NAME   DATE   PERIOD

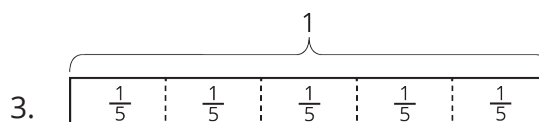# Unit 4, Lesson 4: How Many Groups? (Part 1)

Let's play with blocks and diagrams to think about division with fractions.

4.1: Equal-sized Groups

Write a multiplication equation and a division equation for each statement or diagram.
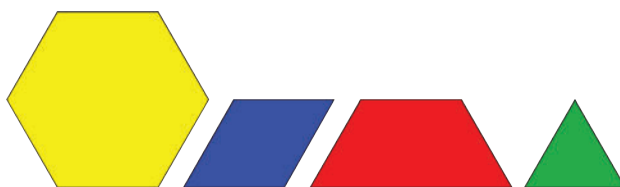
1. Eight $5 bills are worth $40.

2. There are 9 thirds in 3 ones.

3.

$$1$$

| $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ | $\frac{1}{5}$ |

4.2: Reasoning with Pattern Blocks

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

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

1. If a hexagon represents 1 whole, what fraction does each of the following shapes represent? Be prepared to show or explain your reasoning.

   a. 1 triangle   d. 4 triangles   g. 1 hexagon and
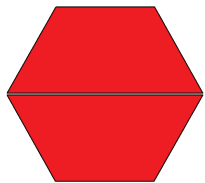   1 trapezoid
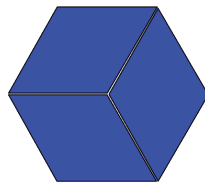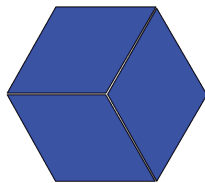
   b. 1 rhombus   e. 3 rhombuses

   c. 1 trapezoid   f. 2 hexagons

2. Here are Elena's diagrams for $2 \cdot \frac{1}{2} = 1$ and $6 \cdot \frac{1}{3} = 2$. Do you think these diagrams represent the equations? Explain or show your reasoning.

$2 \cdot \frac{1}{2} = 1$ $6 \cdot \frac{1}{3} = 2$

3. Use pattern blocks to represent each multiplication equation. Recall that a hexagon represents 1 whole.

   a. $3 \cdot \frac{1}{6} = \frac{1}{2}$

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

4. Answer the following questions. If you get stuck, use pattern blocks.

   a. How many $\frac{1}{2}$s are in 4?

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

   c. How many $\frac{1}{6}$s are in $1\frac{1}{2}$?

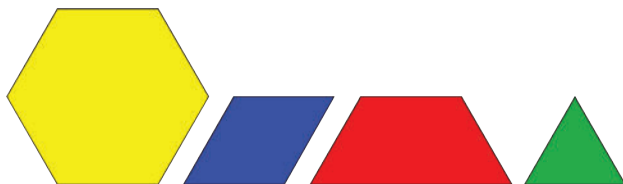NAME   DATE   PERIOD

Lesson 4 Summary

Some problems that involve equal-sized groups also involve fractions. Here is an example: "How many $\frac{1}{6}$ are in 2?" We can express this question with multiplication and division equations.
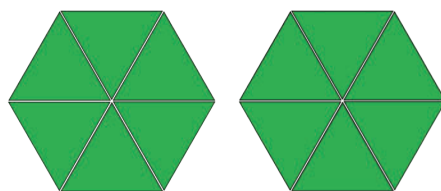
$$? \cdot \frac{1}{6} = 2$$

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

Pattern-block diagrams can help us make sense of such problems. Here is a set of pattern blocks.

If the hexagon represents 1 whole, then a triangle must represent $\frac{1}{6}$, because 6 triangles make 1 hexagon. We can use the triangle to represent the $\frac{1}{6}$ in the problem.

Twelve triangles make 2 hexagons, which means there are 12 groups of $\frac{1}{6}$ in 2.

If we write the 12 in the place of the "?" in the original equations, we have:

$$12 \cdot \frac{1}{6} = 2$$

$$2 \div \frac{1}{6} = 12$$

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Unit 4, Lesson 4: How Many Groups? (Part 1)

1. A shopper buys cat food in bags of 3 lbs. Her cat eats $\frac{3}{4}$ lb each week. How many weeks does one bag last?

   a. Draw a diagram to represent the situation and label your diagram so it can be followed by others. Answer the question.

   b. Write a multiplication or division equation to represent the situation.

   c. Multiply your answer in the first question (the number of weeks) by $\frac{3}{4}$. Did you get 3 as a result? If not, revise your previous work.

2. Use the diagram to answer the question: How many $\frac{1}{3}$s are in $1\frac{2}{3}$? The hexagon represents 1 whole. Explain or show your reasoning.
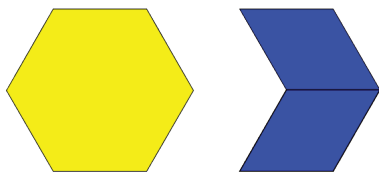
3. Which question can be represented by the equation $? \cdot \frac{1}{8} = 3$?

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

B. What is 3 groups of $\frac{1}{8}$?

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

D. What is $\frac{1}{8}$ of 3?

4. Write two division equations for each multiplication equation.

   a. $15 \cdot \frac{2}{5} = 6$

   b. $6 \cdot \frac{4}{3} = 8$

   c. $16 \cdot \frac{7}{8} = 14$

5. Noah and his friends are going to an amusement park. The total cost of admission for 8 students is $100, and all students share the cost equally. Noah brought $13 for his ticket. Did he bring enough money to get into the park? Explain your reasoning.

   (from Unit 4, Lesson 2)

6. Write a division expression with a quotient that is:

   a. greater than $8 \div 0.001$

   b. less than $8 \div 0.001$

   c. between $8 \div 0.001$ and $8 \div \frac{1}{10}$

(from Unit 4, Lesson 1)

7. Find each unknown number.

    a. 12 is 150% of what number?   d. 5% of what number is 72?

    b. 5 is 50% of what number?   e. 20 is 80% of what number?

    c. 10% of what number is 300?

(from Unit 3, Lesson 14)