

NEW MILFORD PUBLIC SCHOOLS
New Milford, Connecticut



Grade Four Mathematics

September 2014

*Approved by the Board of Education
September 9, 2014*

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New Milford's Mission Statement

The mission of the New Milford Public Schools, a collaborative partnership of students, educators, family and community, is to prepare each and every student to compete and excel in an ever-changing world, embrace challenges with vigor, respect and appreciate the worth of every human being, and contribute to society by providing effective instruction and dynamic curriculum, offering a wide range of valuable experiences, and inspiring students to pursue their dreams and aspirations.

Pacing Guide

<u>Unit #</u>	<u>Weeks</u>	<u>Pages</u>
1	4	6-10
2	3	11-14
3	6	15-19
4	6	20-24
5	8	25-28
6	6	29-33
7	2	34-37
8	5	38-41
9	3	42-45

Key for Standards

- MP 1 - Make sense of problems and persevere in solving them
- MP 2 - Reason abstractly and quantitatively
- MP 3 - Construct viable arguments and critique the reasoning of others
- MP 4 - Model with mathematics
- MP 5 - Use appropriate tools strategically
- MP 6 - Attend to precision
- MP 7 - Look for and make use of structure
- MP 8 - Look for and express regularity in repeated reasoning.

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 1	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 4
Identify Desired Results	
Common Core Standards	
<p>Standards in the Unit</p> <ul style="list-style-type: none"> • (4.OA.1) Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. • (4.OA.2) Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. • (4.OA.3) Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. • (4.OA.4) Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. (Standard also in Ten-Minute Math) <p>Standards Only in Ten-Minute Math</p> <ul style="list-style-type: none"> • (4.NBT.4) Fluently add and subtract multi-digit whole numbers using the standard algorithm. • (4.G.2) Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • A multiplication equation can be interpreted as a comparison of two quantities and how they relate to each other. • Multiplication and division can be used to solve problems. 	<ul style="list-style-type: none"> • How many ways can I interpret a multiplication equation? (An array, repeated addition, a comparison) • What are the different strategies that can be used to solve multiplication and division problems?

<p>By utilizing varied and efficient methods of multiplication and division, more complex problem solving is possible.</p> <ul style="list-style-type: none"> • Factors and multiples can be used to determine part-whole relationships. 	<p>What is the relationship between multiplication and division?</p> <ul style="list-style-type: none"> • How do I determine which strategies to use to solve multistep word problems? • What are factors and multiples?
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Expected Performances
What students should know and be able to do

<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students deepen their understanding of the operation of multiplication. • Students use rectangular arrays to represent the relationship between factors and multiples, use what they know to solve problems that increase in size, and focus on solving problems efficiently. • Students continue to develop fluency with multiplication combinations (facts up to 12 x 12). <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Use known multiplication combinations to find the product of any multiplication combination up to 12 x 12. • Use arrays, pictures or models of groups, and story contexts to represent multiplication situations. • Find the factors of 2-digit numbers

Character Attributes
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance

Technology Competencies
<ul style="list-style-type: none"> • None

Develop Teaching and Learning Plan

<p>Teaching Strategies:</p> <p>Use a math workshop model with teacher-directed mini-lesson</p> <ul style="list-style-type: none"> • to provide students with repeated experiences with concepts and skills • to provide time for teachers to work with small groups of students <p>Use games to develop concepts and practice skills</p> <p>Use student-centered activities and worthwhile math tasks</p> <p>Use a variety of grouping structures</p>	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Construct arrays, referring to rows and columns, to represent multiplication and division problems. • Create equations from an array as well as stories and visuals that match arrays and equations. • Construct multiple arrays for the same number to determine factors. • Use arrays to determine prime, composite and square numbers. • Use Multiplication Cards to develop fluency with combinations up to
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<ul style="list-style-type: none"> • Collaborative groups, partners, individuals <p>Orchestrate class discussions</p> <ul style="list-style-type: none"> • Focus discussions on important mathematics and student strategies • Elicit participation by all students over the course of several discussions • Facilitate student to student discourse <p>Encourage students to represent and discuss their thinking strategies</p> <p>Use Ten-Minute Math to provide on-going practice and review:</p> <ul style="list-style-type: none"> • Counting Around the Class <ul style="list-style-type: none"> • Finding the multiples of numbers through skip counting. • Understanding the relationship between skip counting and multiplication. • Using the nearest landmark to find multiples of a given number • Relating factors to their multiples • Quick Images <ul style="list-style-type: none"> • Organizing and analyzing visual images. • Developing language and concepts needed to communicate about spatial relationships. • Today's Number <ul style="list-style-type: none"> • Generating equivalent expressions for a number using particular constraints. • Practicing computation skills. • Using notation to record expressions. 	<p>12x12.</p> <ul style="list-style-type: none"> • Play games that reinforce factor and multiple concepts such as <i>Factor Pairs</i> and <i>Multiplication Turn Over</i>. • Find factors of 100 and multiples of 100.
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Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Generate examples of arrays of familiar objects and find products represented by these arrays. • Find all arrays for a given number and label the dimensions of each array. • Find and model products of pairs of numbers from 1x2 to 12x12 with arrays. • Determine product represented by an incomplete or partially covered array. • Represent and solve basic multiplication fact problems. • Use known multiplication combinations to find unknown combinations. • Develop fluency with multiplication combinations using known combinations. • Determine if a number is a multiple of a given factor. • Determine which numbers are multiples of a given number. • Demonstrate fluency with multiplication combinations. • Generate all factors of 100. • Find factors of 200, 300 and other multiples of 100. • Explain the relationship between the factors of 16 and 48. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Representing 8x6 • <i>Multiplication Combinations</i> <p>End-of-Unit Assessment</p> <ul style="list-style-type: none"> • Solve a multiplication basic multiplication problem up to and including 12x12. • Create a visual and story context

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| | for a basic multiplication problem. <ul style="list-style-type: none">• Find and represent all factors of 36. |
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Suggested Resources	
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| <ul style="list-style-type: none">• Investigations: Unit 1, Factors, Multiples, and Arrays.• Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al• K-5 Math Teaching Resources, online• Howard County Math Wiki, Grade 4 | |
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New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 2	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 3
Identify Desired Results	
Common Core Standards	
Standards in the Unit <ul style="list-style-type: none"> • (4.NBT.4) Fluently add and subtract multi-digit whole numbers using the standard algorithm. (Standard also in Ten-Minute Math) • (4.MD.2) Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. Standards Only in Ten-Minute Math <ul style="list-style-type: none"> • (4.MD.4) Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Data can be represented in various ways. • Fluently add and subtract multi-digit whole numbers using the standard algorithm. 	<ul style="list-style-type: none"> • How does organizing data make it easier to understand? • How can you describe and compare data using different visual representations? • How are numbers used in everyday life to convey information and solve problems?
Expected Performances	
What students should know and be able to do	
Students will know the following: <ul style="list-style-type: none"> • Students collect data through counting and measuring and use bar graphs and line plots to represent their data involving one group and compare data of two groups. • Students interpret the data and draw conclusions based on the data using terms such as mode, median, range, and outlier. 	

Students will be able to do the following:

- Design an effective survey question to compare two groups.
- Organize and represent data about two groups in order to compare the groups.
- Describe the shape of the data from a numerical data set, including where the data are concentrated and the highest, lowest, and median values.
- Use data to compare two groups.
- Use evidence from a set of data to support an argument

Character Attributes

- Cooperation
- Respect
- Responsibility
- Perseverance

Technology Competencies

- None

Develop Teaching and Learning Plan

Teaching Strategies:

Use a math workshop model with teacher-directed mini-lesson

- to provide students with repeated experiences with concepts and skills
- to provide time for teachers to work with small groups of students

Use games to develop concepts and practice skills

Use student-centered activities and worthwhile math tasks

Use a variety of grouping structures

- Collaborative groups, partners, individuals

Orchestrate class discussions

- Focus discussions on important mathematics and student strategies
- Elicit participation by all students over the course of several discussions
- Facilitate student to student discourse

Encourage students to represent and discuss their thinking strategies

Use Ten-Minute Math to provide on-going practice and review.

- Quick Survey
 - Collecting data.

Learning Activities:

- Collect data to solve a numerical problem or answer a question.
- Determine and create appropriate representations of data, such as a bar graph and line plot.
- Interpret and discuss data using range, outliers and median.
- Compare data across multiple sets.
- Create a survey of numerical questions.
- Collect, represent, interpret and analyze data from a survey.
- Develop arguments and opinions based on data.

<ul style="list-style-type: none"> • Describing features of data. • Interpreting and posing questions about data. • Today's Number <ul style="list-style-type: none"> • Generating equivalent expressions for a number using particular constrains. • Practicing computation skills. • Using notation to record expressions. 	
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Assessments	
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Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
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<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Represent and record observations of a data set. • Measure and record height data for two populations. • Create representations of height data sets for comparison. • Compare height data. • Find the median of two data sets. • Develop a numerical data question for a survey. • Draw conclusions about data. • Describe two sets of mystery data and develop theories about the subject of the data. • Construct a line plot and compare sets of data. • Interpret data to support opinions and decisions. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Collect, represent and compare survey data from two classes <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Describe the shape of data from a numerical data set to compare groups. • Create a line plot from a data set.
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Suggested Resources

- Investigations: Unit 2, Describing the Shape of the Data.
- Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al
- [K-5 Math Teaching Resources](#), online
- [Howard County Math Wiki](#), Grade 4

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 3	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 6
Identify Desired Results	
Common Core Standards	
Standards in the Unit	
<ul style="list-style-type: none">• (4.OA.1) Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.• (4.OA.2) Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.• (4.OA.3) Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.• (4.OA.4) Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. (Standard also in Ten-Minute Math)• (4.NBT.5) Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.• (4.NBT.6) Find whole-number quotients and remainders with up to four-digit dividends and one-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.	
Standards Only in Ten-Minute Math	
<ul style="list-style-type: none">• (4.G.2) Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Multiplication problems can be solved using a variety of strategies. • Division problems can be solved using a variety of strategies. • Division of larger numbers is the same as division of smaller numbers. • Multiplication of larger numbers is the same as multiplication of smaller numbers. 	<ul style="list-style-type: none"> • What are the strategies I can use to solve multiplication equations? • What are the strategies I can use to solve division equations? • What is the relationship between multiplication and division? • How is multiplying multi-digit numbers similar to single-digit numbers?
Expected Performances What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students develop strategies for solving multiplication problems with two-digit numbers and deepen their understanding of the operation of division by focusing on the relationship between multiplication and division. • Using story contexts and multiple towers, students continue their investigation of the relationship between numbers and their factors. • Students practice multiplying by 10 and multiples of 10, break problems into smaller parts that can be multiplied easily, and find the multiples of two-digit numbers. • Students gain fluency with all multiplication combinations to 12 x 12. • Students solve, represent, and discuss division story problems, including some that have a remainder <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Multiply 2-digit numbers by 1-digit and small 2-digit numbers using strategies that involve breaking the numbers apart. • Solve division problems (2-digit and small 3-digit numbers divided by 1-digit numbers), including some that result in a remainder. • Use story problems, pictures, or concrete models to represent division situations. • Multiply by 1- and multiples of 10. • Demonstrate fluency with multiplication combinations up to 12 x 12 	
Character Attributes	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
Technology Competencies	
<ul style="list-style-type: none"> • None 	

Develop Teaching and Learning Plan

Teaching Strategies:

Use a math workshop model with teacher-directed mini-lesson

- to provide students with repeated experiences with concepts and skills
- to provide time for teachers to work with small groups of students

Use games to develop concepts and practice skills

Use student-centered activities and worthwhile math tasks

Use a variety of grouping structures

- Collaborative groups, partners, individuals

Orchestrate class discussions

- Focus discussions on important mathematics and student strategies
- Elicit participation by all students over the course of several discussions
- Facilitate student to student discourse

Encourage students to represent and discuss their thinking strategies

Use Ten-Minute Math to provide on-going practice and review:

- Counting Around the Class
 - Finding the multiples of numbers through skip counting.
 - Understanding the relationship between skip counting and multiplication.
 - Using the nearest landmark to find multiples of a given number
 - Relating factors to their multiples
- Quick Images
 - Organizing and analyzing visual images.
 - Developing language and concepts needed to communicate about spatial relationships.

Learning Activities:

- Solve multiplication problems with smaller 2-digit numbers, exploring ways to break apart problems.
- Represent and explain solutions to multiplication and division problems with pictures, diagrams or models.
- Combine smaller arrays to construct larger arrays for problem solving, using *Array Cards* or pictures.
- Explore array/multiplication/division concepts with games like *Small Array/Big Array*.
- Develop strategies for solving division problems (story and with remainders), including making groups of the divisor and using multiplication combinations.
- Represent related pairs of multiplication and division problems.
- Generate multiples of 2-digit numbers and examine patterns and make predictions.
- Solve related problems that involve multiples of 10.
- Using factors that have been doubled or halved to solve problems.
- Investigate strategies for solving multiplication cluster problems.
- Solve larger multiplication problems by breaking apart numbers or doubling/halving factors.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Solve 2-digit multiplication problems. • Solve two part multiplication problems. • Use arrays to visualize larger multiplication problems. • Combine two arrays to into a larger area; break a larger array into smaller arrays. • Solve 2-digit by 1-digit multiplication problems. • Solve and represent division story problems. • Account for remainders in quotients as appropriate to the context of the problem. • Determine the missing dimension of an array when the product and other dimension are given. • Solve and explain related multiplication and division problems. • Use known multiplication combinations to solve division problems. • Reason about the number relationships within a sequence of multiples of a 2-digit number. • Examine the pattern observed when a number is multiplied by a multiple of 10. • Solve multiplication problems and story problems that involve multiples of 10. • Demonstrate fluency with multiplication combinations. • Solve problems where on factor is doubled or halved. • Develop strategies for solving problems with 2-digit numbers.

	<p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Solving 18×7 • Writing and Solving a Division Problem • Multiplication Combinations <p>End-of-Unit Assessments</p> <ul style="list-style-type: none"> • Solve problems with 2-digit number and multiples of 10. • Solve a division problem with a remainder; create a story context for the problem.
Suggested Resources	
<ul style="list-style-type: none"> • Investigations: Unit 3, Multiple Towers and Division Stories. • Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al • K-5 Math Teaching Resources, online • Howard County Math Wiki, Grade 4 	

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 4	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 6
Identify Desired Results	
Common Core Standards	
<p>Standards in the Unit</p> <ul style="list-style-type: none">• (4.G.1) Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.• (4.G.2) Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. (Standard also in Ten-Minute Math).• (4.G.3) Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.• (4.MD.3) Apply the area and perimeter formulas for rectangles in real world and mathematical problems.• (4.MD.5) Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.• (4.MD.6) Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.• (4.MD.7) Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. <p>Standards Only in Ten-Minute Math</p> <ul style="list-style-type: none">• (4.NBT.4) Fluently add and subtract multi-digit whole numbers using the standard algorithm.	

<p align="center">Enduring Understandings</p> <p align="center">Generalizations of desired understanding via essential questions (Students will understand that ...)</p>	<p align="center">Essential Questions</p> <p align="center">Inquiry used to explore generalizations</p>
<ul style="list-style-type: none"> • Objects can be described, compared, and classified by geometric attributes. • Angles can be measured. • An angle can be decomposed and composed. • Area and perimeter can be found using a formula of any rectilinear shape. 	<ul style="list-style-type: none"> • How do you draw and identify characteristics of 2-dimensional figures? • How can 2-dimensional figures be classified? • How do I use what I know about one angle to find the measurement of other angles? • How do you measure angles? • How do you find the area of a shape?
<p align="center">Expected Performances</p> <p align="center">What students should know and be able to do</p>	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students define and categorize polygons by identifying sets of shapes that have a common attribute and use 90 degrees as a reference for finding the measurement of other angles. • Students continue their measurement work from earlier grades by measuring distance and perimeter, using both U.S. and metric units and finding the area of polygons in square units. • LogoPaths, a Logo programming environment designed for Investigations students in Grades 3–5 is introduced in this unit. It allows students to explore geometrical relationships, especially focusing on angle, length, and perimeter, patterns in sides and angles, and characteristics of specific shapes <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Use appropriate measurement tools to measure distance. • Identify quadrilaterals as any four-sided closed figure. • Know that a right angle measures 90 degrees, and use this as a landmark to find angles of 30, 45 and 60 degrees. • Find the area of polygons using a square unit of measure. 	
<p align="center">Character Attributes</p>	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
<p align="center">Technology Competencies</p>	
<ul style="list-style-type: none"> • None 	

Develop Teaching and Learning Plan

Teaching Strategies:

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Orchestrate class discussions

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Encourage students to represent and discuss their thinking strategies

Use Ten-Minute Math to provide on-going practice and review:

- Quick Images
 - Organizing and analyzing visual images.
 - Developing language and concepts needed to communicate about spatial relationships.
- Today's Number
 - Generating equivalent expressions for a number using particular constraints.
 - Practicing computation skills.
 - Using notation to record expressions.

Learning Activities:

- Use measurement tools to find equivalent benchmark measurements for cm, in, ft, yd and m.
- Investigate estimated vs. exact measurement situations.
- Use U.S. standard and metric units to accurately measure length and compare paths of the same length.
- Measure perimeter with standard units.
- Define, name and classify polygons; use games like *Guess My Rule* with Power Polygons.
- Combine polygons to create new polygons, such as triangles, parallelograms and hexagons.
- Sort quadrilaterals based on attributes and properties using games such as *Guess My Rule*.
- Draw lines, parts of lines and angles measure with a protractor.
- Identify a right angle as 90 degrees.
- Measure acute angles by comparing to 90 degrees.
- Solve addition and subtraction problems for finding unknown angles given known angles
- Create and solve equations for making right triangles.
- Create designs with mirror symmetry.
- Find area of symmetrical designs.
- Find area of irregular polygons by decomposing shapes.
- Find the area of rectangles.
- Determine the area of a triangle in relation to the area of a rectangle.

Assessments	
Performance Task(s) Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)	Other Evidence Application that is functional in a classroom context to evaluate student achievement of desired results
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Find benchmarks of common linear measurement tools. • Estimate lengths of objects with measurement benchmarks. • Investigate relationships between common measurement tools. • Find exact measures for objects. • Measure the perimeter of objects with different units. • Complete figures with missing dimensions, using known dimensions and determine perimeter. • Measure length with a meterstick/yardstick. • Create a path 100 units long (with Logopaths, for example) • Determine if a shape is a polygon or not. • Sort polygons by number of sides, side length and angle size. • Construct polygons of various shapes with different numbers of sides or of a given description. • Create a rectangle with a perimeter of 600 units (with Logopaths, for example). • Sort quadrilaterals by length of sides and angles. • Describe properties of quadrilaterals. • Determine measure and build angles by comparing to 90 degrees. • Identify angles that measure 30, 45, 60 and 90 degrees • Create a nonrectangular figure with perimeter of 800 units (with Logopaths, for example). • Create and find the area of a symmetrical figure, using triangles and trapezoids.

	<ul style="list-style-type: none"> • Divide nonrectangular shapes into halves with equal area. • Find the area of polygons, including rectangles, by decomposing shapes. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • How Long Is Our Classroom? • What is a Quadrilateral? • Building Angles <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Compose shapes from other shapes with certain angle measures. • Find the area of shape.
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Suggested Resources

- Investigations: Unit 4, Size, Shape, and Symmetry.
- Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al
- [K-5 Math Teaching Resources](#), online
- [Howard County Math Wiki](#), Grade 4

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 5	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 8
Identify Desired Results	
Common Core Standards	
<p>Standards in the Unit</p> <ul style="list-style-type: none"> • (4.NBT.1) Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. • (4.NBT.2) Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. (Standard also in Ten-Minute Math) • (4.NBT.3) Use place value understanding to round multi-digit whole numbers to any place. • (4.NBT.4) Fluently add and subtract multi-digit whole numbers using the standard algorithm. • (4.MD.2) Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. <p>Standards Only in Ten-Minute Math</p> <ul style="list-style-type: none"> • (4.NBT.5) Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Understanding place value can lead to number sense and efficient strategies for computing with numbers. • The standard algorithm is useful when numbers aren't easy to compute with alternative strategies including mental math. • Units of measurement can be added, subtracted, multiplied, and 	<ul style="list-style-type: none"> • How does a digit's position affect its value? • How do the numbers in a problem determine how I will add or subtract them? • How do we solve problems involving measurement?

divided to solve problems.	
Expected Performances What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students extend their knowledge of the number system by examining the structure of 10,000 and practice and refine strategies for adding and subtracting whole numbers up to 10,000. • Students continue to study place value by adding and subtracting multiples of 10 and 100 to numbers in the thousands, and they consolidate their understanding of the operation of addition by studying a variety of addition strategies and algorithms, including the U.S. algorithm for addition. • Students continue their study of subtraction by solving, representing, and discussing their strategies for a variety of subtraction problems <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Read, write, and sequence numbers up to 10,000. • Add and subtract multiples of 10 (including multiples of 100 and 1,000) fluently. • Solve addition problems efficiently, choosing from a variety of strategies. • Solve subtraction problems with 3-digit numbers by using at least one strategy efficiently. 	
Character Attributes	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
Technology Competencies	
<ul style="list-style-type: none"> • None 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies:</p> <p>Use a math workshop model with teacher-directed mini-lesson</p> <ul style="list-style-type: none"> • to provide students with repeated experiences with concepts and skills • to provide time for teachers to work with small groups of students <p>Use games to develop concepts and practice skills</p> <p>Use student-centered activities and worthwhile math tasks</p> <p>Use a variety of grouping structures</p> <ul style="list-style-type: none"> • Collaborative groups, partners, individuals 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Examine, read and write numbers up to 10,000 including using expanded form. • Use place value concepts to add and subtract multiples of 10 and 100 with games, such as <i>Changing Places</i>. • Explain and represent solutions to addition and subtraction problems with 3-digit numbers, including representing them on a number line. • Chart addition strategies with specific first steps. • Combine 3-digit numbers to explore addition strategies, using games

<p>Orchestrate class discussions</p> <ul style="list-style-type: none"> • Focus discussions on important mathematics and student strategies • Elicit participation by all students over the course of several discussions • Facilitate student to student discourse <p>Encourage students to represent and discuss their thinking strategies</p> <p>Use Ten-Minute Math to provide on-going practice and review.</p> <ul style="list-style-type: none"> • Practicing Place Value <ul style="list-style-type: none"> • Recognizing and interpreting the value of each digit in a 3- and 4-digit number. • Reading and writing numbers up to 10,000, decimal fractions and decimal numbers. • Adding multiples of 10 to and subtracting multiples of 10 from 3- and 4- digit numbers. • Today's Number <ul style="list-style-type: none"> • Generating equivalent expressions for a number using particular constrains. • Practicing computation skills. • Using notation to record expressions. 	<p>such as <i>Close to 1,000</i>.</p> <ul style="list-style-type: none"> • Solve addition problems in multiple ways while using clear and concise mathematical notation. • Construct a 10,000 chart to examine the relationship between 100, 1,000 and 10,000. • Expand place value concepts to read, write and round to 1,000,000. • Add and subtract with multiples of 10, 100 and 1,000 utilizing expanded form to help. • Solve addition and subtraction problems with 3- and 4-digit numbers within the context of a road trip. • Investigate approaches to subtraction problems including missing part, comparison and removal. • Discuss subtraction strategies and represent those strategies using a number line and within a story context. • Apply 3- and 4-digit addition and subtraction strategies to problems within the context of money and distance.
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Assessments

<p style="text-align: center;">Performance Task(s)</p> <p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p style="text-align: center;">Other Evidence</p> <p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Construct a 1,000 Book for reference. • Use place value and landmark numbers to locate numbers up to 1,000. • Add and subtract multiples of 10 and 100 from 3-digit numbers. • Calculate differences between 3-digit numbers and 1,000. • Solve and explain questions about place value and adding multiples of

	<p>10.</p> <ul style="list-style-type: none"> • Solve and explain addition problems with 2- and 3-digit numbers. • Explain different algorithms for addition. • Combine 3-digit numbers and compare the result with 1,000. • Create a 10,000 chart composed of 100 charts. • Determine the number of 10s in 10,000. • Add and subtract multiples of 10, 100, and 1,000 to multidigit numbers. • Solve addition problems with multidigit numbers and record strategies and solutions. • Solve, write and represent subtraction problems (with and without story context) with 3- and 4-digit numbers. • Answer questions about place value with 4-digit numbers, including writing numbers in expanded form. • Compare 3-digit and 4-digit numbers using $>$, $<$ or $=$. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Numbers to 1,000 • Solving an Addition Problem in Two Ways • Numbers to 10,000 <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Solve 3- and 4-digit addition and subtraction problems.
Suggested Resources	
<ul style="list-style-type: none"> • Investigations: Unit 5, Landmarks and Large Numbers. • Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al • K-5 Math Teaching Resources, online • Howard County Math Wiki, Grade 4 	

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 6	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 6
Identify Desired Results	
Common Core Standards	
Standards in the Unit	
<ul style="list-style-type: none">• (4.NF.1) Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.• (4.NF.2) Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.• (4.NF.3) Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.• (4.NF.4) Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$. b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.) c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.• (4.NF.5) Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.• (4.NF.6) Use decimal notation for fractions with denominators 10 or 100.• (4.NF.7) Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the	

same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

Standards Only in Ten-Minute Math

- (4.NBT.2) Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- (4.MD.4) Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • The same fractional amount can be represented by an infinite set of different but equivalent fractions. • Fractions can be compared using benchmarks, common denominators, or common numerators. • Fractions of the same whole can be added and subtracted. • The meanings of each operation of fractions are the same as the meanings for the operations on whole numbers. • Fractions with a denominator of 10 can be written as an equivalent fraction with a denominator of 100. • Fractions with a denominator with 10 or 100 can be represented with decimal notation. • When the wholes are the same, decimals can be compared. 	<ul style="list-style-type: none"> • How do I know when fractions are equivalent? • How can common numerators, common denominators, or using benchmarks (one-half) help me compare fractions? • What are different ways I can add or subtract mixed numbers? • How do I use visual models, number lines, and equations multiply a whole number and a fraction? • How can I represent a fraction with a denominator of 10 as a fraction with a denominator of 100? • How do you represent fractions with a denominator of 10 or 100 using decimal notation? • How can decimals be compared?

Expected Performances
What students should know and be able to do

Students will know the following:

- Students develop ideas about fractions by identifying fractions of an area ($\frac{3}{4}$ of a rectangle), fractions of a group of objects ($\frac{3}{4}$ of 24), and decimal fractions (.75).
- Students compare fractions of different wholes ($\frac{1}{3}$ of a 6 x 4 rectangle and $\frac{1}{3}$ of a 10 x 10 rectangle), and combine fractions using models and reasoning.
- Students use 10 x 10 grids to represent, compare, and combine common decimals in the tenths and hundredths.

Students will be able to do the following:

- Identify fractional parts of an area.
- Identify fractional parts of a group (of objects, people, etc.)
- Read, write, and interpret fraction notation.
- Order fractions with like and unlike denominators.
- Read, write, and interpret decimal fractions in tenths and hundredths.

Character Attributes

- Cooperation
- Respect
- Responsibility
- Perseverance

Technology Competencies

- None

Develop Teaching and Learning Plan

Teaching Strategies:

Use a math workshop model with teacher-directed mini-lesson

- to provide students with repeated experiences with concepts and skills
- to provide time for teachers to work with small groups of students

Use games to develop concepts and practice skills worthwhile math tasks

Use a variety of grouping structures

- Collaborative groups, partners, individuals

Orchestrate class discussions

- Focus discussions on important mathematics and student strategies
- Elicit participation by all students over the course of several discussions
- Facilitate student to student discourse

Encourage students to represent and discuss their thinking strategies

Use Ten-Minute Math to provide on-going practice and review.

- Practicing Place Value
 - Recognizing and interpreting the value of each digit in a 3- and 4-digit number.
 - Reading and writing numbers up

Learning Activities:

- Identify halves, fourths, eighths from a 4x6 rectangle.
- Find and discuss thirds and sixths while referring to equal parts of a whole.
- Find parts of a group of 24 objects.
- Compare fractional parts of the same sized whole.
- Use fraction combinations with different denominators to create one whole.
- Add and subtract fractions and mixed numbers with the same and related denominators, with just numbers and within story contexts, represented by whole rectangles.
- Estimate the sum of fractions.
- Multiply a whole number and a fraction using visual models to solve story problems.
- Discuss how to represent and notate fractions greater than 1, using Fraction Cards that include improper fractions and mixed numbers.
- Compare and develop arguments about the relative size fraction pairs, using games such as *Capture Fractions*.
- Interpret the meaning of the

<p>to 10,000, decimal fractions and decimal numbers.</p> <ul style="list-style-type: none"> • Adding multiples of 10 to and subtracting multiples of 10 from 3- and 4- digit numbers. • Quick Survey <ul style="list-style-type: none"> • Collecting data. • Describing features of data. • Interpreting and posing questions about data. 	<p>numerator and denominator to identify equivalent fractions, using fraction landmarks.</p> <ul style="list-style-type: none"> • Order fractions, represented on a number line and justify reasoning. • Read, write and represent decimal numbers with tenths and hundredths using a 10x10 square. • Compare decimals, equivalent fractions and decimal fractions using games like <i>Comparing Decimals</i> and <i>Fill Two</i>. • Estimate and combine decimals in the tenths and hundredths in the context of distance measurements. • Read, write and order decimals with justification and representations.
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Assessments

<p style="text-align: center;">Performance Task(s)</p> <p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p style="text-align: center;">Other Evidence</p> <p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
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<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Identify $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{3}{4}$ of a 4 x 6 rectangle. • Find fourths and eighths of a 4 x 6 rectangle. • Solve story problems that find fractional parts of 24. • Identify fractional parts of a 5 x 12 rectangle. • Find fractional parts of a group. • Divide 5 x 12 rectangles into fractional parts. • Add fractions using equivalent fractions and known fraction combinations. • Draw representations of fractions from $\frac{0}{2}$ to $2\frac{1}{2}$, including improper fractions. • Compare fractions to determine which is greater. • Compare fractions to landmarks 0, $\frac{1}{2}$, 1 and 2. • Sort fractions by $>$, $<$ or $=$ and equal to $\frac{1}{2}$ or 1.
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- Order fractions on a number line.
- Represent numbers that include tenths and hundredths on a 10 x 10 square represents 1 whole.
- Compare decimal fractions of a 10 x 10 square.
- Compare and decimal numbers with digits in the tenths or hundredths places.
- Combine decimals on a 10 x 10 square, represented by an equation.
- Add numbers with both whole numbers and decimal parts.
- Combine distances that use tenths and hundredths.

Other Formative Assessments

- Identifying and Comparing Fractions
- Comparing Fractions
- Multiplying Fractions

End-Of-Unit Assessment

- Find fractional parts of group.
- Order fractions on a number line.
- Compare decimals in tenths and hundredths.

Suggested Resources

- Investigations: Unit 6, Fraction Cards and Decimal Squares.
- Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al
- [K-5 Math Teaching Resources](#), online
- [Howard County Math Wiki](#), Grade 4

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 7	Course/Subject: Mathematics Grade Level: 5 # of Weeks: 2
Identify Desired Results	
Common Core Standards	
<p>Standards in the Unit</p> <ul style="list-style-type: none"> • (4.NF.7) Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model. • (4.NBT.2) Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. (Standard also in Ten-Minute Math). • (4.MD.1) Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. • (4.MD.2) Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. <p>Standards Only in Ten-Minute Math</p> <ul style="list-style-type: none"> • (4.G.2) Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Within a system of measurement, the larger units are made from smaller units. • Units of measurement can be added, subtracted, multiplied, and divided to solve problems. • When the wholes are the same, decimals can be compared. 	<ul style="list-style-type: none"> • How are units in the same measurement system related? • How do we solve problems involving measurement? • How can decimals be compared?

Expected Performances	
What students should know and be able to do	
Students will know the following:	
<ul style="list-style-type: none"> • Students translate between 3-D shapes and their 2-D representations as they build cube configurations from pictures and mental images and investigate silhouettes of solids from several different perspectives. • Students build an understanding of measuring volume as they examine the structure of rectangular prisms and determine the number of cubes that fit inside given box patterns. 	
Students will be able to do the following:	
<ul style="list-style-type: none"> • Draw 2-dimensional representations showing different perspectives of a 3-dimensional object. • Find the volume of cube buildings and rectangular prisms. 	
Character Attributes	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
Technology Competencies	
<ul style="list-style-type: none"> • None 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies:</p> <p>Use a math workshop model with teacher-directed mini-lesson</p> <ul style="list-style-type: none"> • to provide students with repeated experiences with concepts and skills • to provide time for teachers to work with small groups of students <p>Use games to develop concepts and practice skills</p> <p>Use student-centered activities and worthwhile math tasks</p> <p>Use a variety of grouping structures</p> <ul style="list-style-type: none"> • Collaborative groups, partners, individuals <p>Orchestrate class discussions</p> <ul style="list-style-type: none"> • Focus discussions on important mathematics and student strategies Elicit participation by all students over the course of several discussions • Facilitate student to student discourse 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Describe properties and attributes of geometric solids, including prisms and cylinders, using terms such as vertex, edge and face. • Identify the shapes of silhouettes projected by geometric solids using games like <i>What's the Shape?</i> • Explore different perspectives of geometric solids by building "landscapes" and decomposing/combining 3-D shapes. • Investigate how 3-D solids project silhouettes with 2-D shapes (ie a cone produces a triangle or a circle). • Design and construct cube buildings from 2-D drawings and three different perspectives (top, front and right sides). • Explore volume concepts with pictures and patterns of rectangular boxes.

<p>Encourage students to represent and discuss their thinking strategies Use Ten-Minute Math to provide on-going practice and review.</p> <ul style="list-style-type: none"> • Practicing Place Value <ul style="list-style-type: none"> • Recognizing and interpreting the value of each digit in a 3- and 4-digit number. • Reading and writing numbers up to 10,000, decimal fractions and decimal numbers. • Adding multiples of 10 to and subtracting multiples of 10 from 3- and 4- digit numbers. • Quick Images <ul style="list-style-type: none"> • Organizing and analyzing visual images. • Developing language and concepts needed to communicate about spatial relationships. 	<ul style="list-style-type: none"> • Complete the design of a box given the shape of the bottom and the volume. • Find the volume of rectangular prisms by drawing patterns and building boxes. • Refine methods for determining volume by investigating results of doubling the volume of a given box. • Convert measurements in larger units to smaller units and make tables of equivalent measures for weights, mass, capacity and time. • Use the four operations to solve word problems involving measurements.
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Assessments

<p style="text-align: center;">Performance Task(s)</p> <p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p style="text-align: center;">Other Evidence</p> <p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
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<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments: Observing Students</p> <ul style="list-style-type: none"> • Describe attributes and properties of geometric solids. • Match solids and silhouettes and pairs of silhouettes. • Build 3-D shapes from 2-D drawings. • Build rectangular prisms and determine volume. • Draw top, front, and right side silhouette of cube buildings. • Compare drawn silhouettes of a cube building prior to construction and after construction. • Build a structure from three building silhouettes. • Find volume of given boxes. • Design a box from pattern to hold a given number of cubes. Find volume of a box from
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	<p>description, then compare results after constructing box.</p> <ul style="list-style-type: none"> • Build a box from given dimensions and number of cubes. • Explore relationship between the dimensions of a box and the volume. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Match the Silhouettes • Drawing Silhouettes <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Find the volume of a cube building.
Suggested Resources	
<ul style="list-style-type: none"> • Investigations: Unit 7, Moving Between Solids and Silhouettes. • Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al • K-5 Math Teaching Resources, online • Howard County Math Wiki, Grade 4 	

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 8	Course/Subject: Mathematics Grade Level: 4 # of Weeks: 5
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Identify Desired Results

Common Core Standards

Standards in the Unit

- (4.OA.3) Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
- (4.NBT.5) Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (Standard also in Ten-Minute Math)
- (4.NBT.6) Find whole-number quotients and remainders with up to four-digit dividends and one-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.

Standard Only in Ten-Minute Math

- (4.OA.4) Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • By utilizing varied and efficient methods of multiplication and division, more complex problem solving is possible. • Mental computation and estimation strategies can be used to determine the reasonableness of the answer. • Multiplication of larger numbers is the same as multiplication of smaller numbers. 	<ul style="list-style-type: none"> • How do I determine which strategies to use to solve multi-step word problems? • How and why do we use both mental computation and estimation, including rounding? • How is multiplying multi-digit numbers similar to single digit numbers? • What are the strategies I can use to

<ul style="list-style-type: none"> • Division of larger numbers is the same as division of smaller numbers. 	<p>solve division equations?</p>
Expected Performances What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students continue to develop efficient strategies for solving multiplication problems by breaking problems into smaller parts or changing one or both numbers to create an easier problem. • Students also focus on recording their work with clear and concise notation. • Students develop strategies for solving division problems (three-digit divided by two-digit), which involve making groups of the divisor. These problems are presented both in story contexts and numerically. <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Multiply 2-digit numbers efficiently. • Solve division problems with 1-digit and small 2-digit divisors by using at least one strategy efficiently. 	
Character Attributes	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
Technology Competencies	
<ul style="list-style-type: none"> • None 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies: Teaching Strategies: Use a math workshop model with teacher-directed mini-lesson</p> <ul style="list-style-type: none"> • to provide students with repeated experiences with concepts and skills • to provide time for teachers to work with small groups of students <p>Use games to develop concepts and practice skills</p> <p>Use student-centered activities and worthwhile math tasks</p> <p>Use a variety of grouping structures</p> <ul style="list-style-type: none"> • Collaborative groups, partners, individuals <p>Orchestrate class discussions</p> <ul style="list-style-type: none"> • Focus discussions on important 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Estimate and solve 2-digit multiplication problems using landmark number strategies. • Use related problem sets to solve the final problem in each cluster. • Use various representations of 2-digit multiplication problem to determine is an estimated product is correct. • Solve two problems in which one of the factors is close to a multiple of 10. • Create sets of cluster problems to solve multiplication problems using games such as Multiplication Cluster Problems, Problems About Oranges, Factor Bingo.

<p>mathematics and student strategies</p> <ul style="list-style-type: none"> • Elicit participation by all students over the course of several discussions • Facilitate student to student discourse <p>Encourage students to represent and discuss their thinking strategies</p> <p>Use Ten-Minute Math to provide on-going practice and review:</p> <ul style="list-style-type: none"> • Counting Around the Class <ul style="list-style-type: none"> • Finding the multiples of numbers through skip counting. • Understanding the relationship between skip counting and multiplication. • Using the nearest landmark to find multiples of a given number • Relating factors to their multiples • Closest Estimate <ul style="list-style-type: none"> • Approximating numbers to nearby landmark numbers, for example, multiples of 10 or 100. • Calculating mentally. • Comparing answer choices to find the one closest to the actual answer. 	<ul style="list-style-type: none"> • Use division strategies and tools to solve story problems, such as equal grouping, story contexts, visual images, 300 chart, Centimeter grid paper. • Solve division problems using games such as Problems About Multiple Towers, Solving Division Problems, and Factor Bingo. • Solve story problems that include both multiplication and division situations.
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Assessments	
Performance Task(s)	Other Evidence
<p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Use multiples of 10 to estimate solutions to 2-digit multiplication problems. • Write story problems and solve 2-digit by 2-digit multiplication problems. • Solve a set of problems and consider ways to break apart 2-digit multiplication problems. • Identify factors of numbers that are multiples of 10. • Solve sets of problems in which one of the numbers has been changed

	<p>to a multiple of 10 to create an easier problem to solve.</p> <ul style="list-style-type: none"> • Solve 2-digit multiplication problems by breaking them apart. • Solve division problems by making groups of the divisor. • Solve division problems with 2- and 3-digit numbers. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Factor bingo • Multiplication cluster problems • Solving multiplication problems. • Writing multiplication story problems. <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Multiply 2-digit numbers efficiently. • Solve division problems with 1-digit and small 2-digit divisions by using at least one strategy efficiently.
Suggested Resources	
<ul style="list-style-type: none"> • Investigations: Unit 8, How Many Packages? How Many Groups? • Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al • K-5 Math Teaching Resources, online • Howard County Math Wiki, Grade 4 	

New Milford Public Schools

Committee Member(s): Corby Kennison, Justin Mack, Stephanie Zappone Unit 9	Course/Subject: Mathematics Grade Level: 5 # of Weeks: 3
Identify Desired Results	
Common Core Standards	
<p>Standards in the Unit</p> <ul style="list-style-type: none"> • (4.OA.5) Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. • (4.NBT.6) Find whole-number quotients and remainders with up to four-digit dividends and one-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. • (4.MD.1) Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. • (4.MD.4) Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. (Standard also in Ten-Minute Math) <p>Standard Only in Ten-Minute Math</p> <ul style="list-style-type: none"> • (4.NBT.5) Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 	
Enduring Understandings Generalizations of desired understanding via essential questions (Students will understand that ...)	Essential Questions Inquiry used to explore generalizations
<ul style="list-style-type: none"> • Patterns help make generalizations about numbers. • Line plots can be used to represent data. • Smaller units are divisions of a larger unit. 	<ul style="list-style-type: none"> • How can patterns help me make generalizations about numbers and number sequences? • How can I construct a line plot to display data? • How are units in the same measurement system related?

Expected Performances	
What students should know and be able to do	
<p>Students will know the following:</p> <ul style="list-style-type: none"> • Students explore situations in which two quantities change in relation to each other. • Students work with changes over time, such as increasing or decreasing speed or the growth of a plant, and situations of constant change, such as how the number of windows in a building depends on the height of the building if every floor has the same number of windows. • Students create and interpret graphs and tables for these linear and nonlinear functions and connect these graphs to the situations they represent. <p>Students will be able to do the following:</p> <ul style="list-style-type: none"> • Connect tables and graphs to each other and to the situations they represent. • Make a graph on a coordinate grid from a table of values. • Describe how a graph shows change: where the rate of change is increasing, decreasing, or remaining constant, and how differences in steepness represent differences in the rate of change. • Take into account the starting amount and the amount of change in describing and comparing situations of constant change. • In a situation of constant change, write rules (using words or arithmetic expressions) to determine the value of one quantity, given the value of the other. 	
Character Attributes	
<ul style="list-style-type: none"> • Cooperation • Respect • Responsibility • Perseverance 	
Technology Competencies	
<ul style="list-style-type: none"> • None 	
Develop Teaching and Learning Plan	
<p>Teaching Strategies:</p> <p>Use a math workshop model with teacher-directed mini-lesson</p> <ul style="list-style-type: none"> • to provide students with repeated experiences with concepts and skills • to provide time for teachers to work with small groups of students <p>Use games to develop concepts and practice skills</p> <p>Use student-centered activities and worthwhile math tasks</p> <p>Use a variety of grouping structures</p> <ul style="list-style-type: none"> • Collaborative groups, partners, individuals 	<p>Learning Activities:</p> <ul style="list-style-type: none"> • Review how to read and interpret graphs on a coordinate grid showing change over time. • Interpret the points and shapes of a graph in terms of the situation the graph represents. • Make and use graphs and tables to describe how things change, such as temperature, penny jars, cube buildings, and plant growth. • Describe the relationship between two quantities in a situation of constant change, taking into account a beginning amount and a constant

<p>Orchestrate class discussions</p> <ul style="list-style-type: none"> • Focus discussions on important mathematics and student strategies • Elicit participation by all students over the course of several discussions • Facilitate student to student discourse <p>Encourage students to represent and discuss their thinking strategies</p> <p>Use Ten-Minute Math to provide on-going practice and review:</p> <ul style="list-style-type: none"> • Closest Estimate <ul style="list-style-type: none"> • Approximating numbers to nearby landmark numbers, for example, multiples of 10 or 100. • Calculating mentally. • Comparing answer choices to find the one closest to the actual answer. • Quick Survey <ul style="list-style-type: none"> • Collecting data. • Describing features of data. • Interpreting and posing questions about data. 	<p>increase.</p> <ul style="list-style-type: none"> • Identify points in a graph with corresponding values in a table and interpret the numerical information in terms of the situation the graph represents. • Find the value of one quantity in a situation of constant change, given the value of the other. • Continue work with Windows and Towers and with Penny Jar Comparisons by using games such as Backward Problems for Single and Double Towers, Windows on Square and Corner Towers, and Penny Jar Comparisons. • Make line graphs of plant growth and examine how faster growth and slower growth are represented in a table and in a graph. • Make a graph of two different plans on one set of axes, and compare the two graphs. • Match graph with tables and stories. Discuss the connections between the description of the change in a story and both the features of the graph and the values in the tables. • Compare graphs of different situations. Create a table and graph for a decreasing Penny Jar Situation.
Assessments	
<p style="text-align: center;">Performance Task(s)</p> <p>Authentic application to evaluate student achievement of desired results designed according to GRASPS (one per marking period)</p>	<p style="text-align: center;">Other Evidence</p> <p>Application that is functional in a classroom context to evaluate student achievement of desired results</p>
<p>Goal:</p> <p>Role:</p> <p>Audience:</p> <p>Situation:</p> <p>Product or Performance:</p> <p>Standards for Success:</p>	<p>Ongoing Formative Assessments:</p> <p>Observing Students</p> <ul style="list-style-type: none"> • Read and interpret a graph accurately. • Classify words and phrases as describing speed or changes in speed, and sketch a graph that depicts the action in the story. • Make representations of Penny Jar Situations using diagrams, pictures,

	<p>tables, or graphs that show the number of pennies after each round.</p> <ul style="list-style-type: none"> • Complete a table for their Penny jar situation and then graph that situation. • Determine whether single and double towers can ever have a given number of windows. • Work to create rules for each of the four types of towers. • Graph the first 5 days of plant growth, then extend the graph to show predicted growth. • Use graph to answer questions about how the graph shows faster and slower growth. <p>Other Formative Assessments</p> <ul style="list-style-type: none"> • Complete a table of values for both the single and double towers and answer questions about the total number of windows for the 10th and 15th floor. • Compare tables and graphs of two Penny Jar situations. <p>End-Of-Unit Assessment</p> <ul style="list-style-type: none"> • Compare graphs • Write a story to match a graph. • Draw a graph to match a story. • Complete a table • Solve a problem about a situation of constant change.
Suggested Resources	
<ul style="list-style-type: none"> • Investigations: Unit 9, Penny Jars and Plant Growth. • Teaching Student-Centered Mathematics, 3-5 by Van de Walle, et. al • K-5 Math Teaching Resources, online • Howard County Math Wiki, Grade 4 	