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# Unit 4, Lesson 5: 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 strategy.

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

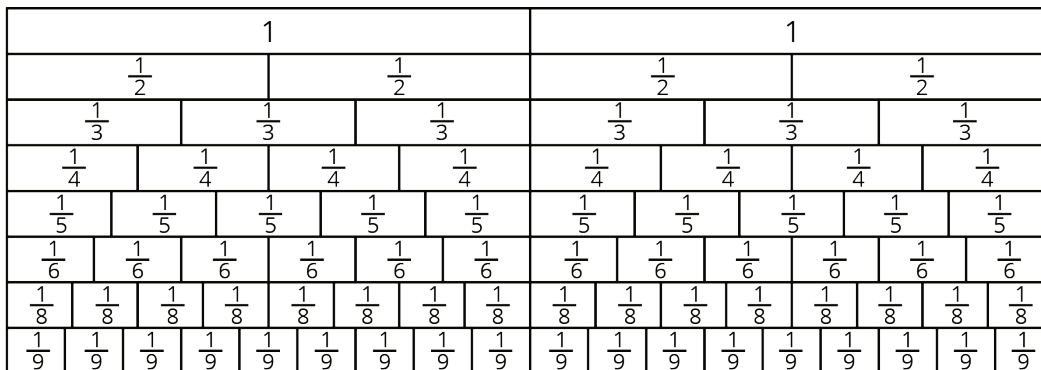
4.  $1 \div \frac{2}{6} = ?$

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

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

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

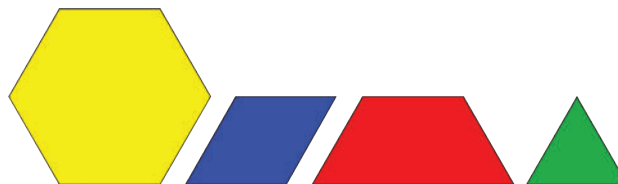
6.  $4 \div \frac{2}{10} = ?$



## 5.2: More Reasoning with Pattern Blocks

m.openup.org/1/6-4-5-2

Your teacher will give you pattern blocks as shown here. Use them to answer the following questions.



1. If the trapezoid represents 1 whole, what do each of the following shapes represent? Be prepared to show or explain your reasoning.

a. 1 triangle

b. 1 rhombus

c. 1 hexagon

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2. Use pattern blocks to represent each multiplication equation. Use the trapezoid to represent 1 whole.

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.”

Is the answer  $1\frac{1}{3}$  or  $1\frac{1}{2}$ ? Show or explain your reasoning.

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

a.  $\frac{2}{3} \div ? = 1$

c.  $1 \div \frac{2}{3} = ?$

e.  $? \div \frac{2}{3} = 1$

b.  $? \cdot \frac{2}{3} = 1$

d.  $1 \cdot \frac{2}{3} = ?$

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### 5.3: Drawing Diagrams to Show Equal-sized Groups

For each situation, draw a diagram for the relationship of the quantities to help you answer the question. Then write a multiplication equation or a division equation for the relationship. Be prepared to share your reasoning.

1. 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?
  
  
  
  
  
  
  
  
  
  
2. 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?
  
  
  
  
  
  
  
  
  
  
3. 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?

#### Are you ready for more?

How many heaping teaspoons are in a heaping tablespoon? How would the answer depend on the shape of the spoons?

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### Lesson 5 Summary

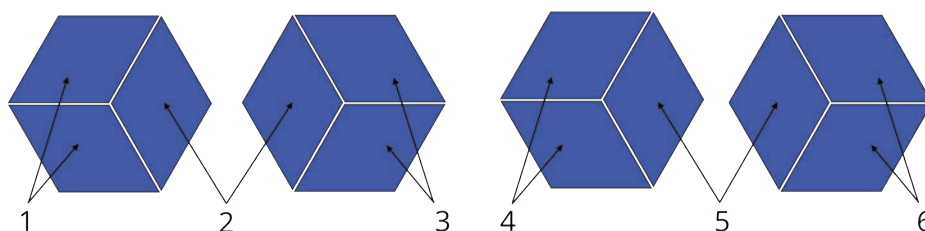
Suppose one batch of cookies requires  $\frac{2}{3}$  cup flour. How many batches can be made with 4 cups of flour?

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

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

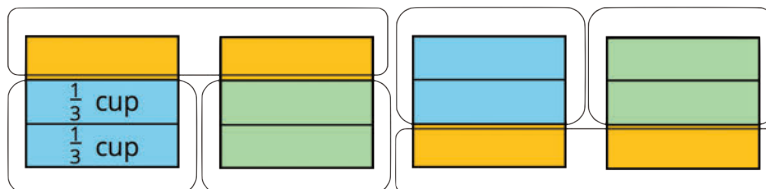
$$4 \div \frac{2}{3} = ?$$

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-sized groups involving fractions. This example shows how we might reason about the same question from above: “How many  $\frac{2}{3}$ -cups 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:

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

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

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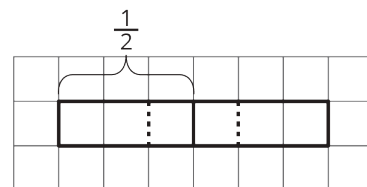
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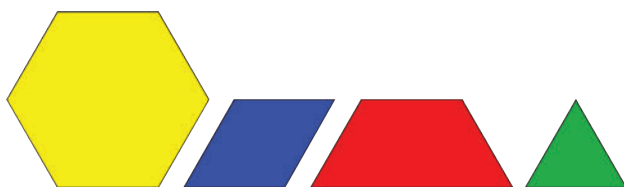
## Unit 4, Lesson 5: How Many Groups? (Part 2)

1. Use the tape diagram to represent and find the value of  $\frac{1}{2} \div \frac{1}{3}$ .

Mark up and label the diagram as needed.



2. What is the value of  $\frac{1}{2} \div \frac{1}{3}$ ? Use pattern blocks to represent and find this value. The yellow hexagon represents 1 whole. Explain or show your reasoning.



3. Use a standard inch ruler to answer each question. Then, write a multiplication equation and a division equation that answer the question.

a. How many  $\frac{1}{2}$ s are in 7?

b. How many  $\frac{3}{8}$ s are in 6?

c. How many  $\frac{5}{16}$ s are in  $1\frac{7}{8}$ ?



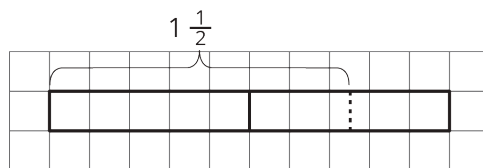
4. Use the tape diagram to represent and answer the question: How many  $\frac{2}{5}$ s are in  $1\frac{1}{2}$ ?

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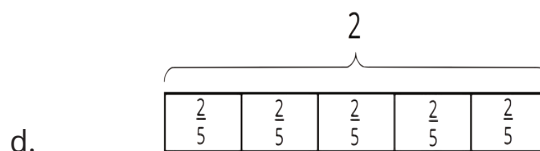
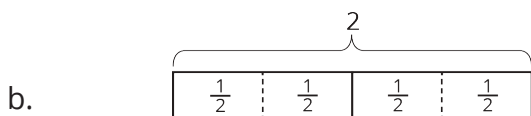
Mark up and label the diagram as needed.



5. Write a multiplication equation and a division equation to represent each question, statement, or diagram.

a. There are 12 fourths in 3.

c. How many  $\frac{2}{3}$ s are in 6?



(from Unit 4, Lesson 4)

6. At a farmer's market, two vendors sell fresh milk. One vendor sells 2 liters for \$3.80, and another vendor sells 1.5 liters for \$2.70. Which is the better deal? Explain your reasoning.

(from Unit 3, Lesson 5)

7. A recipe uses 5 cups of flour for every 2 cups of sugar.

a. How much sugar is used for 1 cup of flour?

b. How much flour is used for 1 cup of sugar?

c. How much flour is used with 7 cups of sugar?

d. How much sugar is used with 6 cups of flour?

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(from Unit 3, Lesson 6)