InsightMath California

Exploring Multiplication of Fractions

Family Guide | Grade 5 | Unit 6

Your student is exploring how using flexible fraction and multiplication interpretations helps to multiply with fractions.

Key Math Ideas

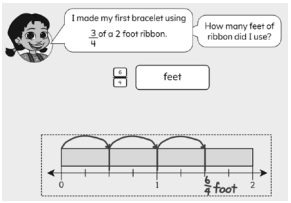
In this unit, students build on what they already know about multiplication to discover that multiplying fractions means more than just adding the same amount repeatedly. Students learn to think about fraction multiplication in different ways:

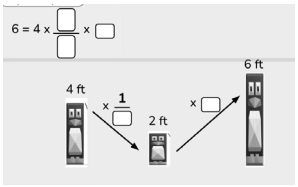
- finding part of a whole, such as finding $\frac{2}{3}$ of 12
- finding part of a part, such as finding $\frac{1}{2}$ of $\frac{3}{4}$
- scaling amounts up or down, such as exploring what happens when making an amount $1\frac{1}{2}$ or $\frac{4}{5}$ as much
- finding the area of rectangles when the sides have fraction or mixed number lengths

Students draw area models, use number lines, and work with real-world contexts for finding a fraction of a whole number and a fraction of a fraction. Students begin to think more flexibly about multiplying fractions in multiple ways and to see how multiplication makes sense even when working with parts of whole numbers.

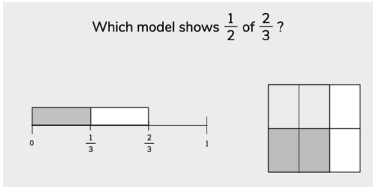
→ In the first half of the unit, your student will learn to

- show and explain how fractions can represent division, such as $\frac{2}{3} = 2 \div 3$;
- use visual models to multiply fractions by whole numbers by finding a fraction (or part) of the whole number, such thinking of $\frac{3}{4} \times 8$ as finding $\frac{3}{4}$ of 8;
- describe that multiplying a fraction by a whole number is the same as dividing the whole number by the denominator and multiplying by the numerator of the fraction, such as thinking of $\frac{2}{3} \times 5 = 5 \div 3 \times 2$
- explain multiplication of a fraction by a whole number as scaling and solving related problems, stretching the whole number by the numerator and shrinking by the denominator;
- compare fraction multiplication expressions without solving them by considering the size of the product based on whether the factors are greater than, less than, or equal to 1.



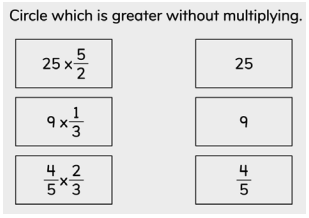


Showing $6 \times \frac{3}{2}$ as scaling, in this case shrinking then growing.



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

- use visual models to multiply two fractions by finding a fraction (or part) of a fraction, such thinking of $\frac{3}{4} \times \frac{2}{6}$ as finding $\frac{3}{4}$ of $\frac{2}{6}$;
- explain why they can multiply fractions by multiplying the numerator by the numerator and the denominator by the denominator;
- recognize that fractions can be multiplied in any order and the product will stay the same, such as recognizing that $\frac{2}{3} \times \frac{3}{5}$ and $\frac{3}{5} \times \frac{2}{3}$ both have a product of $\frac{6}{15}$;
- estimate the size of the product compared to the size of the factors based on whether the factors are greater than, less than, or equal to 1;
- find the area of a rectangle with fraction or mixed number side lengths.



Helpful Hint

Many of students' experiences with multiplication have resulted in answers that were greater than the numbers being multiplied. However, in grade 4 they started to explore situations where the answer is less than one of the numbers being multiplied, and they continue to do so in this unit. Students will encounter many situations in this unit where the product is less than one or both of the factors. Multiplication resulting in a smaller number is a new idea! Support your student by asking them to notice if the factors are greater than, less than, or equal to 1 before solving and make a prediction about the size of the product.

Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ In the first half of the unit:

- How can thinking of fractions as division help you solve problems?
- How can we find a fractional part of a whole number?
- What are some different ways we can think about multiplying a whole number by a fraction?
- How can we model fraction multiplication as shrinking and growing?
- How can we compare fraction multiplication expressions without solving them?

→ In the second half of the unit:

- How can we find a fraction of a fraction?
- What happens when we multiply fractions with the same number in the numerator of one and the denominator of the other?
- How can we find the area of a rectangle with fraction or mixed number dimensions?

If...	Try...
your student struggles to see multiplying of fractions as finding a "fraction of" and only sees it as making equal groups of fractions . . .	encouraging your student to explain the situation in their own words or even act it out to recognize when they are finding equal groups of a fraction or finding a fractional part.

Student Strengths Spotlight

I justify my thinking.	Before solving, students justify their predictions about the size of the product when multiplying fractions.
I explain how my classmates' reasoning compares to my own.	Comparing their thinking to other students' thinking helps your student to grow as a learner by reflecting on their own understanding and learning from others.
I consider how precise I need to be when solving problems.	Students are precise when creating models to multiply fractions, considering how precision allows them to solve accurately.
I use math to represent real-life situations, and I create contexts to match the given math.	Students represent situations with models and equations, but also create their own stories to represent given expressions. This allows them to connect more deeply with the math they are learning.

Try This Together!

- Find a Fraction of a Whole Number. The next time your student is using a set of something, such as beads to make a necklace or crackers to have a snack, ask them to find a fraction of the items. For example, if students have 24 beads you can ask "If you use $\frac{3}{4}$ of the beads to make a necklace, how many beads will the necklace have?" Students can use the items as a visual model to solve or write and solve a multiplication problem.
- A Fraction of a Recipe. Choose a recipe to make with your student and make note of how many people the recipe serves. Then determine what fraction of the recipe you need based on the number of people you are serving. For example, if the recipe serves 12 people and you only need enough for 4 people, you will be making $\frac{1}{3}$ of the original recipe. 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 $\frac{1}{3} \times \frac{2}{3}$ to find how much $\frac{1}{3}$ of $\frac{2}{3}$ cup to get the new amount of lemon juice needed.