

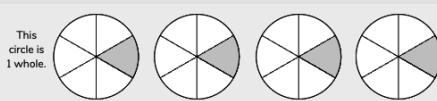
Extending Multiplication to Fractions

Family Guide | Grade 4 | Unit 8

Your student is exploring how equal-groups thinking can help when multiplying and comparing quantities involving fractions.

Key Math Ideas

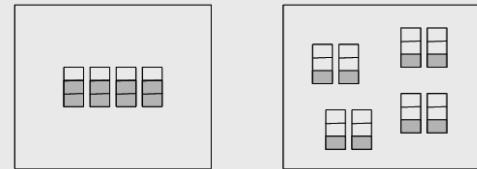
In this unit, your student will extend their understanding of multiplication to include equal groups of fractions and mixed numbers. Students understand multiplying a fraction by a whole number as joining multiple copies (or equal groups) of that fraction. Using visual models and equations, they link repeatedly adding the same unit fraction to the concept of multiplication. Through their work in this unit, students recognize that a fraction can be thought of as multiple copies of a unit fraction as shown in the example to the right, in which students recognize that $\frac{2}{3}$ is 2 one-thirds.



Write 2 equations to represent the model.

$$\frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} \\ 4 \times \frac{1}{6}$$

$$4 \times \frac{2}{3} \ominus 4 \times 2 \times \frac{1}{3}$$

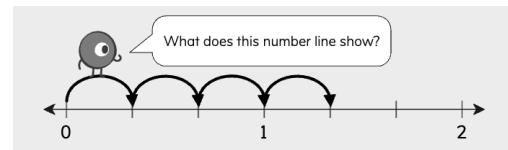


→ In the first half of the unit, your student will learn to

- recognize that repeatedly adding the same unit fraction is the same as multiplying the unit fraction by a whole number, such as $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 4 \times \frac{1}{3}$;
- represent sums of unit fractions as a product of a whole number and a unit fraction, such as $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 3 \times \frac{1}{4} = \frac{3}{4}$;
- solve word problems and missing factor problems for a whole number times a unit fraction;
- compare strategies for multiplying whole numbers by mixed numbers.

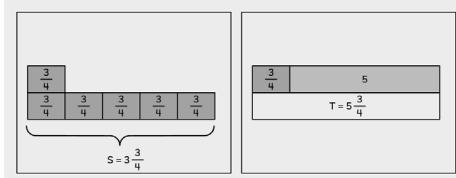
→ In the second half of the unit, your student will learn to

- determine when a problem should be solved using addition and when it should be solved using multiplication;
- solve addition, subtraction and multiplication word problems with fractions and mixed numbers.



The model on the number line shows $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ or $4 \times \frac{1}{3}$

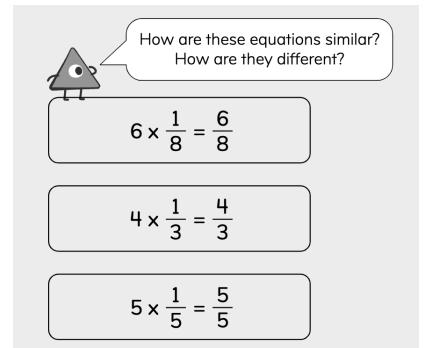
How are these models similar?
How are they different?



The model on the left shows multiplication $\frac{3}{4}$ (5 times $\frac{3}{4}$). The model on the right shows addition (5 added on to $\frac{3}{4}$)

Helpful Hint

Until now, students' experiences with multiplication have resulted in answers that were greater than the numbers being multiplied. However, in this unit they start to explore situations where the answer is less than one of the numbers being multiplied. When multiplying a whole number by a unit fraction, the product is less than the whole number. For example, $5 \times \frac{1}{4} = \frac{5}{4} = 1\frac{1}{4}$, which is less than 5. Support your student by asking them to explain what each number represents in an equation.



Tips for Supporting Your Student at Home

Questions to Ask Your Student



→ At the beginning of the unit:

- How can you represent a fraction as multiplication?
- How can you use visual models to multiply fractions by whole numbers?
- What happens when we multiply a whole number by a fraction with that number in the denominator?

→ By the end of the unit:

- What visual models can you use to make comparisons?
- How can visual models help you understand relationships between quantities in word problems?
- What strategies can you use to solve comparison problems?

If...

Try...

your student struggles to get started on a word problem using comparative language such as "4 times as tall as" or "4 feet taller" . . .

asking your student what they know and what they are trying to find out. Encourage them to draw a model representing what they know to help determine if they should multiply or add to solve the problem.

Student Strengths Spotlight

I learn from my mistakes.

Exploring new ideas can lead to mistakes, and students take this opportunity to recognize that every mistake is an opportunity to learn.

I explain how my classmates' reasoning compares to my own.

Explaining ideas and interpreting the ideas of their classmates allows students to reflect on and expand their own understandings.

I notice patterns and try to apply them.

Recognizing patterns in fractions supports students to think flexibly and expand their strategies.

Try This Together!

- **Preparing for a Party.** Have your student help you divide the snacks for the guests at your party. You can have them estimate, for example, "If a person gets $\frac{1}{4}$ bag of chips, how many bags of chips will I need to serve 12 people?" Have them explain how they used multiplication to calculate the number of bags of chips needed for the party.

- **Go for a Walk!** While on a walk with your student, make some comparisons together using addition and multiplication. For example, say "I think that bush is about 3 feet tall. If the tree is 4 times as tall, how tall would the tree be?" Let students explain whether they found the height of the tree by adding or multiplying.

- **Making More of a Recipe.** Choose a recipe to make with your student and decide how many batches of the recipe you want to make. For example, you may want to triple it for a party, so every ingredient needs to be multiplied by 3. Provide your student with the recipe and ask them to find the new amounts of each ingredient by multiplying. For example, if the original recipe calls for $\frac{2}{3}$ cup of lemon juice, your student will need to multiply $3 \times \frac{2}{3}$ to find the new amount of lemon juice needed.