



Core Focus

- Using multiplication for comparison and the effects of multiplying by fractions less than 1, equal to 1, and greater than 1
- Solving word problems involving fractions and mixed numbers
- Converting measurements and problem solving involving metric measures of liquid volume or capacity (milliliters and liters)
- Converting measurements and problem solving involving customary measures of liquid volume or capacity (fluid ounces, quarts, and gallons)

Multiplication with Common Fractions

- Area models help students visualize the idea of multiplying fractions.
- Students learn what happens when they multiply by a fraction greater than 1 (the result is greater than the factor); by fractions less than 1 (the result is less than the factor); and by fractions equal to 1 (the result is equal to the factor).

II.1 Step In Multiplying Proper and Improper Fractions

Estimate the dimensions of the mirror with your hands.
Do you think the area is more or less than one square meter?
Explain your thinking.

Camella wrote this equation to figure out the exact area.

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

I multiplied the numerators then the denominators. The answer is $\frac{6}{12}$.

How could you use this grid to figure out the product?

Shade the array on the grid to show the dimensions of the mirror.
How does the array match the equation?
What do each of the four bold squares represent?

How would you figure out the product for each of these equations?

$\frac{5}{3} \times \frac{5}{4} = \square$ $\frac{5}{3} \times \frac{7}{4} = \square$

In this lesson, students use an area model (grid) to multiply two fractions when improper fractions are involved.

- Students use various strategies for multiplying mixed numbers. They use an area model or they convert the mixed numbers to improper fractions before multiplying.

II.2 Step In Multiplying Mixed Numbers (Area Model)

Carla drew this grid to help her compare the area of rugs with different dimensions.

To figure out the area of a rug that measured $\frac{2}{3}$ yd by $1\frac{1}{4}$ yd, she wrote this number sentence.

$\frac{2}{3} \times 1\frac{1}{4} = \square$

How do you think Carla used the grid to find the area of the rug?

Liam converted the mixed number to an improper fraction.

Which strategy do you prefer? Why?

How would you figure out the area of rugs with these dimensions?

$1\frac{1}{2}$ yd by $1\frac{1}{3}$ yd $1\frac{3}{4}$ yd by $1\frac{2}{3}$ yd

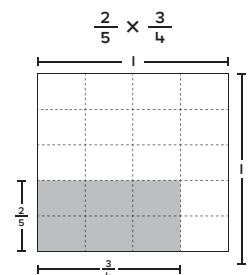
In this lesson, students use various strategies to multiply two mixed numbers, including converting mixed numbers to improper fractions.

Ideas for Home

- Help your child make sense of multiplying with fractions by connecting the numbers to something they know. For example, $\frac{1}{2} \times \frac{1}{3}$ 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 $1/6$ makes sense since they ate a part of a part of the whole so the answer will be less than either factor.

Glossary

- Students use an **area model** (grid) to multiply fractions.



- Improper fractions** are common fractions that have a numerator that is greater than or equal to the denominator. For example, $\frac{7}{5}$ is an improper fraction.
- A **mixed number** is an improper fraction that has been changed to show the whole part/s and the fractional part. For example, $2\frac{1}{6}$ is the same as $2\frac{1}{6}$.

Measurement – Volume and Capacity

- Students review metric measurements of volume — liters (L) and milliliters (mL), practice converting between them, and think of different ways to write the same measure.
- Like kilograms, liters can be described using fraction language. Students describe 1,500 mL as 1.5 liters or $1\frac{1}{2}$ liters.

11.9 Step In Solving Word Problems Involving Metric Units of Liquid Volume (Capacity)

Akeema is shopping for some party supplies. There are 20 people attending. Which bottle of water should she buy? Which disposable cups could she buy? How did you decide?

Akeema wants to provide at least one cup of water for each person. If she uses the 250-mL cups, how many bottles of water should she buy?

1 L \$2.09
1.25 L \$2.15
2 L \$3.29
250 mL 10 pack \$1.75
400 mL 20 pack \$3.20
500 mL 20 pack \$3.90
Disposable cups

I will call the total amount of water W . $W = 20 \times 250$ mL which is the same as $W = 5$ (4×250 mL). That's 5,000 mL or 5 liters.

What is the total cost of this purchase?

In this lesson, students solve multi-step word problems that involve converting metric units of liquid volume.

- Students review fluid ounces, quarts, and gallons, and practice converting between the different measures.
- Students solve problems and think of different ways to write the same measure (e.g. 48 fluid ounces is the same as $1\frac{1}{2}$ quarts).

11.11 Step In Converting between Quarts and Fluid Ounces

Imagine this pitcher is used to fill the empty bottles with water. How many bottles can be filled from one full pitcher?

I know there are 32 fl oz in 1 quart.

How many pitchers of water are needed to fill six of these bottles?

Complete these statements.

<input type="text"/>	fluid ounces	is the same as	1 quart.
<input type="text"/>	fluid ounces	is the same as	$\frac{1}{2}$ quart or 0.5 quart.
<input type="text"/>	fluid ounces	is the same as	$\frac{1}{4}$ quart or 0.25 quart.
<input type="text"/>	fluid ounces	is the same as	$\frac{3}{4}$ quart or 0.75 quart.

How could you use the statements to figure out the number of fluid ounces in $3\frac{1}{4}$ quarts? What equation would you write?

In this lesson, students convert quarts to fluid ounces (big to small) and fluid ounces to quarts (small to big).

Ideas for Home

- Ask your child to describe the amount of fluid ounces written on different beverage containers in relation to quarts or gallons. E.g. they could describe a 20 fluid ounce bottle of juice as being a little more than $\frac{1}{2}$ a quart, or a 64 fluid ounce bottle of juice as exactly two quarts or a half-gallon.
- At the grocery store, ask your child to find items other than beverages that are labeled with fluid ounces (e.g. liquid laundry detergent).
- To develop benchmarks for the relative size of metric measurements compared to customary measurements, look for everyday objects in your home that are labelled with milliliters (mL). Some examples are health care items and foods like soy sauce and salad dressing. For example, 8 fluid ounces (one cup) is about 240 milliliters.

Glossary

► Liquid Volume (Capacity)

Customary Units of Liquid Volume	Metric Units of Liquid Volume		
8 fluid ounces	1 cup	1,000 milliliters	1 liter
2 cups	1 pint	1,000 liters	1 kiloliter
2 pints	1 quart		
4 quarts	1 gallon		

- 1 liter = 1.05 quarts