

Core Content

Cluster Title: Solve real-world and mathematical problems involving area, surface area, and volume.

Standard 1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

MASTERY Patterns of Reasoning

Conceptual:

Classify special quadrilaterals: square, rhombus, trapezoid, parallelogram, rectangle, kite
Relate the area of triangles and the area of rectangles.
Solve problems in a real-world context.

Procedural:

Identify the relationship between bases and heights in polygons.
Determine the area of polygons.

Representational:

Recognize symbolic notation for height (dotted line).
Visually and physically decompose and compose polygons into rectangles and triangles to find area.

Supports for Teachers

Critical Background Knowledge

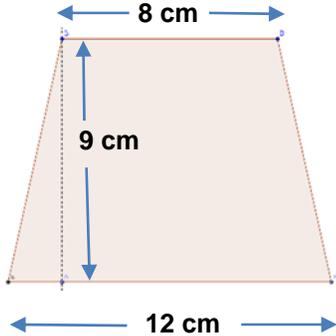
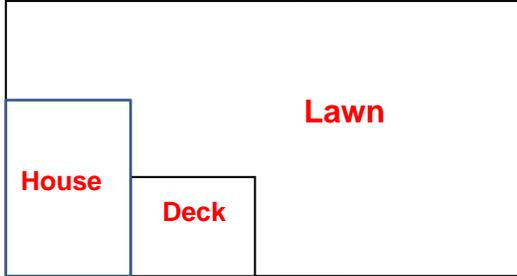
Conceptual:

- Recognize that perpendicular lines form right angles.
- Define and identify polygons.
- Polygons have two dimensions.
- Identify square, rhombus, trapezoid, parallelogram, rectangle, kite.
- The nature of area as an attribute.
- Since area is a different attribute it requires a different measurement unit: square units.

Procedural:

- Determine the area of rectangles.

<p>Representational:</p> <ul style="list-style-type: none"> • Compose and decompose polygons. • Identify right angles in various orientations. • The symbol for right angles:  	
<p>Academic Vocabulary</p> <p>Compose, decompose, base, height, right triangle, polygon, special quadrilaterals, perpendicular</p>	
<p>Tier 1 Instructional Strategies Used</p>	
<p>Derive the formula for triangles from rectangles.</p>	<p>Resources Used</p> <p>Area Formula Graph paper</p>
<p>Begin teaching by decomposing a rectangle into two right triangles, and by composing a rectangle with two right triangles.</p> <ul style="list-style-type: none"> • Use a Geoboard to compose and decompose polygons. • Use dot paper or grid paper to draw polygons and find the area. • Have students decompose paper polygons by cutting into triangles and rectangles. 	<p>Cutting Up Lesson Geoboards (NLVM) http://nlvm.usu.edu/en/nav/frames_asid_282_g_3_t_3.html?open=activities Dot paper</p>
<p>Use the “Triangle Problem” for a mathematical extension involving the area of triangles.</p>	<p>http://www.marktaw.com/blog/TheTriangleProblem.html</p>

Assessment Tasks Used	
<p>Skill-based Task: Find the area of this trapezoid by composing and decomposing the shapes.</p> 	<p>Problem Task: Mario needs to buy sod for his backyard. Here is a diagram of Mario's backyard. Determine how much sod he will need to purchase.</p>  <p>Teacher Note: Students will have to identify appropriate measures for each component and then compose and decompose to come up with an answer. If they give answers in square centimeters or inches ask them to consider if a house and yard that small would be realistic.</p>