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| **Prerequisite Skills** **(Grade 2)** | **Unit Three Standards** **Grade 3** | **Looking Ahead** **(Grade 4)** |
| \*Third grade is the first time students are working with volume and mass. Students need multiple opportunities weighing classroom objects and filling containers to help them develop a basic understanding of the size and weight of a liter, a gram, and a kilogram. | Measurement and Data 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.* I can solve one step word problems involving masses or liquid volume given in the same units.
* I can measure liquid volumes using liters.
* I can measure mass of objects using grams (g), and kilograms (kg).
 | 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. |
| Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. Estimate lengths using units of inches, feet, centimeters, and meters.  | Measurement and Data 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.* I can define “unit square”.
* I can define 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.* I can cover the area of a plane figure with unit squares without gaps or overlaps.
 | Apply the area and perimeter formulas for rectangles in real world and mathematical problems. |
| Measurement and Data 6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).* I can measure areas by counting unit squares.
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| Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. Estimate lengths using units of inches, feet, centimeters, and meters. | Measurement and Data 7a + 7b: 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.* I can find the area of a rectangle by tiling it in unit squares.
* I can compare the area found by tiling a rectangle to the area 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.* I can multiply side lengths to find areas of rectangles.
* I can solve real world problems using area.
 | Apply the area and perimeter formulas for rectangles in real world and mathematical problems. |

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| **Prerequisite Skills** **(Grade 2)** | **Unit Three Standards (Continued)** **Grade 3** | **Looking Ahead** **(Grade 4)** |
| Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. Estimate lengths using units of inches, feet, centimeters, and meters.  | Measurement and Data 7c + 7d: Relate area to the operations of multiplication and addition.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.* I can use an array to multiply.
* I can find the area of a rectangle by modeling the distributive property using multiplication and addition.
* I can use tiling to find the area of rectangles using the distributive property.

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.* I can separate a polygon into non-overlapping rectangles to find the area of each rectangle to solve real world problems.
 | Apply the area and perimeter formulas for rectangles in real world and mathematical problems. |
| Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. Estimate lengths using units of inches, feet, centimeters, and meters.  | Measurement and Data 8: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.* I can define perimeter.
* I can find the perimeter when given the length of sides.
* I can find the perimeter when there is an unknown side length.
* I can create rectangles with the same perimeter and different areas.
* I can create rectangles with the same area and different perimeters.
 | Apply the area and perimeter formulas for rectangles in real world and mathematical problems. |
| Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.5 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.  | Geometry 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.* I can identify and define two-dimensional shapes based on their attributes.
* I can identify rhombuses, rectangles, and squares as quadrilaterals.
 | 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.  |

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| **Standard** | **Learner Objectives** |
| Measurement and Data 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. | * I can solve one step word problems involving masses or liquid volume given in the same units.
* I can measure liquid volumes using liters.
* I can measure mass of objects using grams (g), and kilograms (kg).
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| **What does this standard mean the students will know and be able to do?** |
| This standard asks for students to reason about the units of mass and volume. Students need multiple opportunities weighing classroom objects and filling containers to help them develop a basic understanding of the size and weight of a liter, a gram, and a kilogram. Milliliters may also be used to show amounts that are less than a liter. Word problems should only be one-step and include the same units.Foundational understandings to help with measure concepts: * Understand that larger units can be subdivided into equivalent units (partition).
* Understand that the same unit can be repeated to determine the measure (iteration).
* Understand the relationship between the size of a unit and the number of units needed (compensatory principal).

Students need multiple opportunities ―massing‖ classroom objects and filling containers to help them develop a basic understanding of the size and mass of a liter, a gram, and a kilogram. Milliliters may also be used to show amounts that are less than a liter. |
| **Examples:** |
| Students identify 5 things that have a mass of about one gram. They record their findings with words and pictures. (Students can repeat this for 5 grams and 10 grams.) | A paper clip has a mass of about a) a gram b) 10 gram c) 100 grams? |
| **This helps develop gram benchmarks. One large paperclip weighs about one gram. A box of large paperclips (100 clips) has a mass of about 100 grams so 10 boxes would have a mass of one kilogram.** |

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| **Lessons and Resources for Measurement and Data 2** |
| Unit 9Inv 4A.1, 4A.2, 4A3 | [Estimate and Measure (practice)](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Estimate%20and%20Measure.pdf) | [The Water Experiment](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/The%20Water%20Experiment.pdf) | [Estimate, Order and Measure Ounces, Cups and Quarts](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Estimate%20Order%20and%20Measure%20Ounces.pdf) |

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| **Emphasized Standards for Mathematical Practice** |
| [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically2.html) |

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| **Standard** | **Learner Objectives** |
| Measurement and Data 5a: 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. | * I can define “unit square”.
* I can define area.
 |
| Measurement and Data 5b: 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. | * I can cover the area of a plane figure with unit squares without gaps or overlaps.
 |
| Measurement and Data 6: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). | * I can measure areas by counting unit squares.
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| **What does this standard mean the students will know and be able to do?** |
| These standards call for students to explore the concept of covering a region with ―unit squares, which could include square tiles or shading on grid or graph paper.Students develop understanding of using square units to measure area by:* Using different sized square units
* Filling in an area with the same sized square units and counting the number of square units

Students can cover rectangular shapes with tiles and count the number of units (tiles) to begin developing the idea that area is a measure of covering. Area describes the size of an object that is two-dimensional. **The formulas should not be introduced before students discover the meaning of area.** The area of a rectangle can be determined by having students lay out unit squares and count how many square units it takes to completely cover the rectangle completely without overlaps or gaps. Students need to develop the meaning for computing the area of a rectangle. A connection needs to be made between the number of squares it takes to cover the rectangle and the dimensions of the rectangle. Ask questions such as: • What does the length of a rectangle describe about the squares covering it? • What does the width of a rectangle describe about the squares covering it? Students should be counting the square units to find the area could be done in metric, customary, or non-standard square units. Using different sized graph paper, students can explore the areas measured in square centimeters and square inches. |

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| **Lessons and Resources for Measurement and Data 5 + 6** |
| Unit 4 Inv 2.4, 2.5A, 2.5, 2.6 | [Paper Rectangles](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Paper%20Rectangles.pdf) | [More Areas](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/More%20Areas.pdf) |  |

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| **Emphasized Standards for Mathematical Practice** |
| [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [4. Model with mathematics.](http://elementarymath.dmschools.org/4-model-with-mathematics3.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically2.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision1.html) |

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| **Standard** | **Learner Objectives** |
| Measurement and Data 7a + 7b: 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. | * I can find the area of a rectangle by tiling it in unit squares.
* I can compare the area found by tiling a rectangle to the area found by multiplying the side lengths.
* I can multiply side lengths to find areas of rectangles.
* I can solve real world problems using area.
 |
| Measurement and Data 7c + 7d:Relate area to the operations of multiplication and addition.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. | * I can use an array to multiply.
* I can find the area of a rectangle by modeling the distributive property using multiplication and addition.
* I can use tiling to find the area of rectangles using the distributive property.
* I can separate a polygon into non-overlapping rectangles to find the area of each rectangle to solve real world problems.
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| **What does this standard mean the students will know and be able to do?** |
| Students should tile rectangle then multiply the side lengths to show it is the same. To find the area one could count the squares or multiply 3 x 4 = 12. Students should solve real world and mathematical problems.  |
| **Examples:** |
| Drew wants to tile the bathroom floor using 1 foot tiles. How many square foot tiles will he need? | Joe and John made a poster that was 4ft. by 3ft. Melisa and Barb made a poster that was 4ft. by 2ft. They placed their posters on the wall side-by-side so that that there was no space between them. How much area will the two posters cover?*Students use pictures, words, and numbers to explain their understanding of the distributive property in this context.* | Students can decompose a rectilinear figure into different rectangles. They find the area of the figure by adding the areas of each of the rectangles together. |

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| **Lessons and Resources for Measurement and Data 7** |
| [Two Piece Shapes](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/twopieceshapes.docx) | [Rectangle Comparison No Units](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Rectangular%20Comparison%20no%20units.pdf) | [Rectangle Comparison Square Units](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Rectangular%20Comparison%20square%20units.pdf) |
| Unit 4 Inv 2.4, 2.5A, 2.5 | [Rainbow Rectangles](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Rainbow%20Rectangles.pdf) | [Square Inches](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Square%20Inches.pdf) |

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| **Emphasized Standards for Mathematical Practice** |
| [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically2.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision1.html) |

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| **Standard** | **Learner Objective** |
| Measurement and Data 8: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. | * I can define perimeter.
* I can find the perimeter when given the length of sides.
* I can find the perimeter when there is an unknown side length.
* I can create rectangles with the same perimeter and different areas.
* I can create rectangles with the same area and different perimeters.
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| **What does this standard mean the students will know and be able to do?** |
| Students develop an understanding of the concept of perimeter by walking around the perimeter of a room, using rubber bands to represent the perimeter of a plane figure on a geoboard, or tracing around a shape on an interactive whiteboard. They find the perimeter of objects; use addition to find perimeters; and recognize the patterns that exist when finding the sum of the lengths and widths of rectangles. Students use geoboards, tiles, and graph paper to find all the possible rectangles that have a given perimeter (e.g., find the rectangles with a perimeter of 14 cm.) They record all the possibilities using dot or graph paper, compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.Given a perimeter and a length or width, students use objects or pictures to find the missing length or width. They justify and communicate their solutions using words, diagrams, pictures, and numbers.Students use geoboards, tiles, graph paper, or technology to find all the possible rectangles with a given area (e.g. find the rectangles that have an area of 12 square units.) They record all the possibilities using dot or graph paper, compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.  |
| **Example:** |
| Students then investigate the perimeter of the rectangles with an area of 12.The patterns in the chart allow the students to identify the factors of 12, connect the results to the commutative property, and discuss the differences in perimeter within the same area. This chart can also be used to investigate rectangles with the same perimeter. It is important to include squares in the investigation. |

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| **Lessons and Resources for Operations in Measurement and Data 8** |
| Unit 4 Inv 1.1 – 1.5 | [Ladybug’s Garden](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Ladybug%20Garden.pdf) | [Area Perimeter Review](http://qta.quantiles.com/m/resources/downloads/QuantileResource33928.pdf) |

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| **Emphasized Standards for Mathematical Practice** |
| [1. Make sense of problems and persevere in solving them.](http://elementarymath.dmschools.org/1-make-sense-of-problems-and-persevere-in-solving-them3.html) | [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others2.html) | [7. Look for and make use of structure.](http://elementarymath.dmschools.org/7-look-for-and-make-use-of-structure.html) |

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| **Standard** | **Learner Objectives** |
| Geometry 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. | * I can identify and define two-dimensional shapes based on their attributes.
* I can identify rhombuses, rectangles, and squares as quadrilaterals.
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| **What does this standard mean the students will know and be able to do?** |
| In second grade, students identify and draw triangles, quadrilaterals, pentagons, and hexagons. Third graders build on this experience and further investigate quadrilaterals (technology may be used during this exploration). Students recognize shapes that are and are not quadrilaterals by examining the properties of the geometric figures. They conceptualize that a quadrilateral must be a closed figure with four straight sides and begin to notice characteristics of the angles and the relationship between opposite sides. Students should be encouraged to provide details and use proper vocabulary when describing the properties of quadrilaterals. They sort geometric figures and identify squares, rectangles, and rhombuses as quadrilaterals.Students should classify shapes by attributes and drawing shapes that fit specific categories. For example, parallelograms include: squares, rectangles, rhombi, or other shapes that have two pairs of parallel sides. Also, the broad category quadrilaterals include all types of parallelograms, trapezoids and other four-sided figures. |
| **Example:** |
| Draw a picture of a quadrilateral. Draw a picture of a rhombus. How are they alike? How are they different? Is a quadrilateral a rhombus? Is a rhombus a quadrilateral? Justify your thinking. |

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| **Lessons and Resources for Operations in Geometry 1** |
| Unit 4 Inv 3.1 – 3.5 | [Rectangles and Parallelograms](http://illuminations.nctm.org/LessonDetail.aspx?id=L350) | [2 and 3 Dimensional Figures (2D only)](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/2%20and%203%20dimensional%20figures.pdf) |
| [What is a Rectangle (Video)](http://www.virtualnerd.com/pre-algebra/geometry/rectangle-definition.php) | [What is a Polygon (Video)](http://www.virtualnerd.com/pre-algebra/geometry/polygon-definition.php) | [Analyzing Quadrilaterals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Analyzing%20Quadrilaterals.pdf) |
| [Sorting Quadrilaterals](https://sharepoint.dmps.k12.ia.us/sites/divisions/curr/Public%20Curriculum%20Documents/Mathematics/Elementary%20Math%202013%20-%202014/3rd%20Grade/Unit%203/Sorting%20Quadrilaterals.pdf) |  |  |

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| **Emphasized Standards for Mathematical Practice** |
| [2. Reason abstractly and quantitatively.](http://elementarymath.dmschools.org/2-reason-abstractly-and-quantitatively3.html) | [3. Construct viable arguments and critique the reasoning of others.](http://elementarymath.dmschools.org/3-construct-viable-arguments-and-critique-the-reasoning-of-others2.html) | [5. Use appropriate tools strategically.](http://elementarymath.dmschools.org/5-use-appropriate-tools-strategically2.html) | [6. Attend to precision.](http://elementarymath.dmschools.org/6-attend-to-precision1.html) |

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**Optional Whole Group Lesson Progression**

Unit Pacing: 4 weeks

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| **Resource** | **Location** | **Primary Focus** | **Standard** |
| Investigations | Unit 4* Inv 1.1 – 1.5
 | * I can define perimeter.
* I can find the perimeter when given the length of sides.
* I can find the perimeter when there is an unknown side length.
* I can create rectangles with the same perimeter and different areas.
* I can create rectangles with the same area and different perimeters.
 | 3.MD.8 |
| Investigations | Unit 4* Inv 2.4, 2.5A, 2.5, 2.6
 | * I can define “unit square”.
* I can define area.
* I can cover the area of a plane figure with unit squares without gaps or overlaps.
* I can measure areas by counting unit squares.
* I can find the area of a rectangle by tiling it in unit squares.
* I can compare the area found by tiling a rectangle to the area found by multiplying the side lengths.
* I can multiply side lengths to find areas of rectangles.
* I can solve real world problems using area.
* I can use an array to multiply.
* I can find the area of a rectangle by modeling the distributive property using multiplication and addition.
* I can use tiling to find the area of rectangles using the distributive property.
* I can separate a polygon into non-overlapping rectangles to find the area of each rectangle to solve real world problems.
 | 3.MD.5a3.MD.5b3.MD.63.MD.7a3.MD.7b3.MD.7c3.MD.7d |
| Investigations | Unit 4* Inv 3.1 – 3.5
 | * I can identify and define two-dimensional shapes based on their attributes.
* I can identify rhombuses, rectangles, and squares as quadrilaterals.
 | 3.G.1 |
| Investigations | Unit 9* Inv 4A.1, 4A.2, 4A.3
 | * I can solve one step word problems involving masses or liquid volume given in the same units.
* I can measure liquid volumes using liters.
* I can measure mass of objects using grams (g), and kilograms (kg).
 | 3.MD.2 |

**\*Units pacing is approximate. Some lessons may take more than one day. Use teacher discretion based on student need when planning unit length.**