



# How Many Groups? (Part 2)

Let's use blocks and diagrams to understand more about division with fractions.

## 5.1 Reasoning with Fraction Strips

Write a fraction or whole number as an answer for each question. If you get stuck, use the fraction strips. Be prepared to share your reasoning.

1. How many  $\frac{1}{2}$ s are in 2?

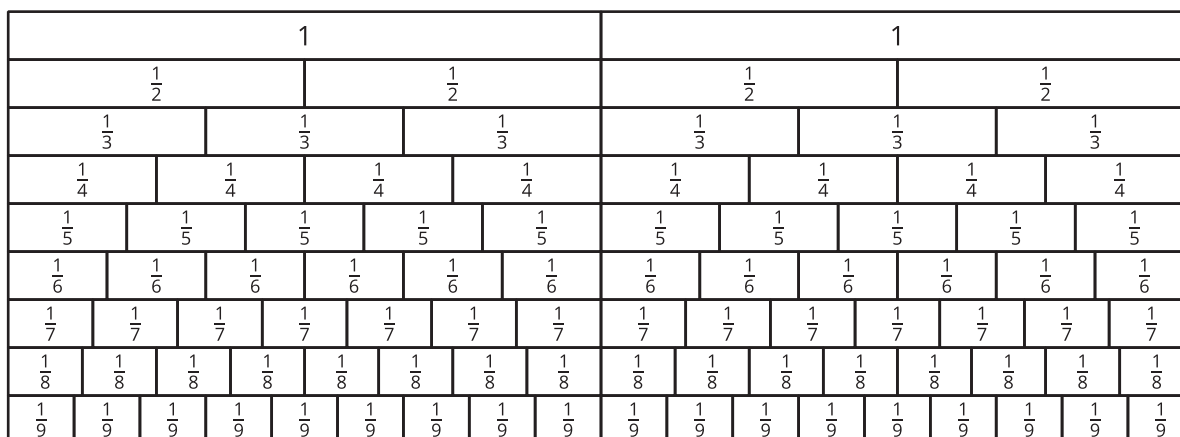
2. How many  $\frac{1}{5}$ s are in 3?

3. How many  $\frac{1}{8}$ s are in  $1\frac{1}{4}$ ?

4.  $1 \div \frac{2}{6} = ?$

5.  $2 \div \frac{2}{9} = ?$

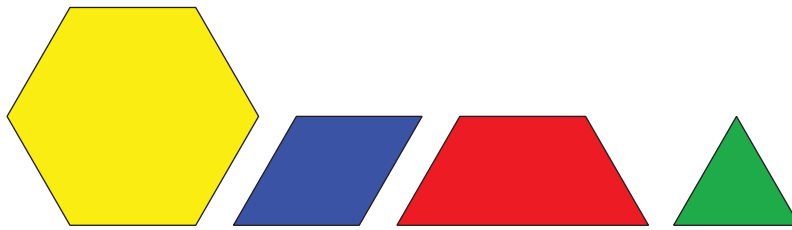
6.  $4 \div \frac{2}{10} = ?$



## 5.2

## More Reasoning with Pattern Blocks

Your teacher will give you pattern blocks. Use them to answer the questions.



1. If the trapezoid represents 1 whole, what does each of the other shapes represent? Be prepared to show or explain your reasoning.
  - a. 1 triangle
  - b. 1 rhombus
  - c. 1 hexagon
2. Use pattern blocks to represent each multiplication equation. Use the trapezoid to represent 1 whole. Sketch or trace the blocks to record your representation.
  - a.  $3 \cdot \frac{1}{3} = 1$
  - b.  $3 \cdot \frac{2}{3} = 2$

3. Diego and Jada were asked “How many rhombuses are in a trapezoid?”

- Diego says, “ $1\frac{1}{3}$ . If I put 1 rhombus on a trapezoid, the leftover shape is a triangle, which is  $\frac{1}{3}$  of the trapezoid.”
- Jada says, “I think it’s  $1\frac{1}{2}$ . Since we want to find out ‘How many rhombuses . . . ?’ we should compare the leftover triangle to a rhombus. A triangle is  $\frac{1}{2}$  of a rhombus.”

Do you agree with either of them? Explain or show your reasoning.

4. Select **all** the equations that can be used to answer the question: “How many rhombuses are in a trapezoid?”

◦  $\frac{2}{3} \div ? = 1$

◦  $1 \div \frac{2}{3} = ?$

◦  $? \div \frac{2}{3} = 1$

◦  $? \cdot \frac{2}{3} = 1$

◦  $1 \cdot \frac{2}{3} = ?$



### 5.3

## Drawing Diagrams to Show Equal-size Groups

For each situation:

- Draw a diagram to represent the situation.
  - Answer the question.
  - Write a multiplication equation or a division equation for the relationship between the quantities.
1. The water hose fills a bucket at  $\frac{1}{3}$  gallon per minute. How many minutes does it take to fill a 2-gallon bucket?
  2. The distance around a park is  $\frac{3}{2}$  miles. Noah rode his bicycle around the park for a total of 3 miles. How many times around the park did he ride?
  3. You need  $\frac{3}{4}$  yard of ribbon for one gift box. You have 3 yards of ribbon. How many gift boxes do you have ribbon for?



 **Are you ready for more?**

There are 48 level teaspoons in 1 cup. Estimate:

1. How many rounded teaspoons are in 1 cup?
2. How many scant teaspoons are in 1 cup?
3. How many extra-heaped teaspoons are in 1 cup?



## Lesson 5 Summary

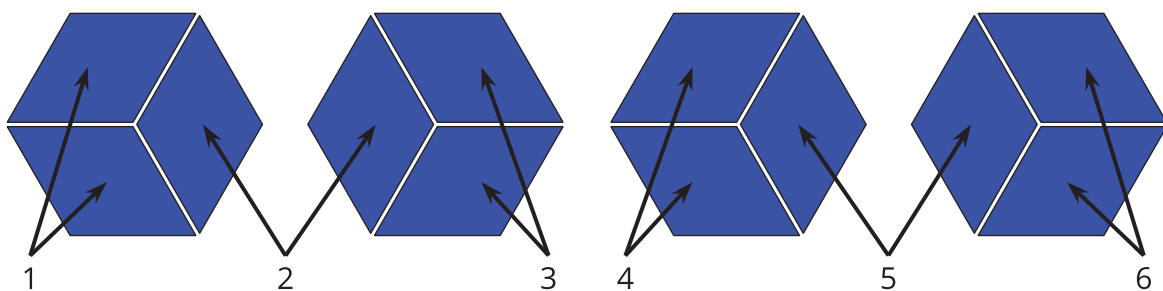
Suppose one batch of cookies requires  $\frac{2}{3}$  cup of flour. How many batches can be made with 4 cups of flour?

We can think of the question as being: “How many  $\frac{2}{3}$ s are in 4?”  
and represent it using multiplication and division equations.

$$? \cdot \frac{2}{3} = 4$$

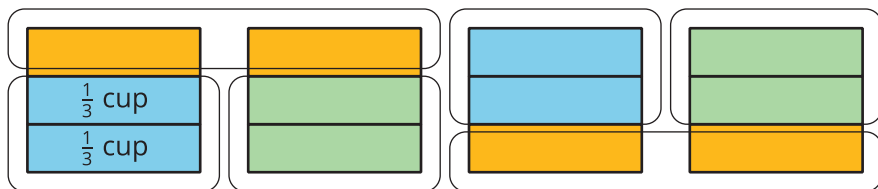
$$4 \div \frac{2}{3} = ?$$

Let’s use pattern blocks to visualize the situation and say that a hexagon is 1 whole.



Since 3 rhombuses make a hexagon, 1 rhombus represents  $\frac{1}{3}$ , and 2 rhombuses represent  $\frac{2}{3}$ . We can see that 6 pairs of rhombuses make 4 hexagons, so there are 6 groups of  $\frac{2}{3}$  in 4.

Other kinds of diagrams can also help us reason about equal-size groups involving fractions. This example shows how we might reason about the same question asked earlier: “How many  $\frac{2}{3}$ -cup are in 4 cups?”



We can see each “cup” partitioned into thirds, and that there are 6 groups of  $\frac{2}{3}$ -cup in 4 cups. In both diagrams, we see that the unknown value (or the “?” in the equations) is 6. So we can now write:

$$6 \cdot \frac{2}{3} = 4$$

$$4 \div \frac{2}{3} = 6$$