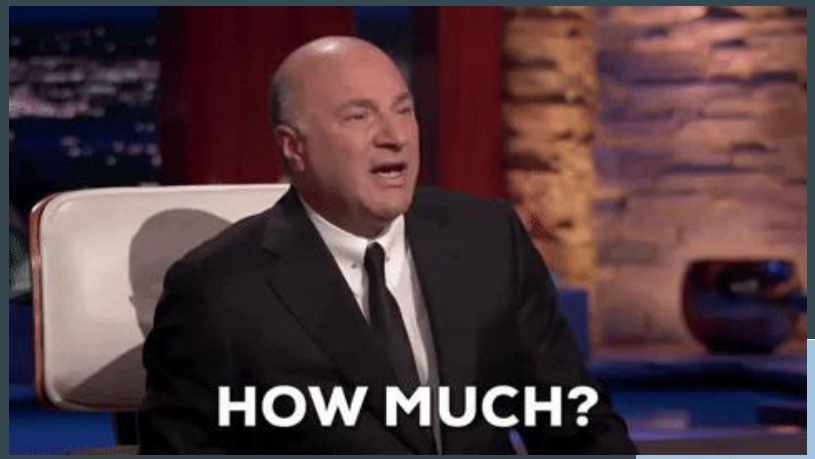
How Much In Each Group

Part 1



Addressing

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because 3/4 of 8/9 is 2/3. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?

Lesson # 8

Let’s look at division problems that help us find the size of one group.

Today's Goals

- ❑ I can tell when a question is asking for the amount in one group.
- ❑ I can use diagrams and multiplication and division equations to represent and answer "how much in each group?" questions.

Students, write your response!

Inventing a Scenario

...

Warm Up 8.1

Inventing a Scenario

1. Think of a situation with a question that can be represented by $12 \div \frac{2}{3} = ?$ Write a description of that situation and the question.
2. Trade descriptions with your partner, and answer your partner's question.

How Much Is One Batch?

Activity 8.2

- MLR2: Collect & Display

To make 5 batches of cookies, 10 cups of flour are required. How many cups of flour does each batch require?

We can write equations and draw a diagram to represent this situation. They help us see that each batch requires 2 cups of flour.

$$5 \cdot ? = 10$$

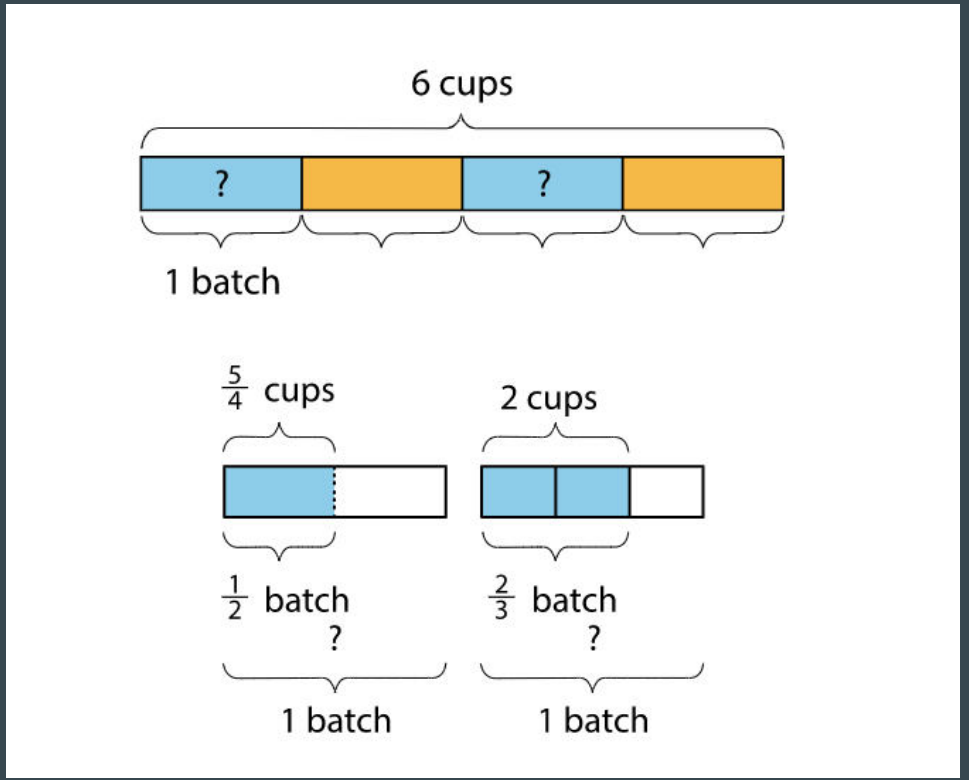
$$10 \div 5 = ?$$

For each question, write a multiplication equation and a division equation, draw a diagram, and answer the question.

1. To make 4 batches of cupcakes, it takes 6 cups of flour. How many cups of flour are needed for 1 batch?
2. To make $\frac{1}{2}$ batch of rolls, it takes $\frac{5}{4}$ cups of flour. How many cups of flour are needed for 1 batch?
3. Two cups of flour make $\frac{2}{3}$ batch of bread. How many cups of flour make 1 batch?

Let's Talk About It

- How are these diagrams like those in previous lessons? How are they different?
- How are these equations and the ones in previous lessons alike and different?
- How are the diagrams for the second and third questions different from the one in the first question?

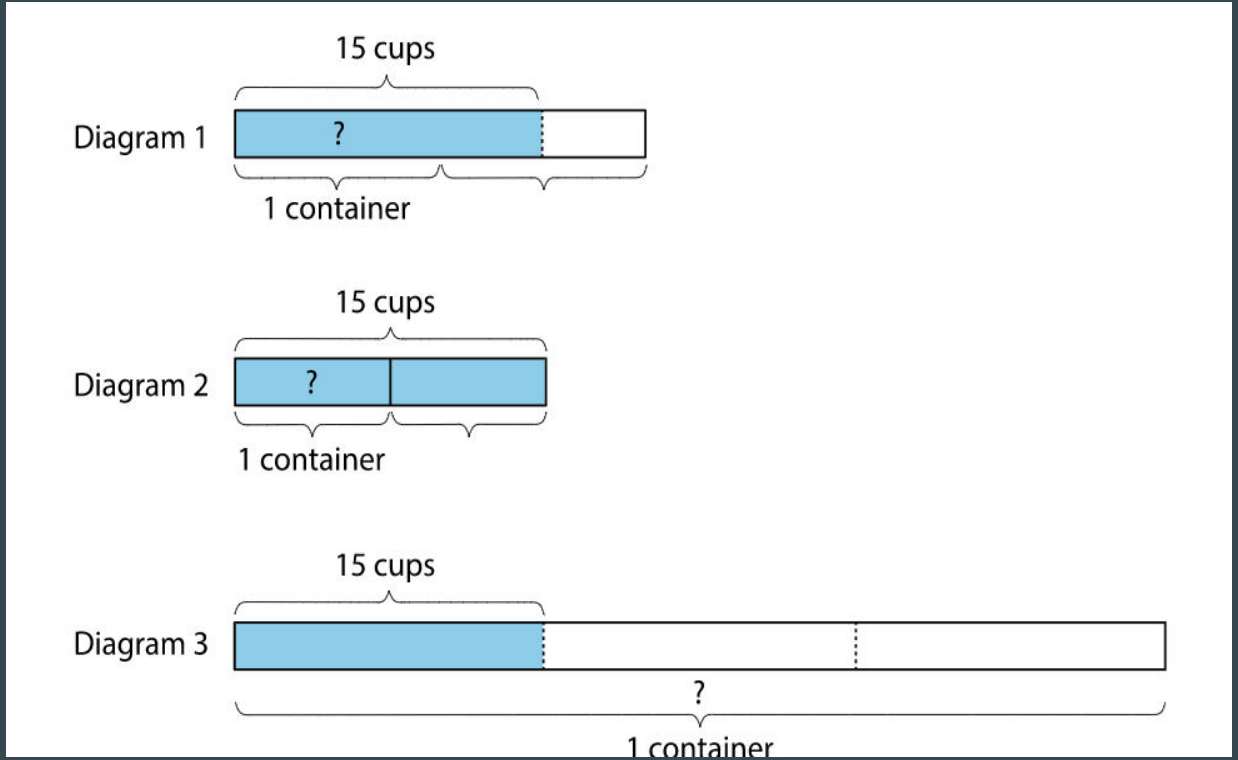


One Container and One Section of Highway

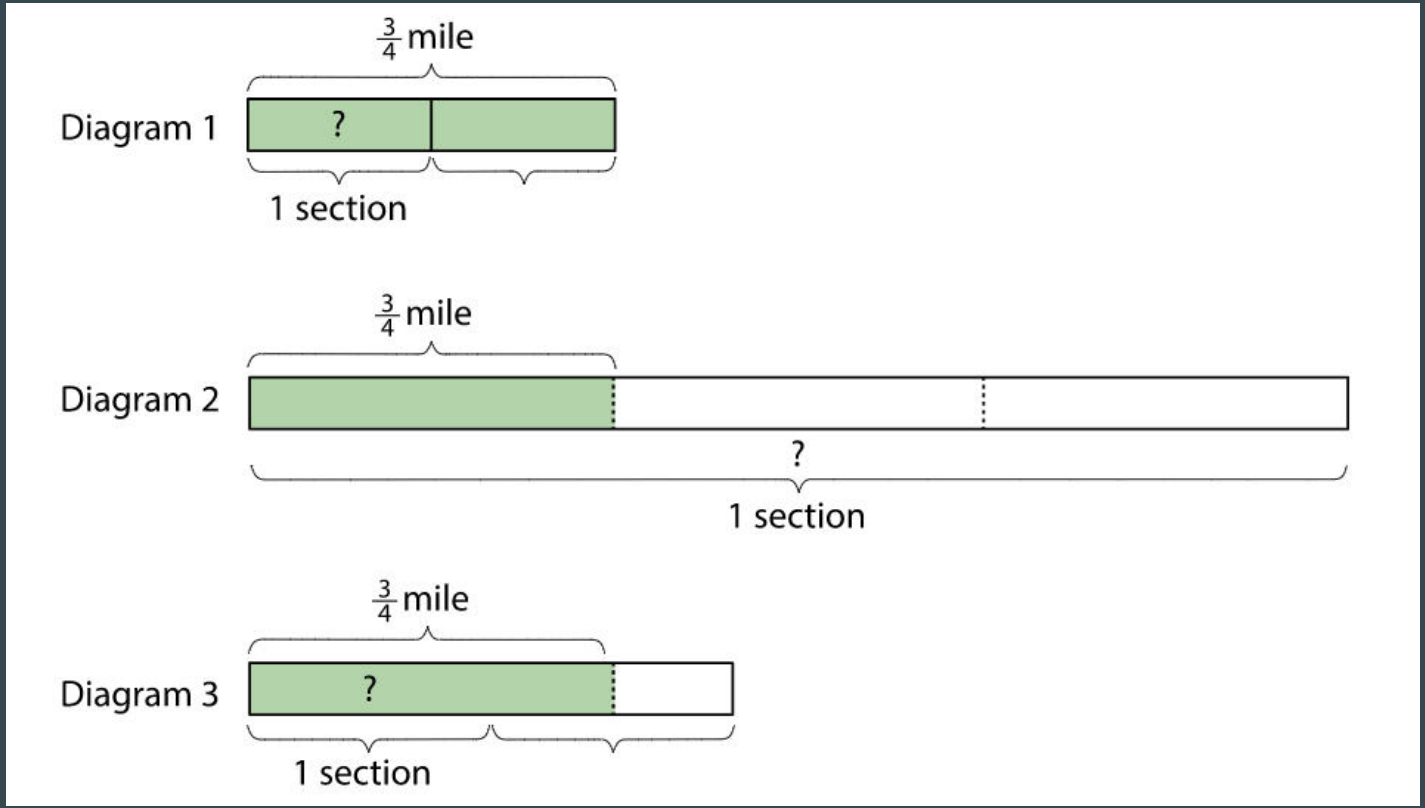
Activity 8.3

- MLR8: Discussion Supports
  - Notice & Wonder

What do you notice? What do you wonder?



What do you notice? What do you wonder?



1. Tyler poured 15 cups of water into 2 equal-sized bottles and filled each bottle. How much water was in each bottle?

   Diagram: Multiplication equation:

   Answer: Division equation:

2. Kiran poured 15 cups of water into equal-sized pitchers and filled $1\frac{1}{2}$ pitchers. How much water was in the full pitcher?

   Diagram: Multiplication equation:

   Answer: Division equation:

3. It takes 15 cups of water to fill $\frac{1}{3}$ pail. How much water is needed to fill 1 pail?

   Diagram: Multiplication equation:

   Answer: Division equation:

Here are three tape diagrams and three descriptions of situations that include questions.

Match a diagram to each situation, then use the diagram to help you answer the question. Next, write multiplication and division equations to represent each situation.

Diagram 1

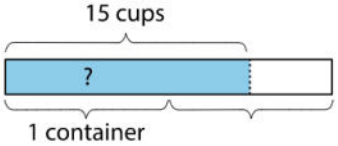


Diagram 2

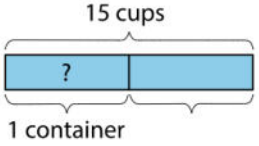
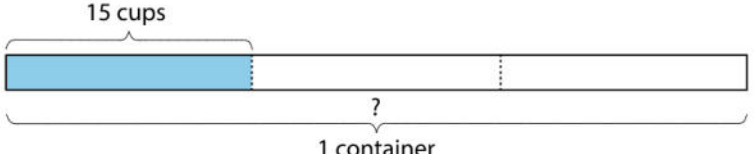


Diagram 3



4. Priya's class has adopted two equal sections of a highway to keep clean. The combined length is $\frac{3}{4}$ of a mile. How long is each section?

Diagram: Multiplication equation:

Answer: Division equation:

5. Lin's class has also adopted some sections of highway to keep clean. If $1\frac{1}{2}$ sections are $\frac{3}{4}$ mile long, how long is each section?

Diagram: Multiplication equation:

Answer: Division equation:

6. A school has adopted a section of highway to keep clean. If $\frac{1}{3}$ of the section is $\frac{3}{4}$ mile long, how long is the section?

Diagram: Multiplication equation:

Answer: Division equation:

Here are three tape diagrams and three descriptions of situations that include questions.

Match a diagram to each situation, then use the diagram to help you answer the question. Next, write multiplication and division equations to represent each situation.

Diagram 1

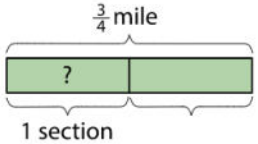


Diagram 2

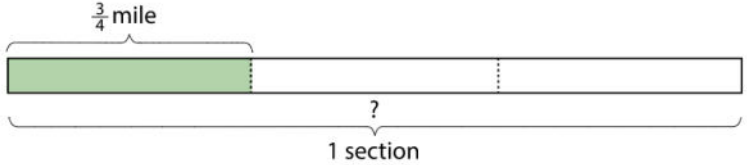
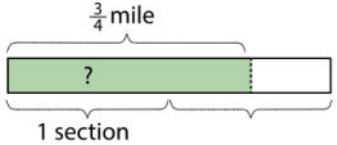


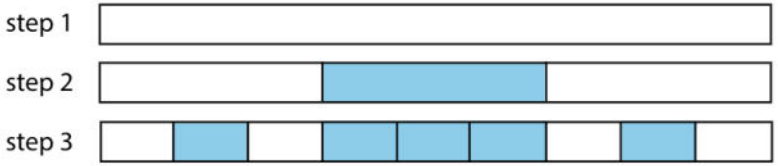
Diagram 3



Are you ready for more?

To make a Cantor ternary set:

- Start with a tape diagram of length 1 unit. This is step 1.
- Color in the middle third of the tape diagram. This is step 2.
- Do the same to each remaining segment that is not colored in. This is step 3.
- Keep repeating this process.



1. How much of the diagram is colored in after step 2? Step 3? Step 10?
2. If you continue this process, how much of the tape diagram will you color?
3. Can you construct a process that will give you a similar kind of object? For example, color the first fifth instead of the middle third of each strip.

Lesson Synthesis

There are two multiplication questions that correspond with 7 ÷ ½= ? We can write:

- ? · ½ =7, which can be interpreted as: “ how many groups of ½ are in 7?”
- ½ · ? =7, which can be interpreted as: “½ of what number is 7?”

Today's Goals

- ❏ I can tell when a question is asking for the amount in one group.
- ❏ I can use diagrams and multiplication and division equations to represent and answer "how much in each group?" questions.

Funding a Camping Trip

Cool Down 8.4

Cool Down

Students in a sixth-grade class are raising money for an end-of-year camping trip. So far, they have raised $240. This is $\frac{2}{5}$ of the cost of the trip. How much does the trip cost?

Write multiplication and division equations and draw a diagram to represent the situation. Then answer the question and show your reasoning.