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.

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Representational:

- Compose and decompose polygons.
- Identify right angles in various orientations.
- The symbol for right angles: ∟

Academic Vocabulary	
Compose, decompose, base, height, right triangle, polygon, special quadrilaterals, perpendicular	
Tier 1 Instructional Strategies Used	**Resources Used**
Derive the formula for triangles from rectangles.	Area Formula Graph paper
Begin teaching by decomposing a rectangle into two right triangles, and by composing a rectangle with two right triangles. • 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.	Cutting Up Lesson Geoboards (NLVM) http://nlvm.usu.edu/en/nav/frames_asid_282_g_3_t_3.html?open=activities Dot paper
Use the “Triangle Problem” for a mathematical extension involving the area of triangles.	http://www.marktaw.com/blog/TheTriangleProblem.html

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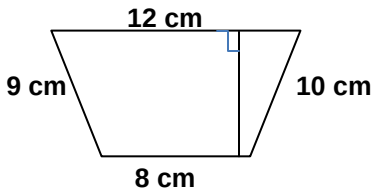
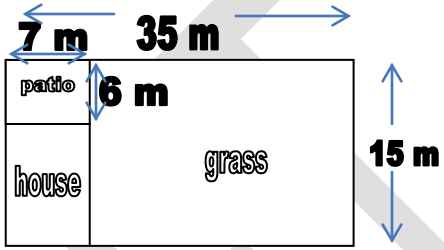
Assessment Tasks Used	
Skill-based Task: Find the area of this trapezoid:  	**Problem Task:** Mario needs to buy sod for his backyard. Here is a diagram of Mario's backyard. Determine how much sod he will need to purchase. 

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