5

Objective

Identify and classify quadrilaterals.

Common Core State Standards

■ **5.G.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.*

■ **5.G.4** Classify two-dimensional figures in a hierarchy based on properties.

Geometry

Identify and Classify Quadrilaterals

In this lesson, students investigate the properties of quadrilaterals by making models. They learn that some quadrilaterals can be classified in more than one way. Knowing the properties of quadrilaterals prepares students to find area and volume.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

■ **Ask:** *Why can neither student make a trapezoid?*

■ **Ask:** *What type of AngLegs® piece would you need to make a trapezoid? Which quadrilaterals have all right angles?*

Solve It

Reread the problem with students. Have them sketch each of the quadrilaterals and justify why they can or cannot make the quadrilaterals given each set of AngLegs. Have students compare their sketches.

More Ideas

For other ways to teach about identifying and classifying quadrilaterals—

■ Have students use Pattern Blocks to identify and classify as many quadrilaterals as possible. Challenge them to combine shapes to build any type of quadrilateral that is missing from the Pattern Blocks set.

■ Have students work in pairs. The first student describes at least three characteristics of a quadrilateral and the other student makes the quadrilateral on a Geoboard. The two students classify the quadrilateral in as many ways and as specifically as possible.

Formative Assessment

Have students try the following problem.

Which best describes the quadrilateral?

A. parallelogram

B. rectangle

C. rhombus

D. square
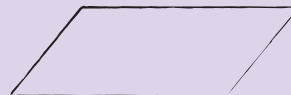
Try It! 25 minutes | Pairs

Here is a problem about identifying and classifying quadrilaterals.

Owen and Lili are using AngLegs to model shapes for an art project. Owen has 2 purple and 2 orange AngLegs. Lili has 4 green AngLegs. How many quadrilaterals can each student make?

Introduce the problem. Then have students do the activity to solve the problem. Distribute AngLegs, charts, and pencils to students. **Say:** *Figures with four sides and four angles are* quadrilaterals.

Materials
- AngLegs® (2 purple, 2 orange, and 4 green per pair)
- Quadrilaterals Chart (BLM 4; 2 per pair)
- paper (2 sheets per pair)
- pencils (2 per pair)

1. Tell students to refer to the chart and note the characteristics of a trapezoid. Then have them determine whether they can build a trapezoid. Tell students to mark the appropriate column—yes or no—at the bottom of the sheet.

2. Instruct students to repeat this process for each of the shapes listed in the chart. Have students tally the yes and no responses.

3. Have students note the similarities that exist among some of the shapes. Discuss, for example, that a square is a special rectangle, and that a rhombus is a special kite.

⚠ Look Out!

Some students may think that since any rhombus, rectangle, or square is a parallelogram that any parallelogram also must be a rhombus, a rectangle, and a square. Guide students to see that by definition a square, rectangle, and rhombus have special characteristics.

Use AngLegs to model each quadrilateral. Identify its characteristics. Name the quadrilateral.

(Check students' work.)

1.

purple
purple
purple
purple
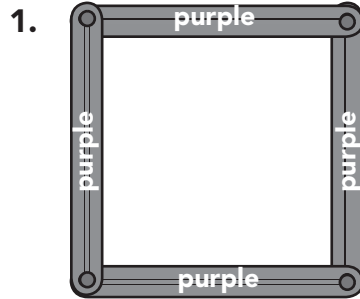
4 congruent sides, 4 right angles, 2 sets of parallel sides; square

2.

green
orange
orange
blue

one set of parallel lines; trapezoid

Using AngLegs, model each quadrilateral named. Sketch the model.
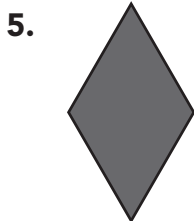
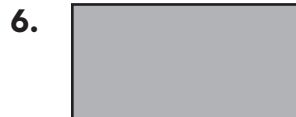**3.** rectangle

Check students' sketches.

4. parallelogram

Check students' sketches.

Identify each quadrilateral by name. Name the characteristics of the figure.

5.

rhombus; 2 sets of parallel sides, 4 congruent sides

6.

rectangle; 2 sets of parallel sides, 4 right angles, 2 sets congruent sides

7.

square; 2 sets of parallel sides, 4 right angles, 4 congruent sides

© ETA hand2mind™

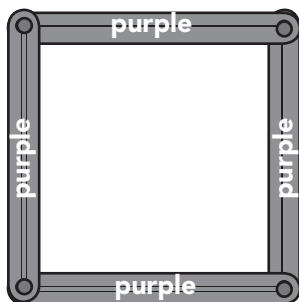Download student pages at hand2mind.com/hosstudent.

Challenge!   What do all quadrilaterals have in common? What do all parallelograms have in common? Name all the specific types of parallelograms and draw a picture of each.

Challenge: (Sample) All quadrilaterals have four sides; All parallelograms have two sets of parallel lines; square, rectangle, rhombus

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name _____

Use AngLegs to model each quadrilateral. Identify its characteristics. Name the quadrilateral.

1.

purple

purple

purple

purple

purple

_____

_____

_____

2.

green

orange

orange

blue

_____

_____

_____

Using AngLegs, model each quadrilateral named. Sketch the model.

3. rectangle

4. parallelogram

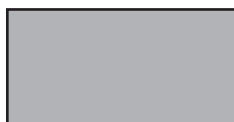**Identify each quadrilateral by name. Name the characteristics of the figure.**

5.

_____

_____

6.

_____

_____

7.

_____

_____

Name _____

Challenge!   What do all quadrilaterals have in common? What do all parallelograms have in common? Name all the specific types of parallelograms and draw a picture of each.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Properties of Quadrilaterals

Name	Number of Pairs of Parallel Sides	Number of Congruent Sides	Number of Right Angles
Trapezoid	1	0, 2, or 3	0 or 2
Parallelogram	2	2 or 4	0 or 4
Rhombus	2	4	0 or 4
Square	2	4	4
Rectangle	2	2 or 4	4
Kite	0 or 2	2 or 4	0, 1, 2, or 4

Can you make the shape?

Shape	Owen		Lili	
	Yes	No	Yes	No
Trapezoid				
Parallelogram				
Rhombus				
Square				
Rectangle				
Kite				