

Core Focus

- Common fractions: Finding a fraction of a whole number
- Common fractions: Multiplying
- Common fractions: Solving word problems

Common fractions

- **Area models** and **number lines** help students visualize the idea of multiplying fractions.
- Students know they can decompose (break apart) numbers to make multiplication easier (e.g. 5×23 is equivalent to 5×20 plus 5×3). Using this idea, students make sense of decomposing mixed numbers for multiplying (e.g. $5 \times 4\frac{1}{3}$ is equivalent to 5×4 plus $5 \times \frac{1}{3}$).

8.1 Common fractions: Reviewing multiplication by whole numbers

Step In Two-thirds of a scoop of laundry detergent is used for each load of laundry. Richard does five loads of laundry.

How much laundry detergent does he use?
In the picture below, each large rectangle represents one whole. Richard uses this picture to help solve the problem.

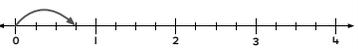


$5 \times \frac{2}{3} =$

How does the picture help solve the problem?
What product should he write?

Giselle uses a different type of laundry detergent. She uses $\frac{3}{4}$ of a scoop for each load of laundry. She also does five loads.

How much laundry detergent does she use?
Draw more jumps on this number line to solve the problem. Then complete the equation.



$5 \times \frac{3}{4} =$

In this lesson, students review how to multiply common fractions and mixed numbers by whole numbers.

- Students use the connection between multiplication and division to find a unit fraction of a collection of objects.

8.2 Common fractions: Relating unit fractions to division

Step In One-fourth of these eggs are used to make an omelette.

How many eggs are in the omelette?
The eggs can be shared equally among 4 to find one-fourth.



How could you share the eggs to find thirds? What about sixths?
Complete each of these statements.

$12 \div 4$	$12 \div 3$	$12 \div 2$	$12 \div 6$
is equivalent to	is equivalent to	is equivalent to	is equivalent to
$\frac{1}{4}$ of 12	$\frac{1}{3}$ of 12	$\frac{1}{2}$ of 12	$\frac{1}{6}$ of 12

How could you use division to calculate $\frac{1}{6}$ of 18?

Multiplication can also be used to calculate the answer. $\frac{1}{6}$ of 18 means $\frac{1}{6} \times 18$, which is $\frac{18}{6}$. The answer is 3.



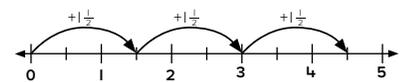
In this lesson, students relate multiplication and division to calculate the answer.

Ideas for Home

- Help your child make sense of multiplying with fractions by connecting the numbers to something they know. E.g. $\frac{1}{2} \times \frac{1}{3}$ might represent $\frac{1}{2}$ of a sandwich and your child eats $\frac{1}{3}$ of that. Ask, "How much of the whole sandwich did you eat?" They can see that $\frac{1}{6}$ makes sense because they ate a part of a part of the whole, so the answer will be less than either factor.
- Talk with your child about the times when you multiply fractions or mixed numbers. E.g. to double a recipe that uses $1\frac{1}{4}$ cups of flour, you multiply $1\frac{1}{4}$ by 2.

Glossary

- ▶ The **number line** below shows three jumps of $1\frac{1}{2}$ to solve $3 \times 1\frac{1}{2}$.



Helpful videos

View these short one-minute videos to see these ideas in action.

www.bit.ly/OI_18
www.bit.ly/OI_19

- Students use the familiar area model to multiply common fractions. Instead of whole numbers for the dimensions, students use common fractions.

8.7 Common fractions: Multiplying two common fractions pictorially

Step In A new housing development is being built on a large rectangular block of land. The land is $\frac{2}{3}$ of a mile by $\frac{3}{4}$ of a mile.

How could you use this diagram to calculate the area of the development?

$\frac{2}{3} \times \frac{3}{4} = ?$

To find the area of a rectangle, I need to multiply the dimensions.

Each of these fractions is a dimension of the total area.

William labeled the dimensions and shaded the rectangle. How does the diagram on the right match the equation above?

How many equal parts divide the whole square?
How many of these parts did William shade?
What is the area of the housing development?

In this lesson, students use an area model (grid) to multiply two fractions that are less than one.

- Students solve word problems involving multiplication of fractions and mixed numbers. They consider a variety of strategies that can be used to solve the problems.

8.12 Common fractions: Solving word problems

Step In This recipe makes one large bowl of punch.

Callum wants to make three bowls.

How would you calculate the total amount of each ingredient he will need to make the punch?

He is making 3 bowls of punch, so that is like multiplying by 3.

Fruit Punch

- $\frac{3}{4}$ cup apple juice
- $\frac{2}{3}$ cup water
- $2\frac{1}{4}$ cups orange juice
- $1\frac{1}{2}$ cups pineapple juice
- 2 cups iced tea

In this lesson, students solve word problems involving multiplication with common fractions and mixed numbers.

Ideas for Home

- Find two fractions and have your child figure out if the product will be less than, equal to, or greater than the first factor. (Note: If the first factor is multiplied by a number less than one, the product will be less than the first factor; if the first factor is multiplied by a number greater than one, the product will be greater than the first factor.)