

Grade 5 · Converting Units and Line Plots · Lesson

Common Core 5.MD.A.1, 5.MD.B.2 · mathovore.fr

Converting units changes the unit but not the amount. To convert a larger unit to a smaller one, multiply by how many small units fit in one large unit; to convert smaller to larger, divide. A line plot with fractions shows measurements as X marks above a number line marked in halves, fourths, or eighths.

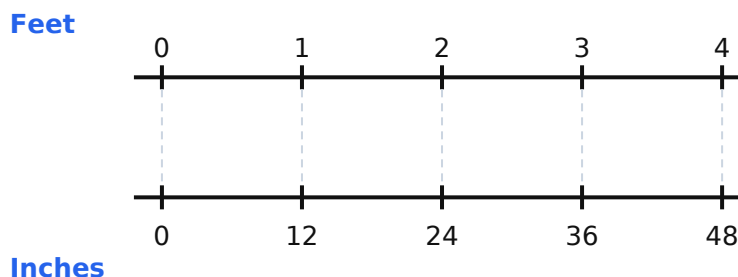
Grade 5 Common Core: 5.MD.A.1 · 5.MD.B.2

Key facts:

- Larger unit to smaller unit: multiply. Smaller unit to larger unit: divide.
- 1 foot = 12 inches, 1 yard = 3 feet, 1 pound = 16 ounces, 1 gallon = 4 quarts.
- Metric units use powers of 10: 1 meter = 100 centimeters and 1 kilometer = 1,000 meters.
- On a line plot, each X stands for one measurement.
- Equal share = total of the data divided by the number of data values.

What does it mean to convert units?

Converting a measurement means writing the same amount with a different unit. A board that is 4 feet long is also 48 inches long. The board does not change; only the unit does. Because a foot is bigger than an inch, it takes *more* inches than feet to name the same length.



Each foot is 12 inches, so 4 feet is 48 inches.

When do you multiply and when do you divide?

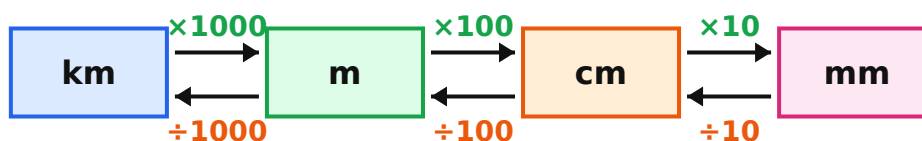
Conversion rule

Going from a **larger unit to a smaller unit**, multiply by the number of small units in one large unit. Going from a **smaller unit to a larger unit**, divide by that same number.

Here are the equivalents to know for Grade 5.

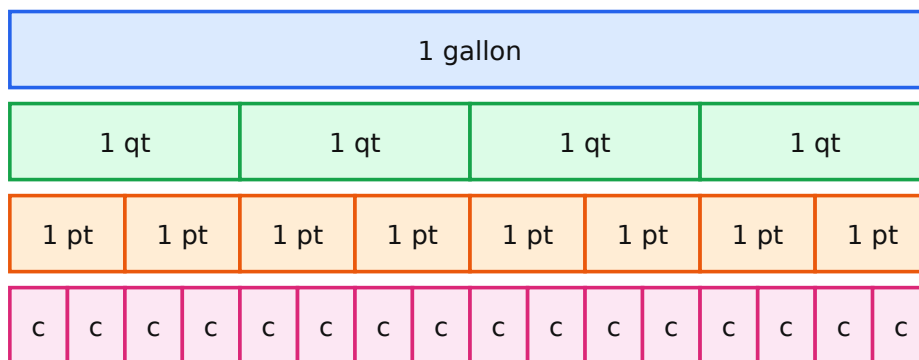
Measure	Equivalents
Length	1 ft = 12 in, 1 yd = 3 ft, 1 mi = 5,280 ft
Weight	1 lb = 16 oz
Capacity	1 gal = 4 qt, 1 qt = 2 pt, 1 pt = 2 c
Metric	1 km = 1,000 m, 1 m = 100 cm, 1 kg = 1,000 g, 1 L = 1,000 mL
Time	1 h = 60 min, 1 min = 60 s

Moving right: multiply (units get smaller)



Moving left: divide (units get larger)

Metric length units: every step to the right multiplies, every step to the left divides.



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

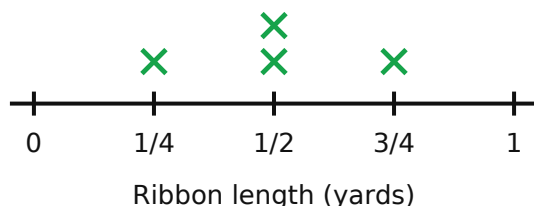
How do you convert a measurement step by step?

1. Find how many small units are in one large unit.
2. Decide the direction: large to small means multiply, small to large means divide.
3. Calculate and write the new unit.

Example. Convert 3.5 kg to grams. One kilogram is 1,000 g, and kilograms are larger than grams, so multiply: $3.5 \times 1,000 = 3,500$. The answer is 3,500 g.

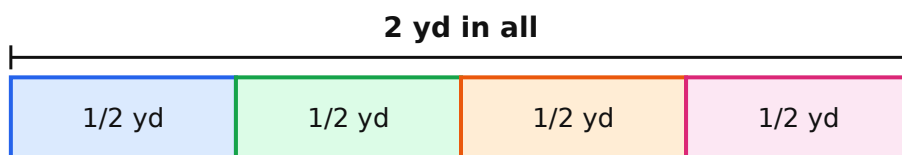
How do you read a line plot with fractions?

A line plot shows each measurement as an X above a number line. The number line is marked in the same fractions as the data, such as halves, fourths, or eighths. Count the X marks above a number to see how many measurements have that value.



Four ribbons: one is $\frac{1}{4}$ yd, two are $\frac{1}{2}$ yd, and one is $\frac{3}{4}$ yd.

To find the *total*, add every measurement. To find an *equal share*, divide the total by the number of measurements. For the four ribbons above, the total is $\frac{1}{4} + \frac{1}{2} + \frac{1}{2} + \frac{3}{4} = 2$ yards. Shared equally, each ribbon would be $2 \div 4 = \frac{1}{2}$ yard.



Sharing the 2 yards equally gives each ribbon $\frac{1}{2}$ yd.

Converting Units and Line Plots: frequently asked questions

How do you know whether to multiply or divide when converting units?

Compare the sizes of the two units. If you are changing to a smaller unit, you need more of them, so multiply. If you are changing to a larger unit, you need fewer of them, so divide.

How many cups are in a gallon?

A gallon is 4 quarts, a quart is 2 pints, and a pint is 2 cups. So one gallon is $4 \times 2 \times 2 = 16$ cups.

Why are metric conversions easier than customary conversions?

Metric units are based on 10, 100, and 1,000, so converting only moves the decimal point. Customary units use factors such as 12, 3, 16, and 5,280, which must be memorized.

What does each X on a line plot mean?

Each X is one measurement from the data set. If three X marks are above $\frac{1}{2}$, three items measured $\frac{1}{2}$ unit.

How do you find an equal share from a line plot?

Add all the measurements to get the total, then divide by the number of X marks. This shows how much each item would hold if the amounts were leveled out evenly.