Summit Public Schools
Summit, New Jersey
Grade Level: Grade 3
Content Area: Math Scope and Sequence

Summary of the Year	**Overview**
In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.	**OPERATIONS AND ALGEBRAIC THINKING** Use the four operations with whole numbers to solve problems. Gain familiarity with factors and multiples. Generate and analyze patterns. **NUMBER AND OPERATIONS IN BASE TEN** Generalize place value understanding for multi-digit whole numbers. Use place value understanding and properties of operations to perform multi-digit arithmetic. **NUMBER AND OPERATIONS—FRACTIONS** Extend understanding of fraction equivalence and ordering. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. Understand decimal notation for fractions, and compare decimal fractions. **MEASUREMENT AND DATA** Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. Represent and interpret data. Geometric measurement: understand concepts of angle and measure angles. **GEOMETRY** Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Year-at-a-Glance **Trimester 1** - Rounding, Addition, Subtraction, Patterns, Place Value - Representing & Interpreting Data - Multiplication: Understanding, Patterns, Facts **Trimester 2** - Division: Understanding, Patterns, Facts - Fractions: Understanding, Comparing - Measurement: Time, Length, Volume, Mass **Trimester 3** - Area & Perimeter - Shapes and Their Attributes	**STANDARDS FOR MATHEMATICAL PRACTICE:** 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.

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Grade Level: Grade 3
Content Area: Math

Trimester	**Chapter and Focus** Major Supporting Additional (identified by PARCC Model Content Framework)	**Standards**
1	**Chapter 1:** Addition and Subtraction Within 1,000 ***Approximate number of instructional days: 18***	3.OA.8: Solve 2-step word problems using the four operations. Represent these problems using equation with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. [limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order] 3.OA.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.* 3.NBT.1: Use place value understanding to round whole numbers to the nearest 10 or 100 3.NBT.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
1	**Chapter 2**: Represent and Interpret Data ***Approximate number of instructional days: 14***	3.OA.8: Solve 2-step word problems using the four operations. Represent these problems using equation with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. [limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order]

		3.NBT.2: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. 3.MD.3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. 3.MD.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units -- whole numbers, halves, or quarters.
1	**Chapter 3:** Understand Multiplication **Chapter 4:** Multiplication Facts & Strategies **Chapter 5:** Use Multiplication Facts ***Approximate number of instructional days for chapters 3-5: 35***	3.OA.1: Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 x 7.* 3.OA.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equation with a symbol for the unknown number to represent the problem. 3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x? = 48, 5 = ___ ÷3, 6 x 6 =? 3.OA.5: Apply properties of operations as strategies to multiply and divide. [Students need not use formal terms for these properties.] *Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative Property of Multiplication) 3 x 5 x 2 can be found by 3 x 5 = 15, then* 15 *x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative Property of Multiplication) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 (Distributive Property)* 3.OA.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two 1-digit numbers. 3.OA.8: Solve 2-step word problems using the four operations. Represent these problems

		using equation with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. [limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order] 3.OA.9: Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.* 3.NBT.3: Multiply 1-digit whole numbers by multiples of 10 in the range 10 - 90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.
Trimester	**Chapter and Focus** Major Supporting Additional (identified by PARCC Model Content Framework)	**Standards**
2	**Chapter 6**: Understand Division **Chapter 7**: Division Facts and Strategies ***Approximate number of instructional day for chapters 6 &7: 19***	3.OA.2: Interpret whole-number quotients of whole numbers, e.g., interpret 56÷8 as the number objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number or groups can be expressed as 56÷ 8.* 3.OA.3: Use multiplication and division within 100 to solve word problems in situations involve equal groups, arrays, and measurement quantities, e.g., by using drawings and equation with a symbol for the unknown number to represent the problem. 3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x? = 48, 5 = ___ ÷3, 6 x 6 =? 3.OA.5: Apply properties of operations as strategies to multiply and divide. [Students need not use formal terms for these properties.] *Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also*

		known. (Commutative Property of Multiplication) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 *x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative Property of Multiplication) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56 (Distributive Property)* 3.OA.6: Understand division as an unknown-factor problem. *For example, find 32 ÷8 by finding the number that makes 32 when multiplied by 8.* 3.OA.7: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40÷5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two 1-digit numbers. 3.OA.8: Solve 2-step word problems using the four operations. Represent these problems using equation with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. [limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order]
2	**Chapter 8**: Understand Fractions **Chapter 9**: Compare Fractions ***Approximate number of instructional days for chapters 8 & 9: 23***	3.NF.1: Understand a fraction 1/*b* as the quantity formed by 1 part when a whole number is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by a parts of size 1/*b*. 3.NF.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line. b. Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line.

		3.NF.3: Explain the equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., ½ = 2/4, 4/6 = ⅔). Explain why the fractions are equivalent, e.g. by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, <, and justify the conclusions, e.g., by using a visual fraction model.
2	**Chapter 10**: Time, Length, Liquid Volume, & Mass ***Approximate number of instructional days: 15***	3.MD.1: Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram. 3.MD.2: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). [Excludes compound units such as cm3 and finding the geometric volume of a container.] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. [Excludes multiplicative comparison problems (problems involving notions of "times as much"]

		3.MD.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units -- whole numbers, halves, or quarters.
Marking Period	**Chapter and Focus** Major Supporting Additional (identified by PARCC Model Content Framework)	**Standards**
3	**Chapter 11**: Perimeter and Area ***Approximate number of instructional days: 15***	3.MD.5: Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units. 3.MD.6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 3.MD.7: Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. 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. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.

		d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
3	**Chapter 12**: Two-Dimensional Shapes ***Approximate number of instructional days: 21***	3.G.1: Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. 3.G.2: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.
3	**Step-Up Lessons** ***Approximate number of instructional days: 15***	

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The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

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

Unit Description: Marking Period 1

In the first marking period, 3rd grade mathematics work will focus on the following concepts: rounding, addition, subtraction, patterns, place value, time and multiplication.

Standard Operations and Algebraic Thinking 3.OA Number and Operations in Base Ten 3.NBT Measurement and Data 3.MD
Big Ideas: *Course Objectives / Content Statement(s)* Operations and Algebraic Thinking 3.OA • *Solve problems involving the four operations, and identify and explain patterns in arithmetic.* Number and Operations in Base Ten 3.NBT • *Use place value understanding and properties of operations to perform multi-digit arithmetic.* Measurement and Data 3.MD • *Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.*

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Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• In what ways can items be grouped? • In what ways can numbers be composed and decomposed? • How can place value properties aid computation? • What are efficient methods for finding sums and differences? • What are tools of measurement and how are they used?	Students will understand that… • Grouping is a way to count, measure, and estimate. • Place value is based on groups of ten. • Flexible methods of computation involve grouping numbers in strategic ways. • Proficiency with basic facts aids estimation and computation of larger and smaller numbers. • Standard units provide common language for communication measurements. • Telling time is an essential life skill.
Areas of Focus: Proficiencies (CCSS)	**Examples, Outcomes, Assessments**
Students will: Operations and Algebraic Thinking 3.OA *Represent and solve problems involving multiplication and division.* 3.OA.1 Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. 3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. 3.OA.4 Determine the unknown whole number in a	Instructional Focus: • Describe patterns on number grids and solve number-grid puzzles. • Write equivalent names for numbers. • Compare and order whole numbers. • Find differences between pairs of numbers. • Identify the numbers 10 and 100 more or 10 and 100 less than a given number. • Compare money amounts. • Use facts to solve multiplication stories. • Use strategies (counters, pictures, or arrays) to compute facts up to 10 x 10. • Use arrays to model multiplication.

multiplication or division equation relating three whole numbers. *Understand properties of multiplication and the relationship between multiplication and division.* 3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3.OA.6 Understand division as an unknown-factor problem. *Multiply and divide within 100.* 3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows that 40 ÷ 5 = 8) or properties of operations. *Solve problems involving the four operations, and identify and explain patterns in arithmetic.* 3.OA.8 Solve two-step word problems using the four operations. 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. 3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.	• Model the turn-around rule for multiplication using an array model. • Calculate values of coin and bill combinations. • Practice estimation skills with money amounts. • Add money amounts, count up, or find the difference to make change. • Calculate elapsed time using relationships between minutes and hours. • Use patterns in the Addition/Subtraction Facts Table to find basic facts. • Describe and extend patterns among facts and their extensions. • Solve multi-digit number stories involving addition and subtraction. • Explain strategies for solving number stories involving addition and subtraction. • Use place-value concepts. • Practice adding three or four numbers in a convenient order. • Select measuring tools and appropriate units for particular measuring tasks. Sample Assessments: • Exit slips o What number is 10 more than 675? o What number is 100 more than 789? o 245 + 92 = _____ o Make the largest 4-digit number possible using the digits 0-9. o 71 – 46 = _____ o 18 + 11 + 25 = _____ o Make a ballpark estimate for: 945 – 326. • Student self-assessment • Writing prompts o Marcy wants to get a strawberry milkshake that costs $1.35. She gives the cashier $2.00. How much change does she get in return? o Mandy is in school from 8:15A.M. until 3:05P.M. each day. How long is her school day?
Number & Operations in Base Ten 3.NBT *Use place value understanding and properties of operations to perform*	

multi-digit arithmetic. 3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100. 3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. 3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.	○ You have 6 boxes of crayons. There are 5 crayons in each box. How many crayons in all? ○ Why is it helpful to know fact families? ○ You spent $7.88 at Brownie Points. You gave the cashier a $10 bill. How much change should you receive? ○ There are 206 bones in the human body; 29 of which are in the head. How many bones are not in the human head? ○ The normal high temperature of Denver, CO is 68°F, while that of Dallas, TX is 81°F. What is the difference in the two temperatures? ○ Michelle drove from Houston, TX to Wichita, KS. On the first day, she drove 245 miles. On the second day, she drove 207 miles. On the third day, she drove 158 miles. How many miles did she drive in all? ○ Is 82 – 49 closer to 30 or 40? How do you know? ○ Using a multiplication table, what do you notice about the products of 7 times a number? Do you observe a pattern?
Measurement and Data 3.MD *Represent and interpret data.* 3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *Represent and interpret data.* 3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units – whole numbers, halves, or quarters.	• Math journals/Interactive Student Notebooks • Record sheets • Teacher observation • Beginning, Middle, End-of-Year assessments • Progress check written assessment • Class checklists Interdisciplinary Connections • Interactive Student Notebooks • Reading/writing word problems • Math literature list (see attached) Learning Games for Kids http://www.learninggamesforkids.com/3rd-grade-math.html#post-157

	• PBS Kids – Sleuths on the Loose http://pbskids.org/cyberchase/math-games/sleuths-on-the-loose/ • Funbrain – Measure It! http://www.funbrain.com/measure/index.html • Batter's Up Baseball http://www.prongo.com/math/index.html • PBS Kids – Number Sense http://pbskids.org/cyberchase/math-games/number sense/ • Around the World in 80 Seconds! http://www.missmaggie.org/scholastic/roundtheworld_eng_launcher.html Media Literacy Integration • PBS Kids – Don't Buy It, Buying Smart http://pbskids.org/dontbuyit/buyingsmart/hotorsnot.html • Partnership for 21st Century Skills (p. 22-23) http://www.p21.org/storage/documents/P21_Math_Map.pdf Global Perspectives • Investigate international money equivalents to the U.S. dollar. • Investigate historical number systems (e.g. hieroglyphics). 21st Century Skills: Creativity and Innovation • Create a song to review addition facts 1-20 using GarageBand or Audacity. • Create a song to review subtraction facts 1-20. • Create a new shape and name it; calculate its area and perimeter. Recreate the shape using MicroWorlds. Critical Thinking and Problem Solving • Create a new algorithm for addition or subtraction. Communication and Collaboration

	Information Literacy Life and Career Skills • What jobs use these skills? • How do your parents use these skills? 21st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy

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3.MP.2 Reason abstractly and quantitatively.
3.MP.3 Construct viable arguments and critique the reasoning of others.
3.MP.4 Model with mathematics.
3.MP.5 Use appropriate tools strategically.

3.MP.6 Attend to precision.
3.MP.7 Look for and make use of structure.
3.MP.8 Look for and express regularity in repeated reasoning.

Unit Description: Marking Period 2

In the second marking period, 3rd grade mathematics work will focus on the following concepts: division, fractions, perimeter, and area.

Standard
Operations and Algebraic Thinking 3.OA
Numbers and Operations – Fractions 3.NF
Measurement and Data 3.MD

Big Ideas: *Course Objectives / Content Statement(s)*
Operations and Algebraic Thinking 3.OA

- *Represent and solve problems involving multiplication and division.*
- *Understand properties of multiplication and the relationship between multiplication and division.*
- *Multiply and divide within 100.*
- *Solve problems involving the four operations, and identify and explain patterns in arithmetic.*

Number and Operations in Base Ten 3.NBT

- *Use place value understanding and properties of operations to perform multi-digit arithmetic.*

Number and Operations - Fractions 3.NF

- *Develop understanding of fractions as numbers.*

Measurement and Data 3.MD

- *Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.*
- *Geometric measurement: understand concepts of area and relate to multiplication and to addition.*
- *Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.*

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Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• What are efficient ways to count? • How does the position of a digit in a number affect its value? • How can place value properties aid in computation? • What are different models of and models for multiplication and division? • What are efficient methods for finding products and quotients? • How can fractions be modeled, compared, and ordered? • What are different strategies to solve multiplication and division problems? • How do I express a pattern to show a relationship?	Students will understand that… • Counting finds out the answer to "how many" in objects/sets. • Place value is based on groups of ten. • Computation involves taking apart and combining numbers using a variety of approaches. • Flexible methods of computation involve grouping numbers in strategic ways. • Proficiency with basic facts aids estimation and computation of larger and smaller numbers. • Fractions express a relationship between two numbers. • Patterns provide insights into potential relationships. • Tell time to the nearest half hour, quarter hour, and five minutes. • Tile equal areas with different-size pattern blocks. • Use arrays to find the areas of rectangles. • Find the area of a rectangular region divided into square units.
Areas of Focus: Proficiencies (CCSS)	**Examples, Outcomes, Assessments**
Students will: Operations and Algebraic Thinking 3.OA *Represent and solve problems involving multiplication and division.* 3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.	Instructional Focus: • Use basic facts to solve division problems. • Use equal sharing and equal grouping to model division. • Identify patterns in skip counting by 2s, 5s, and 10s. • Use Fact Triangles and the Facts Table to generate multiplication and division fact families. • Explore the inverse relationship between multiplication and division fact

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. 3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *Understand properties of multiplication and the relationship between multiplication and division.* 3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3.OA.6 Understand division as an unknown-factor problem. *Multiply and divide within 100.* 3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows that 40 ÷ 5 = 8) or properties of operations. *Solve problems involving the four operations, and identify and explain patterns in arithmetic.* 3.OA.8 Solve two-step word problems using the four operations. 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.	families. • Identify the places in multi-digit numbers and the value of the digits in those places. • Extend patterns in a place-value chart to find digit values. • Read and write 6- and 7-digit whole numbers. • Divide numbers • Use multiplication facts to solve division facts. • Use the Multiplication/Division Facts Table to generate fact families. • Use the turn-around rule (Commutative Property of Multiplication) to generate multiplication facts. • Describe patterns in factors and products. • Use multiplication facts to solve number sentences. • Apply the Associative Property of Addition to solve number sentences. • Share solution strategies for solving number stories. • Recognize multiples of a given number (e.g., 10). • Discuss situations where it is sensible to make an estimate and those where it is sensible to compute an exact answer. • Use estimation strategies to solve number stories. • Read, identify and generate equivalent fractions. • Solve problems involving fractional parts of a collection. • Identify fractions on a number line. • Compare fractions using a number-line model. • Compare fractions to 1/2. • Identify patterns and relationships between numerators and denominators of fractions. • Describe solution strategies for solving fraction number stories. • Find multiples of 10, 100, and 1,000. • Use place-value concepts to calculate products.

Fractions 3.NF 3.NF.1: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole number is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$. 3.NF.2: Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. 3.NF.3: Explain the equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., ½ = 2/4, 4/6 = ⅔). Explain why the fractions are equivalent, e.g. by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, <, and justify the conclusions, e.g., by using a visual fraction model.	• Make reasonable estimates for problems involving multiplication and repeated addition. • Use the partial-products algorithm to solve problems. • Use multiplication facts to find whole-number factors of a whole number. Sample Assessments: • Exit slips o If 6 x 4 = 24, then what is 4 x 6? o What is the "turn-around" fact for 7 x 4 = 28? o What do you call the answer to a multiplication problem? o What do you call the answer to a division problem? o Write the x, ÷ fact family for the numbers 3, 4, and 12 on a sheet of paper. o Write the following number using digits: twenty-seven thousand, eight hundred fifty-seven. o Write the following numbers in order from least to greatest: 9,874; 3,456; 3488; 987; 19,874. o Explain to a friend how to tell time using an analog clock. o Draw an array to show a square product. o Input parentheses to make the following a true statement: 3 + 4 – 2 = 5 o Write a number model for the following: "Ashley scored 15 points, and Izzy scored 7 points. If their team scored 47 points, how many points did the rest of the team score?" o Solve: (7 ÷ 7) + (3 + 4). o Solve: 10 x 45. o Solve: 98 x 100. o List three factors of 18.

Measurement and Data 3.MD *Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.* 3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram. *Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.* 3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g. by using drawings (such as a beaker with a measurement scale) to represent the problem.	• Student self-assessment • Writing prompts o Bobby and John share 18 baseball cards equally. How many baseball cards does each child get? o 16¢ is shared equally among 4 people. How much money does each person get? How about if the same amount of money is shared among 6 people? o 23 kids in a class are arranged with 7 in each row. How many rows are there? o How many baseball teams of exactly 9 players each can be formed from 72 players? Write a corresponding number model. o Billy had 27 markers. Markers come in boxes of 9. How many boxes did he buy? o Why is it important to pay attention to the parentheses when solving an equation? o The distance around a track is 500 meters. How far does a runner travel in 7 laps? Explain how you solved the problem. o Describe two different ways to solve the following problem: 50 x 20. o Pretend you have $8. Do you have enough money to buy 5 packs of gum that cost $1.19 each? How do you know without solving the problem? o An artist made a square mosaic with 199 rows of tiles and 199 tiles in each row. How many tiles were used? Do not use a calculator. Explain your reasoning. o Harry said, "I shared 30 pieces of candy with my friends. I gave 1/2 of the candy to Kim, 1/3 to Diego, and 1/4 to Pablo." Explain how you know Harry made a mistake. o How are fractions helpful in your everyday life?

	○ Ginny ordered a small pizza and a medium pizza. Her brother told her that to split the pizzas equally, she and her mom would each get half of the small pizza and he and her dad would each get half of the medium pizza. Why is this unfair? ○ Andy bought 18 cookies. 1/6 of the cookies were chocolate chip. How many cookies were chocolate chip? Explain how you arrived at the solution. ○ How many 60-pound dogs together would weigh about 1 ton? (1 ton = 2,000 lb.) Explain your reasoning. ○ A farmer planted 4 rows of tomato plants with 26 plants in each row. How many tomato plants in all? Explain how you arrived at the solution. ○ Your friend, Joe has no idea how to use the Partial-Products Algorithm. Explain to Joe how he would use it to solve 7 x 42. ○ Five friends raked Mrs. Griffith's lawn. She paid them $6.00. How much should each of them get? ○ Your friend, Aisha has no idea how to use the Lattice Method of Multiplication. Explain to Aisha how she would use it to solve 8 x 54. • Math journals/Interactive Student Notebooks • Record sheets • Teacher observation • Beginning, Middle, End-of-Year assessments • Progress check written assessment • Class checklists Interdisciplinary Connections • Interactive Student Notebooks • Reading/writing word problems

	• Math literature list (see attached) • Suggested Projects: ○ Students need to plan a simple dinner to cook for family or friends. They will calculate how much the ingredients will cost for one person and then multiply by the number of people they are serving. Technology Integration • Using Google Maps to determine accuracy of Map Scale. • Use Garage Band to create multiplication fact raps. • Math Play – Multiplication Jeopardy http://www.math-play.com/Multiplicaton-Jeopardy/Multiplication-Jeopardy.html • Math Play – Math Basketball http://www.math-play.com/math-basketball-properties-of-multiplication/math-basketball-properties-of-multiplication.html • ABCya.com – Division Drag Race http://www.abcya.com/division_drag_race.htm • ABCya.com – Multiplication Grand Prix http://www.abcya.com/multiplication_grand_prix.htm • E-Lab – Symmetry http://www.hbschool.com/activity/elab2004/gr3/21.htm Media Literacy Integration • PBS Kids – Don't Buy It, Buying Smart http://pbskids.org/dontbuyit/buyingsmart/hotorsnot.html • Partnership for 21st Century Skills (p. 22-23) http://www.p21.org/storage/documents/P21_Math_Map.pdf Global Perspectives • Investigate historically significant monuments for each type of polyhedral

	(e.g., pyramid – Egyptian pyramids). • Research how multiplication was invented by the Babylonians thousands of years ago. • Read *Grandfather Tang's Story* and create different images, using tangrams. 21st Century Skills: Creativity and Innovation • Create a "self-portrait," consisting of polygons. Draw using MicroWorlds. • Invent a new packaging for a product and explain its design, using the characteristics of polyhedra. Critical Thinking and Problem Solving • Create a new algorithm for multiplication or division. Communication and Collaboration Information Literacy Life and Career Skills • What jobs use these skills? • How do your parents use these skills? 21st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy • Students respond to the following prompt: "Why doesn't our body consist

	of line segments? Instead, why does it consist of curved lines?" • Students research the binary nature of components of the human body (e.g., eyes, legs, arms, ears) and the related benefits.

Summit Public Schools **Summit, New Jersey**
Grade Level: Grade 3
Content Area: Math

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

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

Unit Description: Marking Period 3

In the third marking period, 3rd grade mathematics work will focus on the following concepts: shapes and their attributes, liquid volume and mass, data, division facts.

Standard Measurement and Data 3.MD Geometry 3.G
Big Ideas: *Course Objectives / Content Statement(s)* Measurement and Data 3.MD • *Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.* • *Represent and interpret data.* • *Geometric measurement: understand concepts of area and relate to multiplication and to addition.* • *Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.* Geometry 3.G • *Reason with shapes and their attributes.*

Summit Public Schools **Summit, New Jersey**
Grade Level: Grade 3
Content Area: Math

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• In what ways can items be grouped to solve multiplication and division problems? • How does the position of a digit in a number affect its value? • How can patterns be used to make predictions? • What strategies can be used to solve for unknowns? • How do I decide which strategy will work best in a given problem situation? • How do I know when a result is reasonable? • What types of problems are solved with measurement? • What aspects of a graph help people understand and interpret the data? • What kinds of questions can be answered from a graph? • How are geometric properties used to solve problems in everyday life? • How can plane and solid shapes be described? • How are geometric properties used to solve problems in everyday life? • How are geometric figures constructed? • What types of problems are solved with measurement? •	Students will understand that… • The context of a problem determines the reasonableness of a solution. • Objects have distinct attributes that can be measured. • Graphs convey data in a concise way. • Objects can be described and compared using their geometric attributes. • Points, lines and planes are the foundation of geometry. • Estimate lengths and check estimates by measuring to the nearest inch and centimeter. • Identify personal references for customary units of length. • Measure sides of a polygon to the nearest inch. • Add side lengths to find perimeter. • Create triangles and rectangles with a given perimeter. • Find the perimeters of polygons. • Estimate the perimeter of a polygon.
Areas of Focus: Proficiencies (CCSS)	**Examples, Outcomes, Assessments**
Students will: Measurement and Data 3.MD *Geometric measurement: understand concepts of area and relate area to multiplication and to addition.*	Instructional Focus: • Write number models with parentheses to match number stories. • Share solution strategies for solving number stories.

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement. b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units. 3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 3.MD.7 Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. 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. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths *a* and *b* + *c* is the sum of *a* x *b* and *a* x *c*. Use area models to represent the distributive property in mathematical reasoning. Geometry 3.G *Reason with shapes and their attributes.* 3.G.1 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	• Recognize multiples of a given number (e.g., 10). • Discuss situations where it is sensible to make an estimate and those where it is sensible to compute an exact answer. • Use estimation strategies to solve number stories. • Make reasonable estimates for problems involving multiplication and repeated addition. • Use the partial-products algorithm to solve problems. • Use multiplication facts to find whole-number factors of a whole number. • Solve equal-sharing division stories involving money amounts. • Explore different strategies (e.g., lattice multiplication) for solving problems involving multiplication of 1-digit by multi-digit numbers. • Identify polygons in a design. • Draw conclusions from a line graph. • Use points to label and name triangles. • Identify right angles and parallel and intersecting sides of quadrangles. • Draw and name quadrangles. • Measure the sides of a quadrangle. • Locate lines of symmetry in 2-dimensional shapes. • Distinguish between 2- and 3-dimensional shapes. • Identify, compare, and contrast the characteristics of 3-dimensional shapes. • Make a bar graph for a set of data using. • Use graphs to answer simple questions. Sample Assessments: • Exit slips

	List two different types of triangles. o List two different types of quadrangles. o List two objects in the classroom that have at least one line of symmetry. • Student self-assessment • Writing prompts o When is it helpful to use an estimate rather than solving a given problem? • Math journals/Interactive Student Notebooks • Record sheets • Teacher observation • Beginning, Middle, End-of-Year assessments • Progress check written assessment • Class checklists Interdisciplinary Connections • Interactive Student Notebooks • Reading/writing word problems • Read aloud: Fannie in the Kitchen: The Whole Story from Soup to Nuts of How Fannie Farmer Invented Recipes with Precise measurements by Deborah Hopkinson and Nancy carpenter • Students plan a trip within the U.S. and calculate the total distance they will travel, using a map scale and multiplication. • Students create a class bulletin board, consisting of digital photographs of 2-D and 3-D figures they have identified within their classroom and/or school. They will provide a corresponding label and description for each figure. • Students draw a 2-D version of what the front of their ideal house would look like. They will then outline any polygons they

	can readily identify in the blueprint, using a specific color. Then, they will compute the perimeter and area of the windows and doors. • Students write literary nonfiction stories pretending to be 2-D or 3-D shapes and describing life from the perspective of the shape. • Suggested Projects: o Students bring in circulars from grocery stores. They make a shopping list for their family for the week, given a budget of $200. o Students pretend that they are working a job as a cashier. They need to research what their hourly wage would be. Then, they will calculate how much they would get paid for a series of weeks, given different total number of hours worked. o Students each bring in a snack (e.g., raisins, pretzels, apricots) to create an (allergy-free) class trail mix. Working as a class, students divide each snack to equally share with each student. Then, they combine them to form a trail mix. o Students take a recipe and re-write it, using equivalent fractions. Technology Integration • MicroWorlds – use a : to represent a variable • Brainpop videos – commutative and associative • Search NetTrekker search "Associative Property" for videos, how-to sheets, and games • Library of Virtual Manipulative -

	http://school.nettrekker.com/goExternal?np=/external.ftl&pp=/error.ftl&evlCode=198396&productName=school&HOMEPAGE=E • Discovery Education Video – division • Khan Academy videos – division • BrainPop Video - division • Fuel the Brain – Jelly Golf http://www.fuelthebrain.com/Game/play.php?ID=215 • I Know That – Fishy Fractions http://www.iknowthat.com/com/App?File=FractionGame.htm&Type=S&App=FractionGame&Topic=namematch • The Math Games – Fraction Balls http://themathgames.com/our-games/fraction-games/fraction-balls1/league_-1/country_-1/countryNumber_-1 • Practical Money Skills – Ed's Bank http://www.practicalmoneyskills.com/games/ Media Literacy Integration • PBS Kids – Don't Buy It, Buying Smart http://pbskids.org/dontbuyit/buyingsmart/hotorsnot.html • Partnership for 21st Century Skills (p. 22-23) http://www.p21.org/storage/documents/P21_Math_Map.pdf Global Perspectives • Investigate international money equivalents to the U.S. dollar. • Investigate inflation and its impact on the American economy. • Research the origin of 1/2 notes, 1/4 notes, and 1/8 notes in music. 21st Century Skills:

	Creativity and Innovation • Write a song that only consists of ½ notes or 1/8 notes. • Create a song to teach a friend how to use one of the following multiplication strategies: the Partial-Products Algorithm or the Lattice Method of Multiplication. Critical Thinking and Problem Solving • Create a new algorithm for multiplying multi-digit numbers. Communication and Collaboration o *Multiplication Bingo* o *Name That Number* o *Beat the Calculator* o *Equivalent Fractions* o *Fraction Top-It* o *Finding Factors* o *Array Bingo* Information Literacy Life and Career Skills • What jobs use these skills? • How do your parents use these skills? 21st Century Themes (as applies to content area): Financial, Economic, Business, and Entrepreneurial Literacy Civic Literacy Health Literacy

	• Students research what fractional component of their body consists of water and other elements. • Students compare how many teeth an adult has versus a kid. They compute the fraction of teeth that the average kid loses over time.

Ideas for Math Enrichment

Math Computations Comic Book
You will invent a "math computations hero" that will perform mathematical heroic missions that include saving your city from a dreadful math villain. In your mathematical heroic missions you will use all four math operations: addition, subtraction, multiplication and division. On each page of your comic book (six frames on each page), your hero will complete a mission that includes a different math operation that you've recorded on the top of the page. For example, on one page they will use addition to complete their mission and on the next page they will use subtraction and so on!

Fraction Pizza
Students will make their own pizza with several ingredients using fractions. Draw the pizza, fill in the chart for how their pizza is divided. Put a different ingredient in each section. Use at least 3 different ingredients. All fractions together should make a whole pizza.

Vacation Time
You will plan three vacations. You will need to find flights from your city to three different destinations and back (round trip). For each of your trips you need to determine the total amount of hours and minutes it would take from the time you take off from your first flight near the city where you live to the time you land at your destination's final stop. You will do the same for each return trip. Prepare 3 trip summary sheets with all information including starting city, departure time, all stops the flight may make, destination city, arrival time and total travel time. (Many people use online sources such as priceline.com to plan their trips and vacations).

Measurement Story
Write a fiction story about the boy who couldn't stop measuring things. Add illustrations to your story.

Concept or Chapter	Resources for Enrichment
First Day Activity	3.MD.C5,6 Go on a leaf collecting walk. Pick a leaf from those collected.

	Describe the leaf in every detail. Place the leaf on graph paper. How many squares will it cover? Trace the leaf and count the number of squares it completely covers. Leaf Treasures, Family Math for Young Chidren, p. 144-5. (attach) Color each of the following maps with 4 colors so that no *adjacent* countries have the same color. Each puzzle has a *unique* solution. SMP 1,7,8. Coloring Puzzles: http://www2.stetson.edu/~efriedma/4colors/ The four-color map problem was studied by mathematicians the world over for 100+ years. More on this topic can be found at: http://www.mathsisfun.com/activity/coloring.html
3.OA.A4, 3.OA.B5, 3.OA.C7 Students use algebraic thinking and mathematical reasoning to solve place value number problems.	Number Detective, nrich.maths.org/204 Logic Number Puzzles, mathwire.com Logic Number Problems 1-8, Wade H. Sherard,III. (attach)
3.MD.2 Students measure and estimate liquid volume. Students experience how heavy a kilogram is and estimate the weight of everyday items.	https://www.georgiastandards.org/Georgia-Standards/Frameworks/3rd-Math-Unit-6.pdf (See: More Punch Please Making a Kilogram)
3.G.A1 Students draw as many 4-sided figures as possible on a sheet of dot paper. In partnerships or small groups, students share their figures and determine how many are unique. Figures are then sorted into sub-groups with similar properties. Finally, the mathematical names are given.	dot paper directions (attach)

3.NBT.A2,3 This game gives students the opportunity to practice multiplying by 10 and multiples of 10. It also supports mental computation and develops students' numbers sense. Although the game's focus is multiplication, students also practice their addition and subtraction. The object of the game is to be the player whose total is closest to 300 after six rolls of a 1–6 number cube. The total can be greater or less than 300, or exactly 300, but players must use all six turns	http://www.mathsolutions.com/wp-content/uploads/winwin_mathgames.pdf Target 300

Concept or Chapter	**Resources for Support**
Beginning of the Year Activities	Text - Missing Math: A Number Mystery, by Loreen Leedy. ACTIVITY: Have a scavenger hunt to find examples of people using numbers and math at school. Ideas: • The gym teacher timing a race • The cashier in the cafeteria • A scorekeeper at a sports event • A student measuring for an art project • A librarian cataloging books How many examples can your class find in one day?
Chapter 1: Addition and Subtraction Within 1,000	Game: Rounding I Have, Who Has game
Chapter 2: Represent and Interpret Data	Game: Graphing Twister Center: Line Plot foldable

Chapter 3: Understand Multiplication	Game: Multiplication Fishbowl - https://www.teacherspayteachers.com/Product/FREE-Fishbowl-Multiplication-63184 Center: Representing Multiplication Multiple Ways Project: Represent Multiplication
Chapter 4: Multiplication Facts and Strategies	Game: Defensive Multiplication & What's My Name for a Day Center: Analyzing Word Problems Involving Multiplication - Word Problem Task Cards
Chapter 5: Use Multiplication Facts	Game: Guess My Rule: The Function Machine Game - Guess my Rule Center: Everyday Math Multiplication Baseball
Chapter 6: Understand Division	Game: Making Equal Groups Text Support: The Doorbell Rang by Pat Hutchins
Chapter 7: Division Facts and Strategies	Game: Four in a Line Center: Task Cards
Chapter 8: Understand Fractions	Center: Fraction Sundaes OR Fraction Concentration (https://www.teacherspayteachers.com/Product/Spring-fraction-matching-cards-FREEBIE-215756) Text Support: The Hershey's Milk Chocolate Bar Fractions Book

Chapter 9: Compare Fractions	Game: Fraction Snowman Center: Fraction Line-Up: distribute the Fraction Demo Cards to students. Ask students to quickly and quietly assemble themselves in order from least to greatest at the front or back of the room. For added practice, repeat the activity over several days and time the class on how quickly they get into correct line-up positions. http://www.mathwire.com/fractions/fractiondemocards.pdf
Chapter 10: Time, Length, Liquid Volume, and Mass	Teaching Strategy: Elapsed Time T-Chart Strategy Center: Clock foldable - A Foldable to help your students build an understanding of time. Great foldable to put in a math journal
Chapter 11: Perimeter and Area	Game: Land Run Teaching Strategies: http://www.scholastic.com/teachers/top-teaching/2012/12/10-hands-strategies-teaching-area-and-perimeter
Chapter 12: Two-Dimensional Shapes	Center: Shapes Riddles Text Support: Cut Down to Size at High Noon by Scott Sundby