
Approximate Time Frame: 1-2 weeks

Connections to Previous Learning:

In second grade, students identify and draw triangles, quadrilaterals, pentagons, and hexagons based on attributes.

Focus of the Unit:

Third graders build on experience in second grade and further investigate quadrilaterals (technology may be used during this exploration). Students recognize shapes that are and are not quadrilaterals by examining the properties of the geometric figures. They conceptualize that a quadrilateral must be a closed figure with four straight sides and begin to notice characteristics of the angles and the relationship between opposite sides. Students should be encouraged to provide details and use proper vocabulary when describing the properties of quadrilaterals. They sort geometric figures and identify squares, rectangles, and rhombuses as quadrilaterals.

Connections to Subsequent Learning:

Fourth grade students will build a firm foundation of several shape categories; these categories can be the foundation for thinking about the relationships between classes. Students will classify 2-dimensional shapes by attributes and drawing shapes that fit specific categories, including classification by their angles and angle sizes as they relate to geometric properties of perpendicularity and parallelism.

From the K-6 Geometry progression document, p. 13

Students analyze, compare, and classify two-dimensional shapes by their properties (see the footnote on p. 3).^{3.G.1} They explicitly relate and combine these classifications. Because they have built a firm foundation of several shape categories, these categories can be the raw material for thinking about the relationships between classes. For example, students can form larger, super ordinate, categories, such as the class of all shapes with four sides, or quadrilaterals, and recognize that it includes other categories, such as squares, rectangles, rhombuses, parallelograms, and trapezoids. They also recognize that there are quadrilaterals that are not in any of those subcategories.

Students learn to draw shapes with pre-specified attributes, without making a priori assumptions regarding their classification. MP1 For example, they could solve the problem of making a shape with two long sides of the same length and two short sides of the same length that is not a rectangle.

3.G.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.

Quadrilaterals and some special kinds of quadrilaterals

Quadrilaterals: four-sided shapes.



Subcategory:

Parallelograms: four-sided shapes that have two pairs of parallel sides.



Subcategory:

Rectangles: four-sided shapes that have four right angles. They also have two pairs of parallel sides. We could call them "rectangular parallelograms."



Subcategory:

Squares: four-sided shapes that have four right angles and four sides of the same length. We could call them "rhombus rectangles."



P1

The representations above might be used by teachers in class. Note that the left-most four shapes in the first section at the top left have four sides but do not have properties that would place them in any of the other categories shown (parallelograms, rectangles, squares).

Desired Outcomes

Standard(s):**Reason with shapes and their attributes.**

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Transfer: *Students will apply...*

Knowledge of shapes by drawing representations in different categories that share attributes and recognize those shapes (quadrilaterals) in real world settings.

Understandings: *Students will understand that ...*

- Objects can be described and compared using their geometric attributes.
- Figures are categorized according to their attributes.

Essential Questions:

- How can 2-dimensional shapes be described?
- How are geometric figures constructed?

Highlighted Mathematical Practices: (Practices to be explicitly emphasized are indicated with an *.)

- * **1. Make sense of problems and persevere in solving them.** Students demonstrate their ability to persevere by drawing shapes with pre-specified attributes.
- 2. Reason abstractly and quantitatively.** Students demonstrate reasoning by justifying and explaining attributes of quadrilaterals in words and drawings.
- 3. Construct viable arguments and critique the reasoning of others.** Students will be able to explain why specific shapes are called quadrilaterals. They will also listen to each other and explain what their peers have said.
- 4. Model with mathematics.** In this unit, students are asked to use various modalities and model shapes with manipulatives or drawings. They are asked to communicate how their visuals represent these shapes.
- 5. Use appropriate tools strategically.** Students will use concrete models to represent shapes. Students will use concrete models to represent shapes.
- 6. Attend to precision.** Students precisely solve problems such as finding all the possible different compositions of quadrilaterals that make other quadrilaterals.
- 7. Look for and make use of structure.** Students will observe, identify, and categorize quadrilaterals based upon attributes.
- 8. Look for and express regularity in repeated reasoning.** Students will notice commonalities in attributes.

Prerequisite Skills/Concepts:

- Grade 2 students work with shapes as they recognize, identify and draw various shapes based upon attributes.

Advanced Skills/Concepts:

- Connect lines to lines of symmetry in two-dimensional figures.
- Identify angles.
- Classify shapes by the properties of their angles.

Knowledge: *Students will know...*

- Geometric shapes that represent quadrilaterals.
- Shapes are categorized.
- Quadrilaterals are two-dimensional.

Skills: *Students will be able to do...*

- Analyze, compare, and classify 2-dimensional shapes by their properties. (3.G.1)
- Draw shapes with pre-specified attributes. (3.G.1)
- Investigate, describe, and reason about decomposing and composing quadrilaterals to make other quadrilaterals. (3.G.1)
- Rotate arrays physically and mentally to view them as compositions of smaller

	<p>arrays. (3.G.1)</p> <ul style="list-style-type: none"> • Understand that shapes in different categories may share attributes and belong to a larger category. (3.G.1) • Recognize and draw examples of more complex quadrilaterals. (3.G.1)
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WIDA Standard:

English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.

English language learners will benefit from:

- Labeling shapes on anchor charts and providing manipulatives in those shapes for identification/matching purposes.
- Identifying real world objects that represent various quadrilaterals.
- Relating the terms ‘quad’ and ‘lateral’ to students’ native languages.

Academic Vocabulary:

Critical Terms:

Quadrilateral
Rhombus
Rectangle
Square
Attribute
Geometric
2-dimensional
Plane

Supplemental Terms:

Angle
Degree
Compare
Flat
Solid
3-dimensional

Assessment

Pre-Assessments	Formative Assessments	Summative Assessments	Self-Assessments

Sample Lesson Sequence

