

Objective

Categorize shapes.

Common Core State Standards

- **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.

Geometry

Categorizing Shapes

The reasoning skills that students have developed at this age allow them to explore and solve more complex geometric problems. They become more precise as they describe and classify shapes. As they compare shapes, they explain and justify their reasoning. In this lesson, students use Pattern Blocks to model and create new shapes with various attributes.

Try It!

Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** *Can Sasha have a triangle as her new shape? Why or why not?* Guide discussion around quadrilaterals having 4 sides and triangles having 3 sides.
- **Ask:** *Can Sasha make a pentagon as her new shape? Why or why not?* Again, guide discussion that pentagons have 5 sides, not 4 sides.
- **Ask:** *Could Sasha create a shape that has 4 sides that are all unequal lengths? Why or why not?* Guide students to conclude that a quadrilateral just needs 4 sides, no matter their lengths.

Solve It

Reread the problem with students. Have them draw their new shape to share with the class. Then, have them write a few sentences explaining why their shape is a quadrilateral and how it is different from the three quadrilaterals that Sasha already made.

More Ideas

For other ways to teach about categorizing shapes—

- Have pairs use Pattern Blocks and a spinner numbered 3, 4, 5, 6, and 8. Have one student spin the spinner. Then have the students create several shapes with that number of sides. Have students describe and compare their shapes and categorize them if possible.
- Have pairs take a handful of Pattern Blocks. Ask students to sort the shapes they chose into groups that share the same characteristics. Have students explain their groupings, focusing on number of sides, number of corners, comparisons between angles, etc.

Formative Assessment

Have students try the following problem.

Which shape is not a quadrilateral?

- A. square B. rectangle C. triangle D. rhombus

Try It!

20 minutes | Pairs

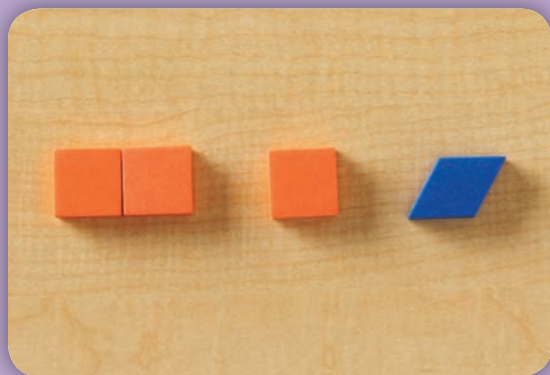
Here is a problem about categorizing shapes.

Sasha has been making quadrilaterals and she wants to make a new one. So far, she has made a rectangle, square, and rhombus. Help Sasha find a quadrilateral she has not yet made. Compare the properties of the new quadrilateral with the properties of the ones she has already made.

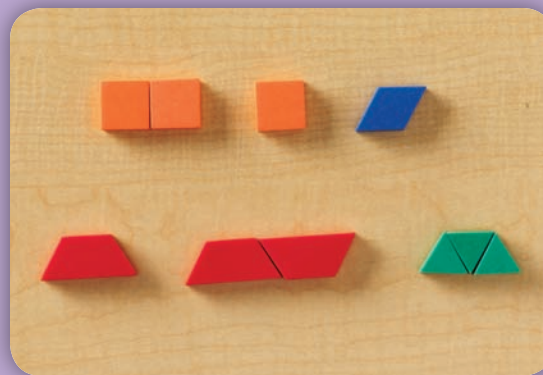
Introduce the problem. Then have students do the activity to solve the problem. Distribute Pattern Blocks to students.

Materials

- Pattern Blocks (10 triangles and 7 each of the other shapes per pair)



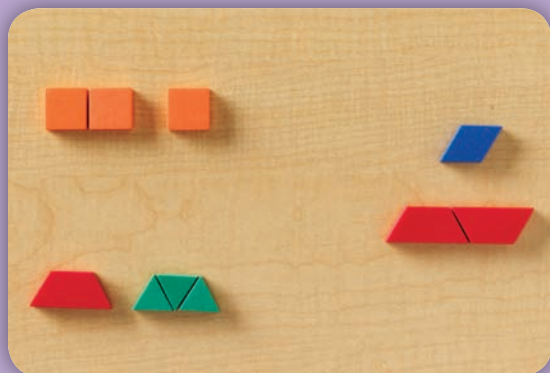
1. Say: Find or make each of the shapes Sasha has already made. Have students find or make a rectangle, square, and rhombus using Pattern Blocks. **Ask:** What property do all these shapes have that make them a quadrilateral? Elicit that they all have 4 sides.



2. Ask: What other properties do the shapes have? Guide discussion to squares having square corners (right angles) and 4 sides the same length, rectangles having square corners and opposite sides the same length, and rhombuses having 4 equal sides, but not necessarily square corners. **Say:** Sasha wants to make a new quadrilateral. Find or make some shapes that could be Sasha's.

Look Out!

Watch for students who are counting all the sides of the smaller blocks, and not the "big picture" sides once a new shape is created. Have students trace around their new shape to see the real sides of the new shape.

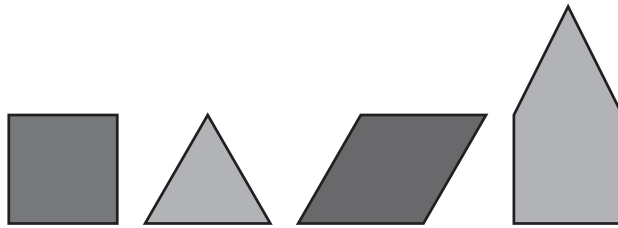


3. Say: Look at all your shapes. Compare their properties. Have students look for common attributes among their shapes (beyond having 4 sides) and group the shapes according to these attributes. Discuss the attributes with students.



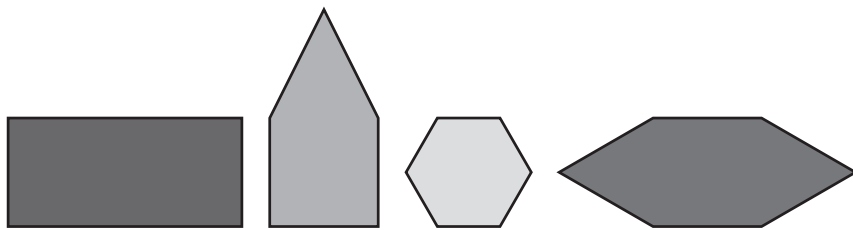
Use Pattern Blocks to model the shapes. (Check students' work.)

1. Circle 2 quadrilaterals.



square and rhombus circled

2. Circle 2 hexagons.

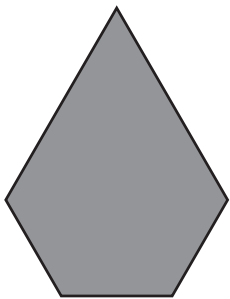


last two shapes circled

Model the shape. Draw or trace a shape that has at least one same property.

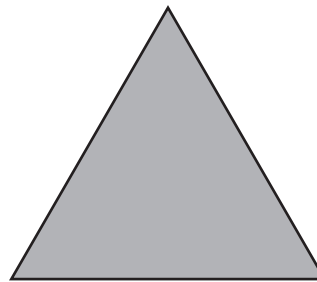
(Check students' models.)

3.



any shape that has 5 sides

4.



this can be any kind of triangle

Use Pattern Blocks to model and trace the shapes described.

5. 4 different quadrilaterals

Possible answers: square, rectangle, rhombus, trapezoid, parallelogram

Answer Key

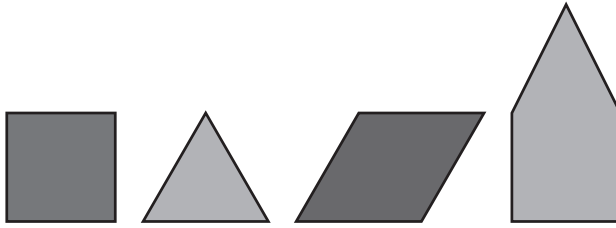
Challenge! Jessica says that all rhombuses are quadrilaterals. Mike says all quadrilaterals are rhombuses. Who is right? Explain your answer using words and drawings.

Challenges: Jessica is right. All rhombuses are quadrilaterals with 4 sides and opposite sides parallel. There are more kinds of quadrilaterals than rhombuses, so all quadrilaterals cannot be rhombuses. Students may make drawings of squares or rectangles or trapezoids to show other quadrilaterals.

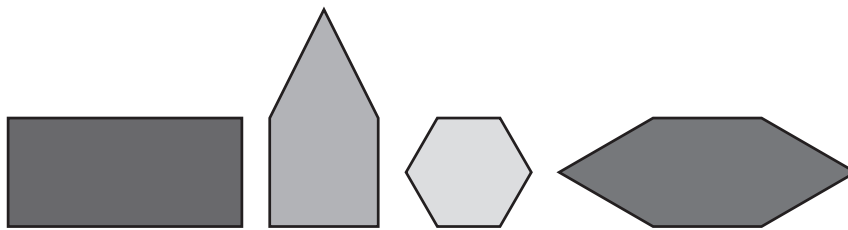
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Use Pattern Blocks to model the shapes.

1. Circle 2 quadrilaterals.

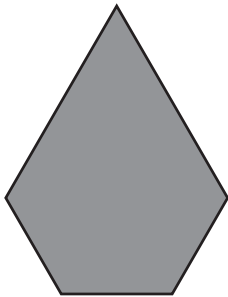


2. Circle 2 hexagons.

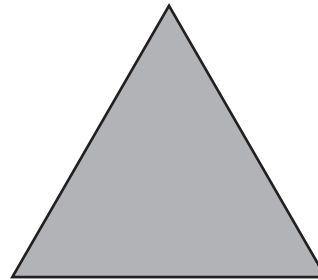


Model the shape. Draw or trace a shape that has at least one same property.

3.



4.



Use Pattern Blocks to model and trace the shapes described.

5. 4 different quadrilaterals

Name _____

Challenge! Jessica says that all rhombuses are quadrilaterals. Mike says all quadrilaterals are rhombuses. Who is right? Explain your answer using words and drawings.

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