limit numerators to whole numbers less than the denominator; no simplification necessary.)* • Construct models to recognize and represent the concepts of simple equivalent fractions. • Generate simple equivalent fractions with the denominator of 1,2,3,4,6, and 8. • Use concepts of fractions an whole numbers to solve problems involving equivalent fractions. **M03.A-F.1.1.4** *Express whole numbers as fractions, and/or generate fractions that are equivalent to whole numbers (limit the denominators to 1,2,3,4,6, and 8; limit numerators to whole numbers less than the denominator).* • Generate fractions that are equivalent to whole numbers. **M03.A-F.1.1.5** *Compare two fractions with the same denominator (limit the denominators to 1,2,3,4,6, and 8), using the symbols >,=, or <, and/or justify the conclusions.* • Using models, compare and contrast two fractions with the same denominator. • Use a diagram to translate between models and symbolic notation with two fractions that have the same denominator. • Compare three fractions with the same denominator and put them in order from least to greatest and greatest to least.			

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	• Compare two fractions with the same numerator and reason about their size. • Recognize that comparisons are valid when two fractions refer to the same whole.			
<u>Operations and Algebraic Thinking</u> **M03.B-O.1.1 Understand various meanings of multiplication and division.** **M03.B-0.1.2 Solve mathematical and real-world problems using multiplication and division, including determining the missing number in a multiplication and/or division equation.** **M03.B-O.2.1 Use properties to simplify and solve multiplication**	**M03.B-0.1.1.1** *Interpret and/or describe products of whole numbers (up to and including 10 x 10).* <u>*Example 1*</u>*: Interpret 35 as the total number of objects in 5 groups, each containing 7 objects.* <u>*Example 2*</u>*: Describe a context in which a total number of objects can be expressed as 5 x 7.* • Construct and model multiplication as an array. • Model and explain an array to find factors of 2-digit numbers up to 50. • Model and explain multiplication as repeated addition. • Apply the multiplication algorithm to solve a single digit multiplication combination. • Understand division as the inverse relationship of multiplication. • Explain the concept of division as *sharing*, or the splitting of the whole into equal parts. • Explain the concept of division as *grouping* of a set of objects. • Construct multiplication combinations to solve division problems. • Use and understand multiplication notation. • Use and understand division notation. • Represent equivalent forms of the same number using concrete objects. • Explain the concept of the total number of object to formulate as a multiplication expression. **M03.B-0.1.1.2** *Interpret and/or describe whole-number quotients of whole numbers (limit dividends through 50, and limit divisors and quotients through 10).* <u>*Example 1:*</u> *Interpret 48 / 8 as the number of objects in each share when 48 objects are partitioned equally into 8 shares, or as a number of shares when 48 objects are partitioned into*			

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problems. **M03.B-O.2.2 Relate division to a missing number multiplication equation.** **M03.B-O.3.1 Use operations, patterns, and estimation strategies to solve problems (may include word problems).**	*equal shares of 8 objects each.* *<u>Example 2:</u> Describe a context in which a number of shares or a number of groups can be expressed as 48 / 8.* • Model and explain the relationship among the divisor, the dividend, and the quotient in a given problem. • Create and solve an original problem and explain the relationship among the divisor, the dividend, and the quotient. ***M03.B-01.2.1*** *Use multiplication (up to and including 10 x 10) and/or division (limit dividends through 50, and limit divisors and quotients through 10) to solve word problems in situations involving equal groups, arrays, and/or measurement quantities.* • Relate multiplication concepts to other content areas to solve word problems. • Relate division concepts to other content areas to solve word problems. ***M03.B-O.1.2.2*** *Determine the unknown whole number in a multiplication (up to and including 10 x 10) or division (limit dividends through 50, and limit divisors and quotients through 10) equation relating three whole numbers.* *Example: Determine the unknown number that makes an equation true.* • Generalize a pattern in multiplication to find a missing number in a multiplication equation. • Generalize a pattern in multiplication to find a missing number in a division equation. ***M.03.B-O.2.1.1*** *Apply the commutative property of multiplication (not identification or definition of the property).* • Model and explain the concept of the commutative property. • Demonstrate and explain how and why the commutative property of multiplication works. ***M03.B-O.2.1.2*** *Apply the associative property of multiplication (not identification or definition of the property).* • Model and explain the concept of the associative property. • Demonstrate and explain how and why the associative			

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	property of multiplication works. ***M03.B-O.2.2.1*** *Interpret and/or model division as a multiplication equation with an unknown factor. Example: Find 32 / 8 by solving 8 x ? = 32.* • Model a multiplication equation with an unknown factor in order to solve a division problem. (12 / 4= *a* is the same as *a* x 4=12) ***M03.B-O.3.1.1*** *Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers.* • Utilize concepts of operations to solve non-routine problems with two or more steps. • Show evidence and logic to justify the outcome of a two-step word problem. ***M03.B-O.3.1.2*** *Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers.* • Model and interpret a two-step word problem with an equation that incorporates a symbol for an unknown quanitity. ***M03.B-O.3.1.3*** *Assess the reasonableness of answers. Limit problems posed with whole numbers and having whole-number answers.* • Gather, analyze, and evaluate information to determine the reasonableness of an answer. ***M03.B-O.3.1.4*** *Solve two-step equations using order of operations (equation is explicitly stated with no regrouping symbols).* • Solve routine problems applying multiple concepts or operations. • Demonstrate reasoning and planning in solving an equation with more than one operation.			

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	M03.B-O.3.1.5 *Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations.* *Example 1: Observe that 4 times a number is always even.* *Example 2: Explain why 6 times a number can be decomposed into three equal addends.* • Specify and explain multiples of the numbers 2, 3, 4, 5, 6, and 10 by skip counting. • Describe and compare the characteristics of the multiples of a number. • Understand that doubling (or halving) one factor in a multiplication expression doubles (or halves) the product. ***M03.B-O.3.1.6*** *Create or match a story to a given combination of symbols (+,-,x,/, <,>,=) and numbers.* • Interpret a word problem and select the appropriate numbers and symbols for the operation. ***M03.B-O.3.1.7*** *Identify the missing symbol (+,-,x,/, <,>,=) that makes a number sentence true.* • Model and interpret an inequality or equality within a simple equation.			
Geometry **M03.C-G.1.1 Analyze characteristics of polygons.**	***M03.C-G.1.1.1*** *Explain that shapes in different categories may share attributes, and that the shared attributes can define a larger category.* *Example 1: A rhombus and a rectangle are both quadrilaterals since they both have exactly four sides.* *Example 2: A triangle and a pentagon are both polygons since they are both multi-sided plane figures.* • Analyze the sizes of angles in a polygon to determine if they are greater than, equal to, or less than a right angle. • Describe and compare the sizes of angles in a polygon to classify the polygon intoan appropriate category/categories. • Describe and compare the length of sides in a polygon to classify the polygon into an appropriate			

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	category/categories. • Describe the types of lines in a polygon as they relate to perpendicular or parallel in order to classify the polygon into an appropriate category/categories. • Describe, compare, and contrast attributes of two-dimensional plane figures. • Categorize figures based on characteristics. • ***M03.C-G.1.1.2*** *Recognize rhombi, rectangles, and squares as examples of quadrilaterals, and/or draw examples of quadrilaterals that do not belong to any of these subcategories.* • *Categorize figures based on characteristics.* • *Describe, compare, and contrast attributes of two-dimensional plane figures.* ***M03.C-G.1.1.3*** *Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.* *Example 1: Partition a shape into 4 parts with equal areas.* *Example 2: Describe the area of each of 8 equal parts as 1/8 of the area of the shape.* • Construct models to represent equal parts of a geometric shape.			
Measurement and Data **M03.D-M.1.1 Determine or calculate time and elapsed time.** **M03.D-M.1.2 Use the attributes of liquid volume, mass, and length of objects.**	***M03.D-M.1.1.1*** *Tell, show, and/or write time (analog) to the nearest minute.* ***M03.D-M.1.1.2*** *Calculate elapsed time to the minute in a given situation (total elapsed time limited to 60 minutes or less).* ***M03.D-M.1.2.1*** *Measure and estimate liquid volumes and masses of objects using standard units (cups {c}, pints {pt}, quarts {qt}, gallons {gal}, ounces {oz} and pounds {lb}) and metric units (liters {l}, grams {g}, and kilograms {kg}).* ***M03.D-M.1.2.2*** *Add, subtract, multiply, and divide to solve one-step word problems involving masses or liquid volumes that are given in the same units.*			

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M03.D-M.1.3 Count, compare, and make change using a collection of coins and one-dollar bills. **M03.D-M.2.1 Organize, display, and answer questions based on data.**	***M03.D-M.1.2.3*** *Use a ruler to measure lengths to the nearest quarter inch or centimeter.* ***M03.D-M.1.3.1*** *Compare total values of combinations of coins (penny, nickel, dime, quarter) and/or dollar bills less than $5.00.* • Compare total values of coin/bill combinations less than $5.00, using >, <, or =. • Given a money amount less than $5.00, show at least two combinations of coins/bills to make that amount. ***M03.D-M.1.3.2*** *Make change for an amount up to $5.00 with no more than $2.00 change given (penny, nickel, dime, quarter, and dollar).* • Explain the steps followed to make change by counting on from the cost to the amount given. • Justify your answer to a making change problem by adding the "cost" plus the "change" to determine if the total equals the amount "given". ***M03.D-M.1.3.3*** *Round amounts of money to the nearest dollar.* • Using estimation concepts, round amounts of money to the nearest dollar. ***M03.D-M.2.11*** *Complete a scaled pictograph and a scaled bar graph to represent a data set with several categories (scales limited to 1, 2, 5, and 10).* • Design a scaled pictograph and bar graph with several categories to represent data. • ***M03.D-M.2.1.2*** *Solve one-and two-step problems using information to interpret data presented in scaled pictographs and scaled bar graphs (scales limited to 1, 2, 5, and 10).* *Example 1: (One-step) "Which category is the largest?"* *Example 2: (Two-step) "How many more are in category A than in category B?"* • Interpret the data from a graph to "tell a story" about the data. • Interpret the data from a graph to determine the largest, smallest, greatest, least, etc.			

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	• Examine the data from two graphs to write comparison/contrast statements. • Describe the overall trend in a graph as increasing, decreasing, or staying the same. • Extend a pattern on a bar graph to predict the subsequent bars. • ***M03.D-M2.1.3*** *Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Display the data by making a line plot, where the horizontal scale is marked in appropriate units-whole numbers, halves, or quarters.* ***M03.D-M.2.1.4*** *Translate information from one type of display to another. Limit to pictographs, tally charts, bar graphs, and tables.* *Example:* *Convert a tally chart to a bar graph.*			
M03.D-M.3.1 Find the areas of plane figures **M03.D-M.4.1 Find and use the perimeters of plane figures.**	***M03.D-M.3.1.1*** *Measure areas by counting unit squares (square cm, square m, square in., square ft, and non-standard square units).* • Determine the number of squares that fit in a given shape. • Explain and generalize that area is a two-dimensional measurement and is measured in square units. • ***M03.D-M.3.1.2*** *Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.* • Specify and explain the relationship between an array and the area of a rectangle. • Investigate and generalize a formula for finding the area of a rectangle. • ***M03.D-M.4.1.1*** *Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, exhibiting rectangles with the same perimeter and different areas, and exhibiting rectangles with the same area*			

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	and different perimeters. Use the same units throughout the problem. • Explain and generalize that perimeter is a one dimensional or linear measurement and is measured in linear units. • Explain the difference between area and perimeter as it relates to two-dimensional and one-dimensional units of measurement. • Use models to measure around the outside edge of a two-dimensional figure. • Justify the perimeter of a two-dimensional figure using standard units. • Given the perimeter and the length of all but one side of a polygon, determine the length of the unknown side. • Investigate, model, and generalize that rectangles with the same area can have different perimeters. • Investigate, model, and generalize that rectangles with the same perimeters can have different areas.			