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Unit 4, Lesson 9: How Much in Each Group? (Part 2)

Let's practice dividing fractions in different situations.

9.1: Number Talk: Greater Than 1 or Less Than 1?

Decide whether each of the following is greater than 1 or less than 1.

1. $\frac{1}{2} \div \frac{1}{4}$

2. $1 \div \frac{3}{4}$

3. $\frac{2}{3} \div \frac{7}{8}$

4. $2\frac{7}{8} \div 2\frac{3}{5}$

9.2: Two Water Containers



1. After looking at these pictures, Lin says, "I see the fraction $\frac{2}{5}$." Jada says, "I see the fraction $\frac{3}{4}$." What quantities are Lin and Jada referring to?

2. How many liters of water fit in the water dispenser?

Write a multiplication equation and a division equation for the question, then find

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the answer. Draw a diagram, if needed. Check your answer using the multiplication equation.

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9.4: Inventing a Situation

1. Think of a situation that involves a question that can be represented by $\frac{1}{3} \div \frac{1}{4} = ?$

Write a description of that situation and the question.

2. Trade descriptions with a member of your group.

- Review each other's description and discuss whether each invented question is an appropriate match for the equation.
- Revise your description or question based on feedback from your partner.

3. Find the answer to your question. Explain or show your reasoning. If you get stuck, draw a diagram.

Lesson 9 Summary

Sometimes we have to think carefully about how to solve a problem that involves multiplication and division. Diagrams and equations can help us.

Let's take this example: $\frac{3}{4}$ of a pound of rice fills $\frac{2}{5}$ of a container.

There are two whole amounts to keep track of: 1 whole pound, and 1 whole container. The equations we write and the diagram we draw depend on what question we are trying to answer. Here are two questions that could be asked:

- How many pounds fill 1 container?
- What fraction of a container does 1 pound fill?

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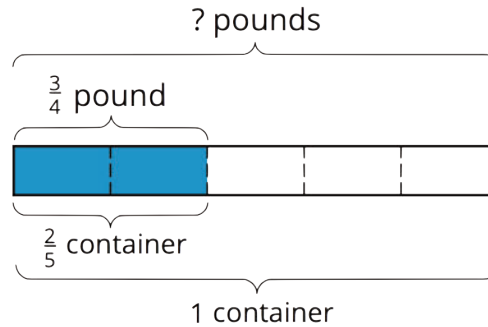
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We can represent and answer the first question (how many pounds fill a whole container) with:

$$\frac{2}{5} \cdot ? = \frac{3}{4}$$

$$\frac{3}{4} \div \frac{2}{5} = ?$$

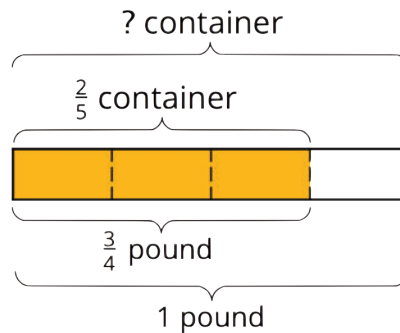


If $\frac{2}{5}$ of a container is filled with $\frac{3}{4}$ pound, then $\frac{1}{5}$ of a container is filled with half of $\frac{3}{4}$, or $\frac{3}{8}$, pound. One whole container then has $5 \cdot \frac{3}{8}$ (or $\frac{15}{8}$) pounds.

We can represent and answer the second question (what fraction of the container 1 pound fills) with:

$$\frac{3}{4} \cdot ? = \frac{2}{5}$$

$$\frac{2}{5} \div \frac{3}{4} = ?$$



If $\frac{3}{4}$ pound fills $\frac{2}{5}$ of a container, then $\frac{1}{4}$ pound fills a third of $\frac{2}{5}$, or $\frac{2}{15}$, of a container. One whole pound then fills $4 \cdot \frac{2}{15}$ (or $\frac{8}{15}$) of a container.

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Unit 4, Lesson 9: How Much in Each Group? (Part 2)

- A group of friends is sharing $2\frac{1}{2}$ pounds of berries.
 - If each friend received $\frac{5}{4}$ of a pound of berries, how many friends are sharing the berries?
 - If 5 friends are sharing the berries, how many pounds of berries does each friend receive?
- $\frac{2}{5}$ kilogram of soil fills $\frac{1}{3}$ of a container. Can 1 kilogram of soil fit in the container? Explain or show your reasoning.
- After raining for $\frac{3}{4}$ of an hour, a rain gauge is $\frac{2}{5}$ filled. If it continues to rain at that rate for 15 more minutes, what fraction of the rain gauge will be filled?
 - To help answer this question, Diego wrote the division equation $\frac{3}{4} \div \frac{2}{5} = ?$. Explain why this equation does *not* represent the situation.
 - Write a multiplication equation and a division equation that does represent the situation.



- 3 tickets to the museum cost \$12.75. At this rate, what is the cost of:
 - 1 ticket?
 - 5 tickets?

(from Unit 2, Lesson 8)

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5. Elena went 60 meters in 15 seconds. Noah went 50 meters in 10 seconds. Elena and Noah both moved at a constant speed.
- How far did Elena go in 1 second?
 - How far did Noah go in 1 second?
 - Who went faster? Explain or show your reasoning.

(from Unit 2, Lesson 9)

6. The first row in the table shows a recipe for 1 batch of trail mix. Complete the remaining rows with recipes for 2, 3, and 4 batches of the same type of trail mix.

number of batches	cups of cereal	cups of almonds	cups of raisins
1	2	$\frac{1}{3}$	$\frac{1}{4}$
2			
3			
4			

(from Unit 2, Lesson 11)