LESSON 2

Objective

Partition shapes into equal areas.

Common Core State Standards

- **3.G.2** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Geometry

Partitioning Shapes

In this lesson, students build upon their understanding of fractions and area. Using concrete models, students are able to visualize how smaller shapes fill the area of larger shapes. They count to figure out how many equal pieces there are in each whole and determine the fraction for one equal piece in relation to the whole. Students use Pattern Blocks to partition shapes into smaller shapes and discover the fractional pieces.

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

Talk About It

Discuss the Try It! activity.

- **Say:** *We can say that one triangle represents $\frac{1}{3}$ of the area of the trapezoid.*
- **Ask:** *What fraction of the area is represented by two triangle pieces?*
- **Ask:** *What fraction of the area is represented by three triangle pieces?* Elicit that the fraction is $\frac{3}{3}$. Elicit further that three thirds is all the thirds, so $\frac{3}{3}$ refers to the whole area. Tell students that $\frac{3}{3}$ means the same thing as 1.

Solve It

Reread the problem with students. Have them write the denominator of the fraction (3 parts) and then the numerator, showing how many parts each triangle represents.

More Ideas

For other ways to teach about partitioning shapes into equal areas—

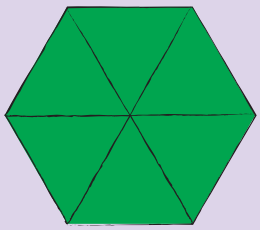
- Have students use Pattern Blocks to explore questions such as how many triangles make up a hexagon, how many rhombuses make up a hexagon, and so on. Have them trace the partitioned shape, and write a fraction representing one piece of the partitioned shape.
- Have students use Color Tiles to create partitioned rectangles and squares. Have them create partitions of halves, thirds, fourths, sixths, and eighths. Have them write the total number of partitions and the fraction that each partition represents.

Formative Assessment

Have students try the following problem.

What fraction of the hexagon is one green triangle?

A. $\frac{1}{3}$ **B.** $\frac{1}{4}$ **C.** $\frac{1}{5}$ **D.** $\frac{1}{6}$



Try It! 25 minutes | Pairs

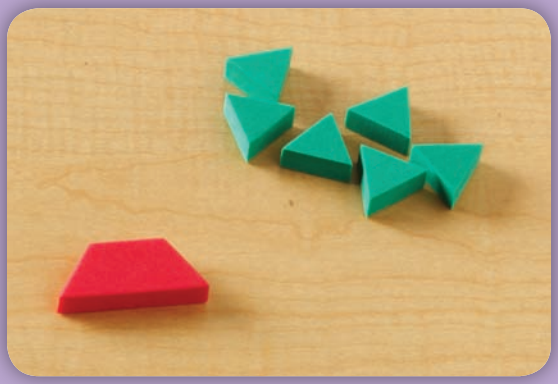
Here is a problem about partitioning shapes into equal areas.

Kyle is working with Pattern Blocks. He has divided a trapezoid block into equal triangles. How many triangles did he use? What fraction of the trapezoid does one triangle represent?

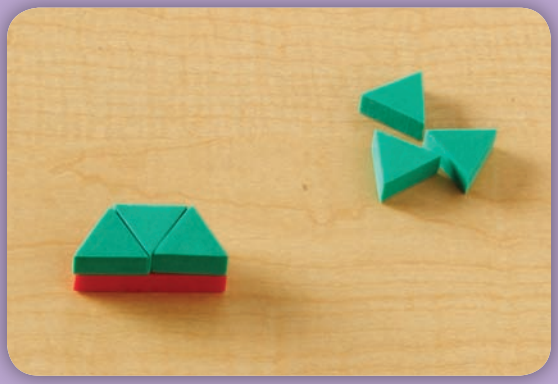
Introduce the problem. Then have students do the activity to solve the problem. Distribute Pattern Blocks, paper, and pencils to students.

Materials

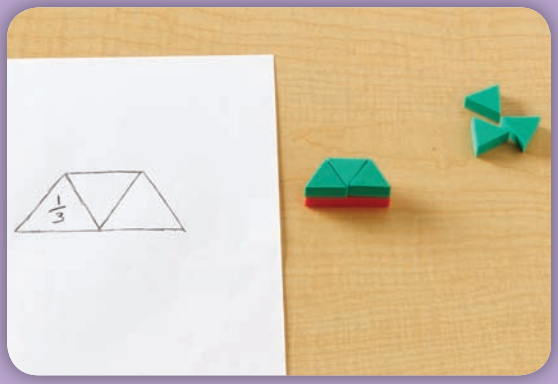
- Pattern Blocks (10 triangles and 7 each of the other shapes per pair)
- paper (1 sheet per pair)
- pencils (1 per pair)



1. Say: *Find the red trapezoid in your set of blocks. Find some green triangles. Let's see if we can put together some triangles to make a trapezoid.*



2. Say: *We are making the trapezoid with smaller equal pieces. So each equal piece will be a fraction of the whole shape.* **Ask:** *How many triangles are needed to make the trapezoid?*



3. Ask: *What fraction of the trapezoid does one triangle represent?* **Say:** *The total number of smaller parts is the denominator of the fraction.* Write $\frac{}{3}$ on the board. Elicit that since you asked what fraction of the whole one triangle represents, the numerator is 1. Complete the fraction on the board, $\frac{1}{3}$. Have students draw the model and label one of the thirds.

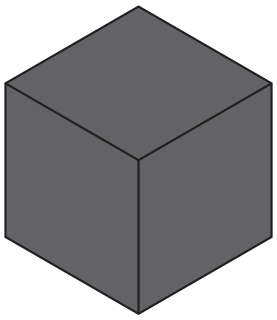
⚠ Look Out!

Watch for students who try to make the whole with different-sized shapes. Explain that the smaller shapes comprising the whole must all be the same size.

Answer Key

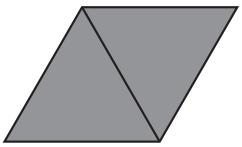
Use Pattern Blocks of equal size to divide the shape. Determine the number of equal pieces. Write the fraction for one piece. (Check students' work.)

1. yellow hexagon, divided using blue rhombuses



$\frac{1}{3}$

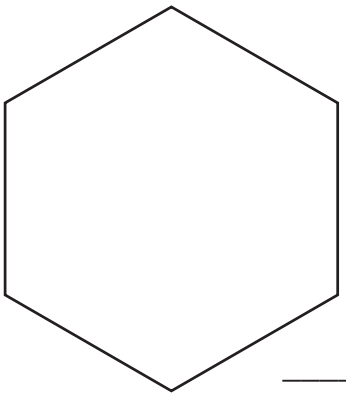
2. blue rhombus, divided using green triangles



$\frac{1}{2}$

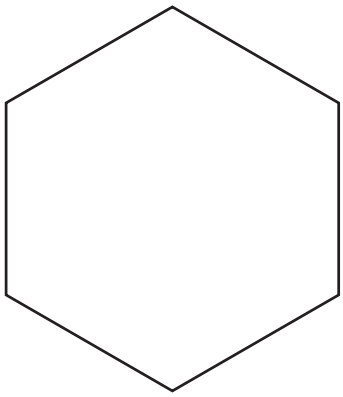
Use Pattern Blocks of equal size to divide the shape. Draw the model. Write the fraction for one piece. (Check students' models.)

3. hexagon, divided using red trapezoids



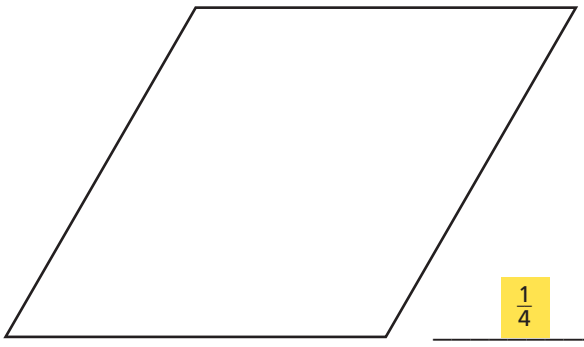
$\frac{1}{2}$

4. hexagon, divided using green triangles



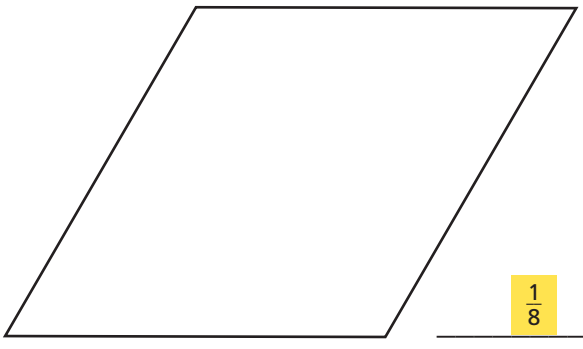
$\frac{1}{6}$

5. parallelogram, divided using blue rhombuses



$\frac{1}{4}$

6. parallelogram, divided using green triangles



$\frac{1}{8}$

Answer Key

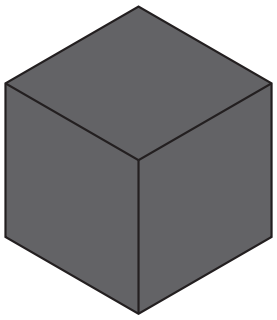
Challenge! Explain why the smaller pieces you used in the previous problems must be of equal size to describe fractions of larger shapes.

Challenge: (Sample) Fractions are equal parts of a whole. To describe fractions of the larger shape, the smaller shapes must be equal.

Name _____

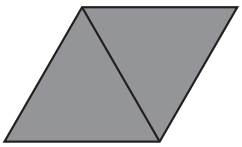
Use Pattern Blocks of equal size to divide the shape. Determine the number of equal pieces. Write the fraction for one piece.

1. yellow hexagon, divided using blue rhombuses



_____

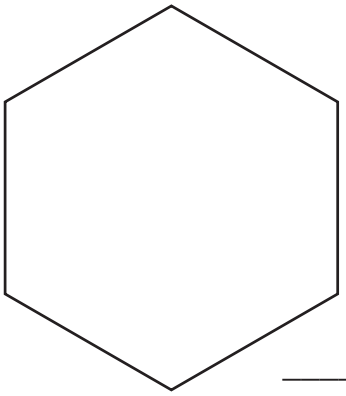
2. blue rhombus, divided using green triangles



_____

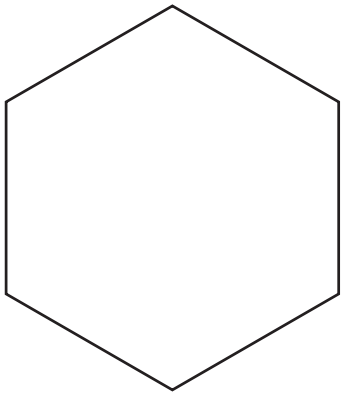
Use Pattern Blocks of equal size to divide the shape. Draw the model. Write the fraction for one piece.

3. hexagon, divided using red trapezoids



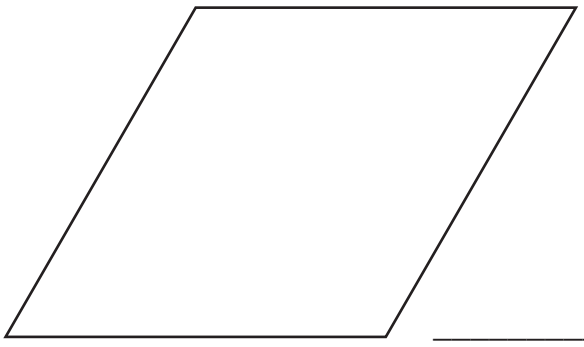
_____

4. hexagon, divided using green triangles



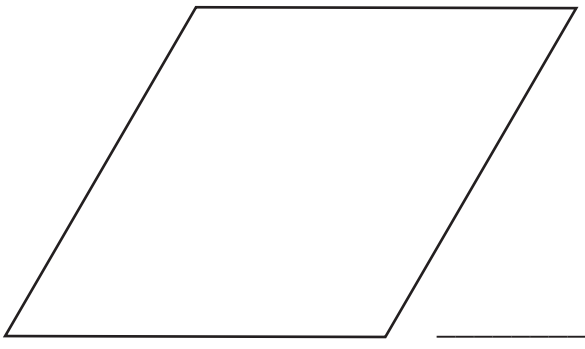
_____

5. parallelogram, divided using blue rhombuses



_____

6. parallelogram, divided using green triangles



_____

Name _____

Challenge! Explain why the smaller pieces you used in the previous problems must be of equal size to describe fractions of larger shapes.