## Lesson 4: What Fraction of a Group?

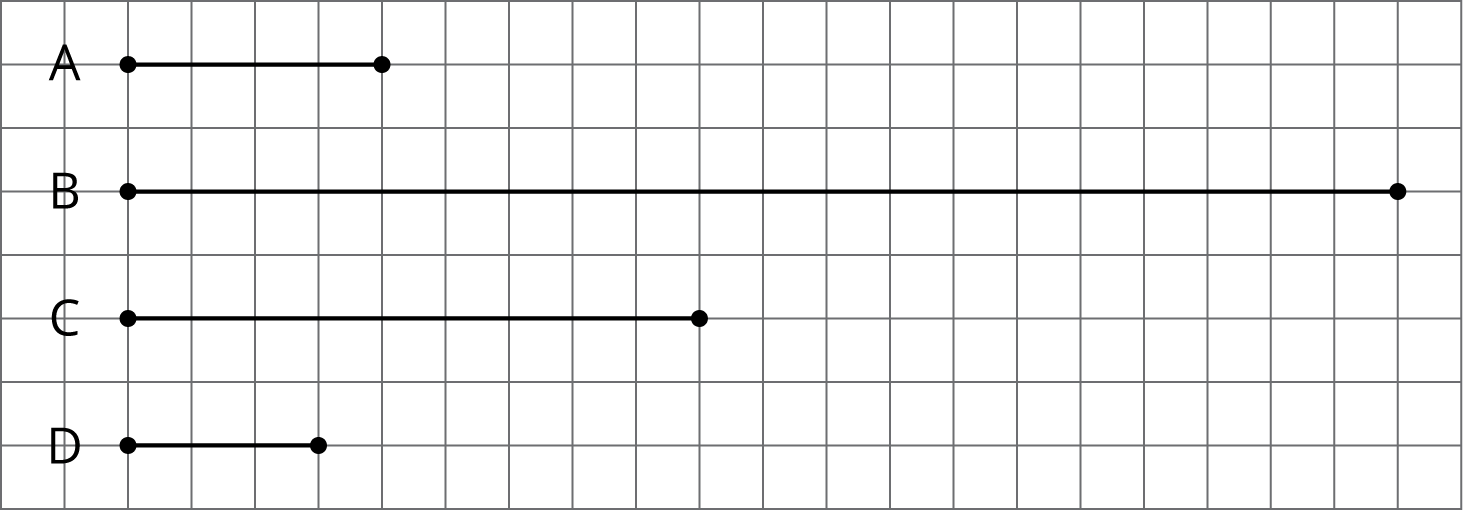
Let’s think about dividing things into groups when we can’t even make one whole group.

### 4.1: Estimating a Fraction of a Number

1. Estimate the quantities:
   1. What is of 7?
   2. What is of ?
   3. What is of ?
2. Write a multiplication expression for each of the previous questions.

### 4.2: Fractions of Ropes

Here is a diagram that shows four ropes of different lengths.



1. Complete each sentence comparing the lengths of the ropes. Then, use the measurements shown on the grid to write a multiplication equation and a division equation for each comparison.
   1. Rope B is \_\_\_\_\_\_\_ times as long as Rope A.
   2. Rope C is \_\_\_\_\_\_\_ times as long as Rope A.
   3. Rope D is \_\_\_\_\_\_\_ times as long as Rope A.
2. Each equation can be used to answer a question about Ropes C and D. What could each question be?
   1. and
   2. and

### 4.3: Fractional Batches of Ice Cream

One batch of an ice cream recipe uses 9 cups of milk. A chef makes different amounts of ice cream on different days. Here are the amounts of milk she used:

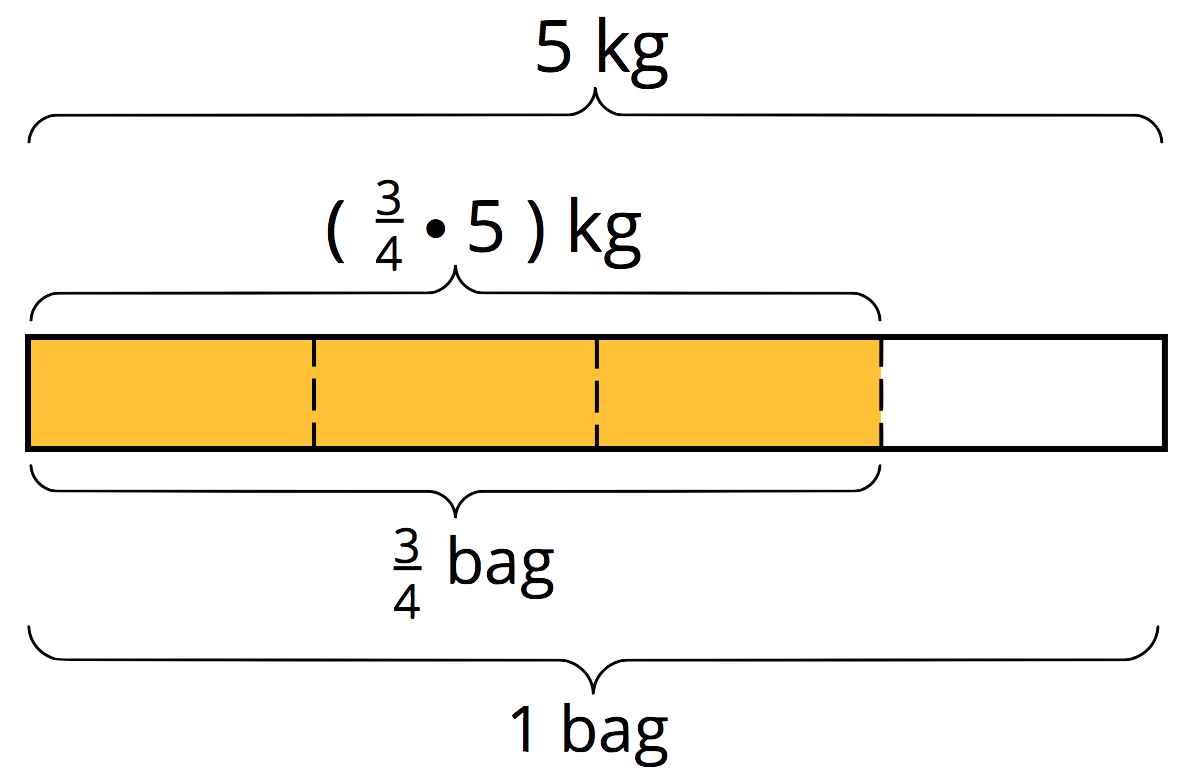
* Monday: 12 cups
* Tuesday: cups
* Thursday: 6 cups
* Friday: cups

1. How many batches of ice cream did she make on these days? For each day, write a division equation, draw a tape diagram, and find the answer.
   1. Monday
   * 
   1. Tuesday
   * 
2. What fraction of a batch of ice cream did she make on these days? For each day, write a division equation, draw a tape diagram, and find the answer.
   1. Thursday
   * 
   1. Friday
   * 
3. For each question, write a division equation, draw a tape diagram, and find the answer.
   1. What fraction of 9 is 3?
   * 
   1. What fraction of 5 is ?
   * 

### Lesson 4 Summary

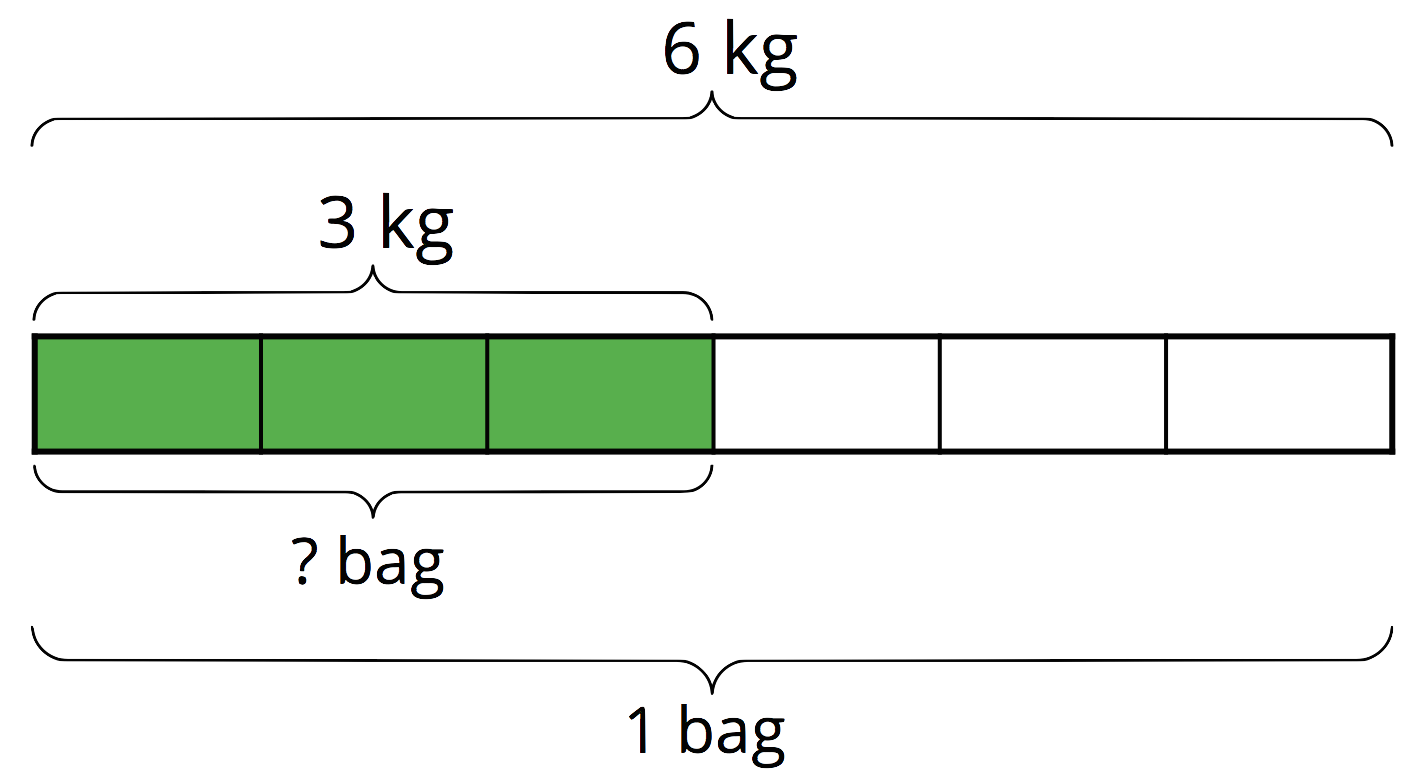
It is natural to think about groups when we have more than one group, but we can also have a *fraction of a group*.

To find the amount in a fraction of a group, we can multiply the fraction by the amount in the whole group. If a bag of rice weighs 5 kg, of a bag would weigh ( kg.



Sometimes we need to find what fraction of a group an amount is. Suppose a full bag of flour weighs 6 kg. A chef used 3 kg of flour. What fraction of a full bag was used? In other words, what fraction of 6 kg is 3 kg?

This question can be represented by a multiplication equation and a division equation, as well as by a diagram.

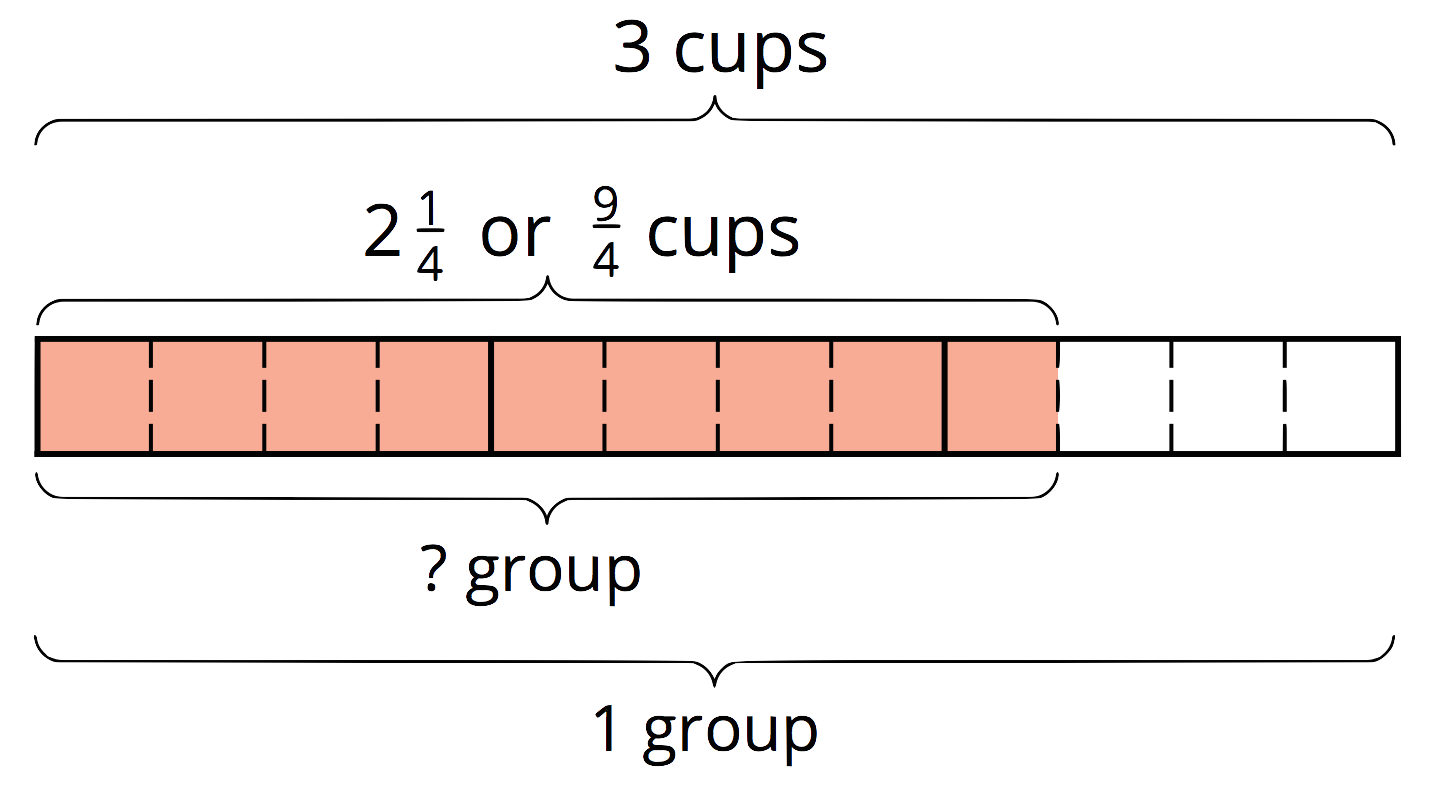


We can see from the diagram that 3 is of 6, and we can check this answer by multiplying: .

In *any* situation where we want to know what fraction one number is of another number, we can write a division equation to help us find the answer.

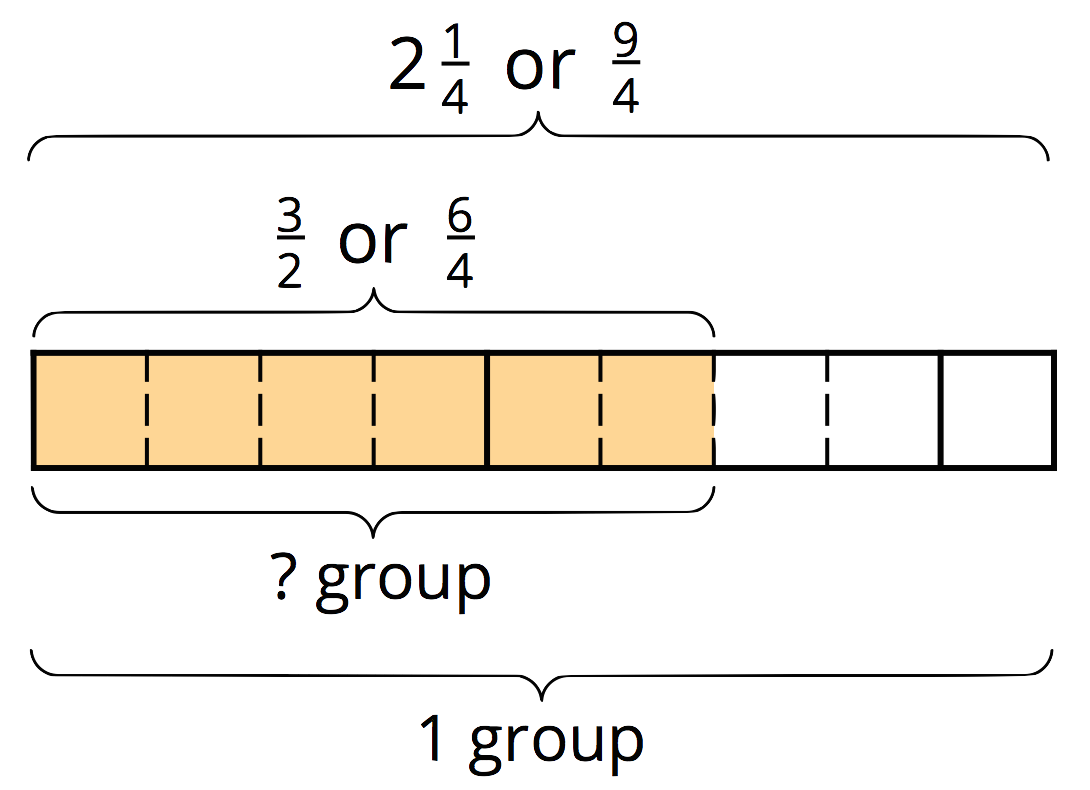
For example, “What fraction of 3 is ?” can be expressed as , which can also be written as .

The answer to “What is ?” is also the answer to the original question.



The diagram shows that 3 wholes contain 12 fourths, and contains 9 fourths, so the answer to this question is , which is equivalent to .

We can use diagrams to help us solve other division problems that require finding a fraction of a group. For example, here is a diagram to help us answer the question: “What fraction of is ?,” which can be written as .



We can see that the quotient is , which is equivalent to . To check this, let’s multiply. , and is, indeed, equal to .



© CC BY Open Up Resources. Adaptations CC BY IM.