

Core Content

Cluster Title: Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Standard 5: Recognize area as an attribute of plane figures and understand concepts of area measurement.

- a. A square with side length one 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.

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand that the area of a plane figure is dealing with the inside of the shape.

Students will understand what a square unit is and how it is used to measure area.

Students will understand that when using a unit square the entire surface of the plane figure must be measured without gaps or overlaps.

Students will understand that area can be solved using n when the unit of measurement is unknown using repeated addition and multiplication.

Procedural:

Students can use manipulatives (unit blocks) to show area with no gaps or overlaps.

Students can use repeated addition or multiplication to find the area of a plane figure.

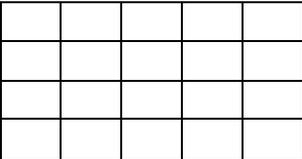
Representational:

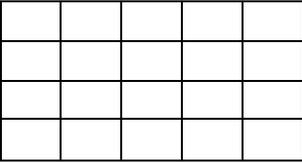
Students can draw pictures of plane figures and be able to show the area of that shape.

Students can take real-world objects (a book, table, etc.) and use manipulatives (unit blocks) to explain the area of the object without actually measuring it.

Using graph paper, students can draw a given figure and write the area.

Supports for Teachers

Critical Background Knowledge	
<p>Conceptual: Students will understand that a plane figure is has two dimensions. Students will know the plane figures. Students will know that repeated addition is the same as multiplication. Students will know that shapes come in a variety of sizes. Students will understand the concept of measurement.</p> <p>Procedural: Students can measure the length of the side of a shape. Students can solve basic multiplication problems.</p> <p>Representational: Students can draw plane figures on graph paper (arrays). Students can show repeated addition with array drawing. Students can represent repeated addition as a multiplication problem. Students can show multiplication with array drawing.</p>	
Academic Vocabulary and Notation	
<p>area, plane figure, square unit</p>	
Instructional Strategies Used	Resources Used
<p>Define what a square unit is using graph paper.</p>  <p style="text-align: center;">↖ (one unit square)</p>	<p>Burns, Marilyn. <i>Spaghetti and Meatballs for All: A Mathematical Story</i>. Scholastic Paperbacks, 2008.</p> <p>Ziefert, Harriet. <i>Squarehead</i>. Houghton Mifflin, 2001.</p> <p>Greene, Rhonda. <i>When a Line Bends A Shape Begins</i>. Sandpiper, 2001.</p> <p>http://www.shodor.org/interactive/activities/AreaExplorer/</p>

<p>Cover a plane figure with square units and then count them.</p> <p>Have students take a square piece of paper and fold the paper until it has many squares when opened. Students must count the square units to find the area.</p>	<p>http://www.ixl.com/math/grade-3</p> <p>http://nlvm.usu.edu/en/nav/topic_t_4.html (geoboard)</p> <p>http://olc.spsd.sk.ca/de/math1-3/virtual%20manipulatives/areaGRID.html</p>
Assessment Tasks Used	
<p>Skill-Based Task: Give students the following shape and have them color the square units and determine how many there are. Write a number sentence to show repeated addition and/or multiplication.</p> 	<p>Problem Task: Ask students to draw a rectangle on graph paper. The rectangle must follow the lines of the graph paper and keep all square units whole. Ask students to color and determine the area of the rectangle.</p> <p>On your graph paper, draw two different rectangular representations of 60 square units. Explain your illustration in writing.</p>