

Grade 6 · Converting Measurement Units · Lesson

Common Core 6.RP.A.3d · mathovore.fr

Converting measurement units means changing a measurement to another unit without changing its amount. Use ratio reasoning with a conversion factor, a ratio of equal measurements such as 12 inches to 1 foot. Multiply to change to a smaller unit and divide to change to a larger unit.

Grade 6 Common Core: 6.RP.A.3d

Key facts:

- A conversion factor is a ratio of equal measurements, so it equals 1.
- Common customary facts: 12 in = 1 ft, 3 ft = 1 yd, 5,280 ft = 1 mi, 16 oz = 1 lb.
- Capacity: 2 cups = 1 pint, 2 pints = 1 quart, 4 quarts = 1 gallon (16 cups).
- Metric conversions use powers of 10, such as 1,000 m = 1 km.
- For multi-step conversions, chain factors or use a ratio table.

What is a unit conversion?

A unit conversion changes a measurement from one unit to another without changing the amount. A rope that is 3 feet long is also 36 inches long. The two measurements describe the same length, so they form a ratio that keeps its value.

Conversion factor

A **conversion factor** is a ratio of two equal measurements, such as $\frac{12 \text{ in}}{1 \text{ ft}}$. Because the top and bottom are the same length, the factor equals 1, and multiplying by it changes the unit but not the amount.

What are the common conversions?

Length	Weight	Capacity
12 in = 1 ft	16 oz = 1 lb	2 cups = 1 pint
3 ft = 1 yd	1,000 g = 1 kg	2 pints = 1 quart
5,280 ft = 1 mi	—	4 quarts = 1 gallon

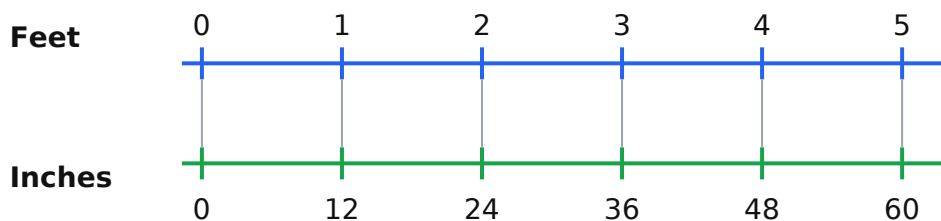
A quick chart of equivalent measurements.

These customary and metric equivalents are used again and again in Grade 6. Memorize them or keep this chart nearby.

Measure	Equivalent
Length	12 in = 1 ft, 3 ft = 1 yd, 5,280 ft = 1 mi
Weight	16 oz = 1 lb
Capacity	2 c = 1 pt, 2 pt = 1 qt, 4 qt = 1 gal
Metric	100 cm = 1 m, 1,000 m = 1 km, 1,000 g = 1 kg, 1,000 mL = 1 L

How do you convert using ratio reasoning?

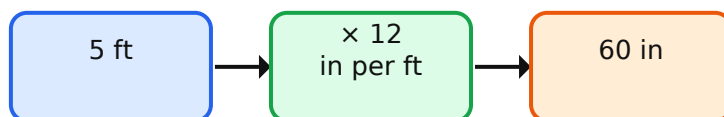
1. Choose the equivalent measurements that connect the two units.
2. Write the conversion factor so the unit you want is on top and the unit you start with is on the bottom.
3. Multiply the original measurement by the factor. The starting unit cancels.
4. Check the size: going to a smaller unit gives a larger number, and going to a larger unit gives a smaller number.



Every foot adds 12 inches, so 5 feet is 60 inches.

Example. Convert 5 feet to inches.

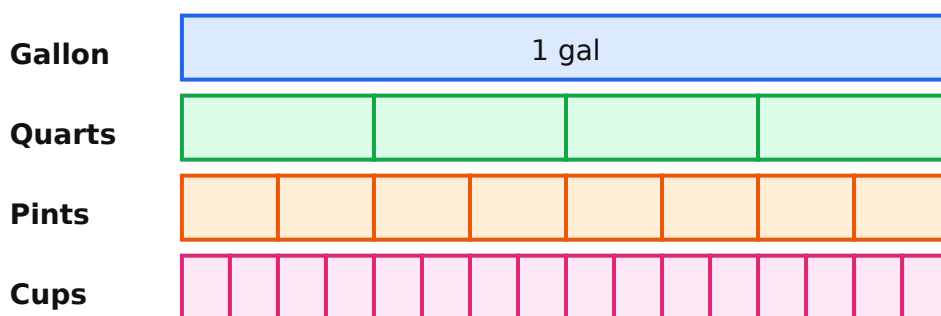
$$5 \text{ ft} \times \frac{12 \text{ in}}{1 \text{ ft}} = 60 \text{ in}$$



Multiply by the conversion factor to change the unit.

Inches are smaller than feet, so the number grew from 5 to 60, as expected.

How do you do a multi-step conversion?



One gallon is 4 quarts, 8 pints, or 16 cups.

When no single factor links the units, chain the factors. To convert 3 gallons to cups, go from gallons to quarts, quarts to pints, and pints to cups:

$$3 \times 4 = 12 \text{ qt}, 12 \times 2 = 24 \text{ pt}, 24 \times 2 = 48 \text{ c}$$

So 3 gallons equal 48 cups. A ratio table or a double number line also works: one gallon matches 16 cups, so 3 gallons match $3 \times 16 = 48$ cups. To change to a larger unit, divide: 84 inches is $84 \div 12 = 7$ feet.

Converting Measurement Units: frequently asked questions

What is a conversion factor?

A conversion factor is a ratio of two equal measurements, such as 12 inches over 1 foot. It equals 1, so multiplying by it changes the unit without changing the amount.

When do you multiply and when do you divide in a conversion?

Multiply when you change to a smaller unit, because you need more of them (feet to inches). Divide when you change to a larger unit, because you need fewer (inches to feet).

How many cups are in a gallon?

A gallon has 4 quarts, each quart has 2 pints, and each pint has 2 cups. So one gallon equals 4

times 2 times 2, which is 16 cups.

How do you convert metric units?

Use the powers of 10. For example, 1 kilometer equals 1,000 meters, so 3.5 km is 3.5 times 1,000, or 3,500 m. To go from centimeters to meters, divide by 100.

Can a ratio table help with unit conversion?

Yes. Put the known equivalent in one column, such as 1 foot and 12 inches, then multiply both numbers by the same amount to find other equivalent measurements.