Lesson 4: How Many Groups? (Part 1)

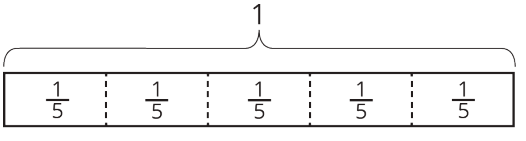
Let's play with blocks and diagrams to think about division with fractions.

4.1: Equal-sized Groups

Write a multiplication equation and a division equation for each sentence or diagram.

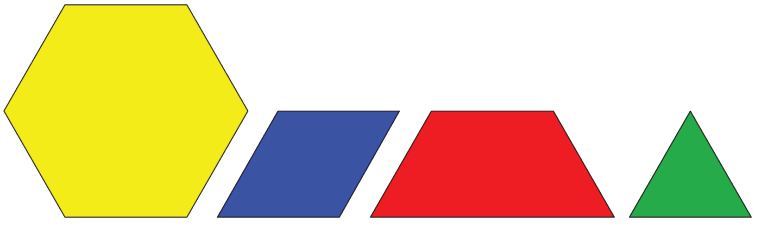
1. Eight $5 bills are worth $40.

2. There are 9 thirds in 3 ones.

3. 

4.2: Reasoning with Pattern Blocks

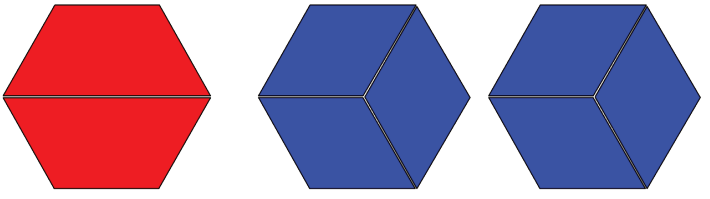
Your teacher will give you pattern blocks as shown here. Use them to answer the questions.



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

   - 1 triangle
   - 4 triangles
   - 1 hexagon and 1 trapezoid
   - 1 rhombus
   - 3 rhombuses
   - 1 trapezoid
   - 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.



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

3. Use pattern blocks to represent each multiplication equation. Remember 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 questions. If you get stuck, consider using pattern blocks.

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

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

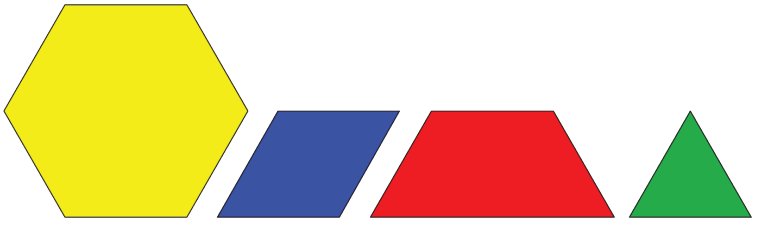
   c. How many $\frac{1}{6}$s are in $1\frac{1}{2}$?

Lesson 4 Summary

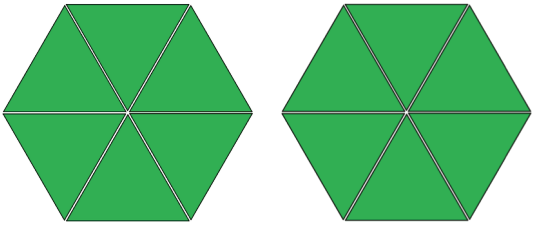
Some problems that involve equal-sized groups also involve fractions. Here is an example: "How many $\frac{1}{6}$ are in 2?" We can express this question with multiplication and division equations.

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

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:

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

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