

Grade 3			
Unit	Unit Title	Lesson	Day
3.2	Measurement –Plane Figures: Area and Attributes	1 of 3	1 and 2
Lesson Focus			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
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.	Recognize area as an attribute of polygons.	SMP4 Model with mathematics.	How is finding the area of a shape different from finding the perimeter of a shape? How do you find area with unit squares?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> Recognize the properties of a square. Understand perimeter is the distance around a figure. 	Area Square unit Unit square	Students may confuse area with perimeter and by doing so will measure only the squares around a shape and not every square inside a shape.	OnCore Lesson 87 Student pp. 173-174 K-5 Math Resources Exploring Area Area on the Geoboard
Instruction			
9. Instruction Practices (What are the teachers doing)		10. Learning Practices (What are the students doing)	
Teachers will guide children to estimate and measure area of plane shapes by counting unit squares following the lesson guidelines in OnCore lesson 87 (TM p. 91), teachers will: Show students a square tile and explain that the sides of the tile are all the same length and the length can be referred to as 1 unit and the square can be referred to as a unit square. Tell them they will learn how to use unit squares to measure area. Discuss with students the meaning of area. Go over the figures on the top of page 173 and make sure they recognize that the figure is made up of unit squares before walking them through drawing lines and counting the squares. Please note that although this lesson is on understanding area, questions 8 and 10 on p 174 does ask about perimeter.		In Lesson 87 students will: <ul style="list-style-type: none"> Count unit squares to find the area of shapes. Decide whether area or perimeter is used for a situation given. Complete On Core Student Practice pp. 173-174. In K-5 Math Resources students will: Explore area in rectangles Explore area on a geoboard.	

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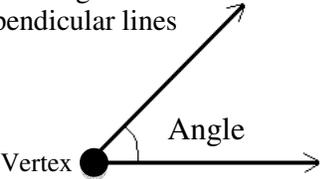
Grade 3			
Unit	Unit Title	Lesson	Day
3.2	Measurement –Plane Figures: Area and Attributes	2 of 3	3 -4
Lesson Focus			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.</p> <p>b. <i>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></p> <p>3.MD.6 Measure area by counting unit squares (square cm, square m, square in., square ft, and improvised units).</p>	Estimate and measure area of plane shapes by counting unit squares.	SMP5 Use appropriate tools strategically.	How can you find the area of a plane shape?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Recognize properties of a square. •Understand the meaning of area. 	Square inch Square centimeter	Students may confuse area with perimeter and by doing so will measure only the squares around a shape and not every square inside a shape.	<p>OnCore Lesson 88 Student pp. 175-176 1-inch square tiles</p> <p>K-5 Math Resources Find the Area *New Area Compare</p>
Instruction			
9. Instruction Practices (What are the teachers doing)		10. Learning Practices (What are the students doing)	
<p>Teachers will guide children to estimate and measure area of plane shapes by counting unit squares following the lesson guidelines in OnCore lesson 88 (TM p. 92), teachers will:</p> <p>Introduce the lesson by placing 1-inch squares around the outside edge of a sheet of paper and discuss why the tiles do not model area. Have students show how to use the tiles to show the area of the paper and have them cover the paper to model area. Make sure when students answer what the area is that they say 5 square inches and not 5 tiles.</p> <p>Extend the lesson by discussing how to count each square to find the area of the shape, rather than placing and counting tiles.</p>		<p>In Lesson 88 students will:</p> <ul style="list-style-type: none"> • Estimate and measure the area of plane shapes by counting unit squares. • Complete On Core Student Practice pp. 175-176. <p>In K-5 Math Resources students will:</p> <ul style="list-style-type: none"> •Find the number of square units needed to cover the rectangles. •Compare the area of rectangles. 	

**Lesson Alignment Guide – Mathematics
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Grade 3

Unit 3.2	Unit Title Measurement –Plane Figures: Area and Attributes	Lesson 3 of 3	Day 5-10
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question																												
<p>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.</p>	<ul style="list-style-type: none"> •Identify and describe attributes of plane shapes. •Describe angles in plane shapes. •Identify polygons by the number of sides and angles they have. •Determine if lines or line segments are intersecting, perpendicular, or parallel. •Describe and compare triangles based on the number of sides that have equal length and by their angles sizes (right angle, greater than a right angle and less than a right angle). 	<p>SMP1 Make sense of problems and persevere in solving them.</p> <p>SMP3 Construct viable arguments and critique the reasoning of others.</p> <p>SMP2 Reason abstractly and quantitatively.</p> <p>SMP6 Attend to precision.</p> <p>SMP7 Look for and make use of structure.</p> <p>SMP8 Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> •What are some ways to describe two-dimensional shapes? •How can you describe angles in plane shapes? •How can you use line segments and angles to make polygons? •How can you describe line segments that are sides of polygons? •How can you use sides and angles to help you describe quadrilaterals? •How can you use sides and angles to help you describe triangles? •How can you use the strategy draw a diagram to classify plane shapes? 																												
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials																												
<ul style="list-style-type: none"> •Recognize likenesses and differences among geometric shapes. •Recognize line segments, rays, and angles. •Identify closed and open plane shapes. •Classify and describe an angle as a right angle, less than a right angle, or greater than a right angle. •Identify parallel and perpendicular sides of polygons. •Recognize line segments of equal length. •Classify quadrilaterals based on their sides and angles. •Classify a quadrilateral as a square, a rectangle, a rhombus, or a trapezoid based on its sides and angles. •Describe triangles based on their sides and angles. 	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Point</td> <td style="width: 50%;">Line</td> </tr> <tr> <td>Endpoints</td> <td>Line segment</td> </tr> <tr> <td>Ray</td> <td>Plane shape</td> </tr> <tr> <td>Closed shape</td> <td>Open shape</td> </tr> <tr> <td>Angle</td> <td>Right angle</td> </tr> <tr> <td>Polygon</td> <td>Side</td> </tr> <tr> <td>Square</td> <td>Rectangle</td> </tr> <tr> <td>Rhombus</td> <td>Trapezoid</td> </tr> <tr> <td>Triangle</td> <td>Quadrilateral</td> </tr> <tr> <td>Pentagon</td> <td>Hexagon</td> </tr> <tr> <td>Octagon</td> <td>Decagon</td> </tr> <tr> <td>Venn diagram</td> <td>Parallel lines</td> </tr> <tr> <td>Intersecting lines</td> <td></td> </tr> <tr> <td>Perpendicular lines</td> <td></td> </tr> </table> <div style="text-align: center; margin-top: 10px;">  </div>	Point	Line	Endpoints	Line segment	Ray	Plane shape	Closed shape	Open shape	Angle	Right angle	Polygon	Side	Square	Rectangle	Rhombus	Trapezoid	Triangle	Quadrilateral	Pentagon	Hexagon	Octagon	Decagon	Venn diagram	Parallel lines	Intersecting lines		Perpendicular lines		<p>Students may think a square is not a rectangle and that all rectangles have two long sides and two short sides. The orientation of the square also may confuse some students; they think that it is a “diamond” and don’t realize that a square is a square no matter its orientation.</p> <p>Students often confuse the terms vertex and angle. The vertex is the point at which the two line segments meet and the angle is the space formed by the two rays or line segments from a common point (vertex). See vocabulary.</p>	<p>OnCore Lessons 97 - 104 Student pp. 193-208</p> <p>Ruler</p> <p><u>The Greedy Triangle</u> (optional - great book for learning names of shapes and seeing how a shape changes as it gets one more side and one more angle.)</p> <p>K-5 Math Resources</p> <p>2D Shape Sort</p> <p>Comparing Quadrilaterals</p>
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Endpoints	Line segment																														
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Instruction

9. Instruction Practices (What are the teachers doing)

Teachers will guide children to identify and describe attributes of plane shapes, describe angles in plane shapes, identify polygons by the number of sides and angles they have, determine if lines or line segments are intersecting, perpendicular, or parallel, and describe and compare triangles based on the number of sides that have equal length and by their angles sizes (right angle, greater than a right angle and less than a right angle) following the lesson guidelines in OnCore lessons 97 - 104 (TM p. 102-109), teachers will:

- Show students shapes that are open or closed and ask them to compare the shapes and describe how they are alike and how they are different. Discuss the descriptions of point, line, line segment and ray that are given on student p. 183. Have students explain how line segments and rays are different from lines and from each other. Discuss plane shape, closed shape, and open shape. Check student understanding by asking them to describe open and closed shapes and have them draw an example of an open shape with four line segments.
- Discuss the meaning of right angle. Demonstrate how you can use the corner of a piece of paper to make the comparison of angles. Explain the importance of lining up one edge of the paper along one ray of the angle. Point out that the other ray will either lay along the other edge (right angle), will be hidden by the paper (less than a right angle), or will be visible beyond the edge of the paper (greater than a right angle).
- Stress that a figure can be a polygon only if it is a closed shape and is made entirely of line segments. Discuss the special names of the shapes. (You may point out the prefixes tri, quad, pent, hex, oct, and dec meaning three, four, five, six, eight, and ten respectively).
- Draw a line and then another line that crosses it. Point to each angle formed by the lines and have students decide what type of angle it is (right angle, greater than a right or less than a right angle). Discuss the terms intersecting lines, perpendicular lines, and parallel lines. Make sure that students understand that 2 sides of a polygon that do not meet are not necessarily parallel. Emphasize the fact that parallel sides are always the same distance apart.
- Ask students to describe what a quadrilateral is and discuss the terms square, rectangle, rhombus, and trapezoid. Encourage students to compare descriptions of the quadrilaterals. *For example, ask them to explain how the descriptions of a square and a rectangle are alike and how they are different.*
- Tell the students they will use the properties of quadrilaterals to draw them. Be sure to show rhombuses, rectangles, and squares in various orientations so they know its shape no matter how it is drawn. (Students sometimes don't recognize a square when it's orientated with the vertex pointing north.)
- Show students a set of triangles of various types. Give them a description of a triangle based on both sides and angles, such as a triangle with one right angle and no sides of equal length, and have them identify every triangle in the set that matches the description. Point out that when a triangle has one right angle or one angle greater than a right angle, the other two angles and always less than a right angle.
- Remind students they learned how to describe properties of plane shapes. Work together as a class to make a list of properties, number of sides, parallel sides, perpendicular sides, sides of equal length, right angles, and so on. Let them know they will organize a set of shapes according to these properties. Discuss the term *Venn Diagram* and go over the example at the top of p.207. To check their understanding you could ask why the shapes that look like a rectangle and a hexagon are not in the overlap area. To extend the process you could draw a Venn Diagram with one circle labeled Quadrilaterals and an overlapping circle labeled Right Angle. Show students a set of shapes and have them decide where the shape should be placed.

10. Learning Practices (What are the students doing)

In Lessons 97-104 students will:

- Identify and describe attributes of plane shapes.
- Decide whether the shape is open or closed.
- Describe angles in plane shapes.
- Identify polygons by the number of sides they have.
- Determine if a shape is a polygon or not.
- Write the names of each polygon by the number of sides and angles it has.
- Determine if lines or line segments are intersecting, perpendicular, or parallel.
- Determine which shapes have parallel sides, which have perpendicular sides, and which have interesting sides.
- Classify and compare quadrilaterals based on their sides and angles.
- Draw quadrilaterals on grid paper.
- Describe triangles based on the number of sides that have equal length and by their angles.
- Solve problems by using the strategy *draw a diagram* to classify plane shapes.
- Complete On Core Student Practice pp.173-208

In K-5 Math Resources students will:

- Sort 2-D shape cards according to their properties.
- Compare quadrilaterals according to their properties.