

Core Content

Cluster Title: Classify two-dimensional figures into categories based on their properties.

Standard 3: Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. (For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.)

MASTERY Patterns of Reasoning:

Conceptual:

Students understand that two-dimensional shapes are put into categories based on their attributes (side lengths, angle measures, parallel vs. perpendicular sides), and that shapes can belong to multiple categories. Students can identify the various categories in which a specific shape may belong.

Procedural:

Students can define two-dimensional shapes based on their attributes (e.g., a rhombus is a quadrilateral with four equal sides). Student will classify shapes according to common attributes.

Representational:

Students can draw or construct, using geoboards, specific shapes according to the definitions provided, attributes described, or categories given.

Supports for Teachers

Critical Background Knowledge	
<p>Conceptual: Students can identify properties of various shapes (e.g., what makes a triangle a right triangle). Students understand what two-dimensional shapes are. Students can define what a polygon is.</p> <p>Procedural: Students can identify acute, right, and obtuse angles. Students can identify parallel and perpendicular lines.</p> <p>Representational: Students can represent a variety of basic two-dimensional shapes.</p>	
Academic Vocabulary and Notation	
<p>polygon, angle, line, parallel, perpendicular, triangle, quadrilateral, pentagon, trapezoid, hexagon, octagon, decagon, parallelogram, rectangle, rhombus, square, isosceles, scalene, acute, right, obtuse, equilateral, two-dimensional</p>	
Instructional Strategies Used	Resources Used
<p>Give students sets of triangle-shaped cards to play “Guess My Rule.” Player 1 will look through the variety of triangles and find at least 2 that share a common attribute. (e.g., player 1 groups together all triangles that have 2 equal sides). Player 2 looks at the grouped cards to determine the common attribute. Students record the common attribute before the next person creates his/her grouping.</p> <p>After playing for a while, bring all students together to see what rules they listed. Discuss how these listed properties are properties mathematicians use to define</p>	<p>http://nlvm.usu.edu/en/nav/category_g_2_t_3.html</p> <p>http://teams.lacoe.edu/documentation/classrooms/amy/geometry/6-8/activities/quad_quest/quad_quest.html</p> <p>http://www.bbc.co.uk/schools/ks2bitesize/maths/shape_space/shapes/play_popup.shtml</p> <p>http://www.crickweb.co.uk/ks2numeracy-shape-and-weight.html#quad</p>

<p>specific triangles. Make a class poster with the definitions of the specific types of triangles that exist and discuss how, according to these rules, a triangle can fit in multiple categories.</p> <p>Repeat the activity listed above with quadrilaterals.</p> <p>Have students use geoboards (or virtual geoboards) to construct various shapes. Ask students to make a parallelogram. Discuss how a rectangle, square, and rhombus may all correctly answer that prompt.</p> <p>Ask true-or-false questions about polygons fitting into specific categories or sharing attributes (e.g., A trapezoid has two sides parallel so it must be a parallelogram—true or false?).</p>	
<p>Assessment Tasks Used</p>	
<p>Skill-Based Task: A parallelogram has four sides, with both sets of opposite sides parallel. What types of quadrilaterals are parallelograms?</p> <p>Regular polygons have congruent sides and angles. Name or draw some regular polygons.</p>	<p>Problem Task: Provide a series of “sometimes, never, or always” questions, and require that students provide a written or pictorial explanation for each answer.</p> <p>Example: A parallelogram is a square—sometimes, never, or always?</p> <p>Explain how you know.</p> <p>Explain why all squares are rectangles, but not all rectangles are squares.</p> <p>My friend was sure that she had made a rectangle. The teacher said that it was not a rectangle. How can my friend check to see if it is?</p>