

Unit 6 - Quadruple the Fun

Overview

In Unit 6, students analyze polygons in various contexts including in relationship to fractions, area and perimeter. They develop increasingly precise ways to describe, classify, and make generalizations about two-dimensional shapes, particularly quadrilaterals. Models such as tangrams, toothpicks, colored tiles, linear units, and geoboards help build an understanding that shared characteristics can define a larger category. Polygons are also measured in terms of perimeter and area. In addition, quadrilaterals are partitioned into parts with equal areas and the area of each equal part is expressed as a unit fraction of the whole.

21st Century Capacities: Analyzing, Design

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 3 Construct viable arguments and critique the reasoning of others.
 MP 4 Model with mathematics
 MP 7 Look for and make use of structure.

CCSS.MATH.CONTENT.3.MD.C.5.A A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
 CCSS.MATH.CONTENT.3.MD.C.5.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.
 CCSS.MATH.CONTENT.3.MD.C.7.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.
 CCSS.MATH.CONTENT.3.MD.C.7.B Multiply side lengths to find areas of

Transfer:

Students will be able to independently use their learning in new situations to...

1. Draw conclusions about shapes or objects (analyzing)
2. Make multiple revisions to reach a more efficient, accessible and accurate solution (design)
3. Justify reasoning using clear and appropriate mathematical language

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Geometry can be used to explain the world around me.
2. A variety of attributes/characteristics help us to categorize, compare, and differentiate between shapes.
3. Area and perimeter help define spaces.
4. Mathematicians create or use models to examine, describe, solve and/ or make predictions.
5. There are flexible ways of representing and recognizing fractional quantities.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

- A. What are the attributes of this shape? How are they alike and different to another shape?
- B. How can I create a model to show my understanding of the characteristics of a shape?
- C. Why is it important to understand the relationship between area and perimeter?
- D. How can I visualize equivalent amounts?

Acquisition:

Grade 3 Math Curriculum

<p>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.</p> <p>CCSS.MATH.CONTENT.3.MD.C.7.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.</p> <p>CCSS.MATH.CONTENT.3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.</p> <p>CCSS.MATH.CONTENT.3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.</p> <p>CCSS.MATH.CONTENT.3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.</p>	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> 1. Shared attributes of shapes help define a larger category; 2. How to describe, classify and make generalizations about two-dimensional shapes; 3. Equivalent fraction pieces do not have to be congruent in order to have equal area; 4. The area of a figure is composed by non-overlapping rectangles. 5. <u>Vocabulary</u>: angle, area, attribute, perimeter, polygon quadrilateral, rhombus, rectangle, square, trapezoid, congruent, parallel, parallelogram, vertex, hexagon, pentagon, equilateral, dimension 	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> 1. Defining attributes of quadrilaterals 2. Identifying rhombuses, rectangles and squares as quadrilaterals 3. Constructing and drawing quadrilaterals that are not rhombuses, rectangles or squares 4. Building models of shapes based on generalizations and nonexamples 5. Recognizing congruent and non-congruent fraction pieces 6. Partitioning shapes into parts with equal area 7. Measuring area and perimeter of polygons 8. Finding the unknown side length of a polygon given its perimeter and other side lengths 9. Creating rectangles with the same perimeter but different areas 10. Finding area by multiplying side lengths
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