

Core Content

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

Standard 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 $a \times b$ and $a \times c$. 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.

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand the relationship of multiplication and addition to area.

Students will know the area algorithm to solve mathematical and real world problems.

Students will understand that rectilinear shapes can be broken down into rectangles.

Students will know that area is additive.

Procedural:

Students know that area equals length \times width.

Students can work backwards to find the possible lengths and widths when given the area of a rectangle.

Students can divide a rectangle into two parts then using the distributive property find the area of the rectangle.

Students can determine the lengths for each side, and find the area for each rectangle.

Students can add the areas from each rectangle together to find the area of an original rectilinear shape.

Representational:

Students can model the additive nature of area.

Students can represent whole-number products as rectangular areas in mathematical reasoning.

Students can represent the distributive property in mathematical reasoning.

Supports for Teachers

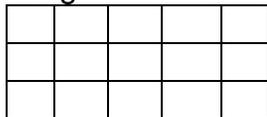
Critical Background Knowledge	
<p>Conceptual:</p> <ul style="list-style-type: none"> Students will understand the distributive property Students will what is the best way to decompose a shape into rectangles or squares. Students will know multiplication facts. Students will know what area is. <p>Procedural:</p> <ul style="list-style-type: none"> Students can use multiplication facts Students can solve addition problems. Students can apply the distributive property. <p>Representational:</p> <ul style="list-style-type: none"> Students can model decomposing shapes Students can model finding lengths of sides not given. Students can model the distributive property. 	
Academic Vocabulary and Notation	
product, additive, distributive property, rectilinear, decompose	
Instructional Strategies Used	Resources Used
<p>Students will need to use tiles to find the area, recognize the similarities to an array, and create the algorithm.</p> <p>Practice dividing a rectangle into two parts and finding the lengths of the sides. Then find the area of the whole rectangle using the distributive property.</p> <p>Decompose nonrectangular rectilinear shapes into rectangles, find the area of each part, then</p>	<p>http://www.mathplayground.com/PartyDesigner/PartyDesigner.html</p> <p>http://pbskids.org/cyberchase/math-games/airlines-builder/</p> <p>http://pbskids.org/cyberchase/videos/area-alert/</p> <p>http://math.pppst.com/perimeter.html</p> <p>Burstein, John. "Calculating Area Space Rocket." <i>Weekly Reader</i>, 2003.</p> <p>Arvoy, Marsha. <i>Area (My Path to Math)</i>. Crabtree, 2010.</p>

add the areas of the various rectangles together.

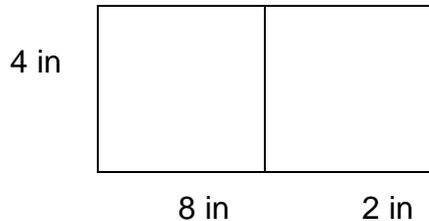
Assessment Tasks Used

Skill-Based Task:

Multiply the side lengths to find the rectangle's area.



Multiply the side lengths and use the distributive property to find the rectangle's overall area.



Problem Task:

Susan and her friends were asked to design their ideal snow fort. After much thought, they came up with a u-shaped fort. Their fort is represented below. Find the total area of the wall of the fort. Then find the total area of the fort.

