

Grade 5 - Converting Measurement Units - Lesson

Common Core 5.MD.A.1 · maths-pdf.fr/en/

To convert units, multiply or divide by the conversion factor. Going from a larger unit to a smaller unit, multiply: $3 \text{ ft} = 3 \times 12 = 36 \text{ in}$. Going from a smaller unit to a larger unit, divide: $36 \text{ in} = 36 \div 12 = 3 \text{ ft}$. Metric conversions use powers of 10, so move the decimal point.

Grade 5 · Common Core State Standards: **5.MD.A.1**

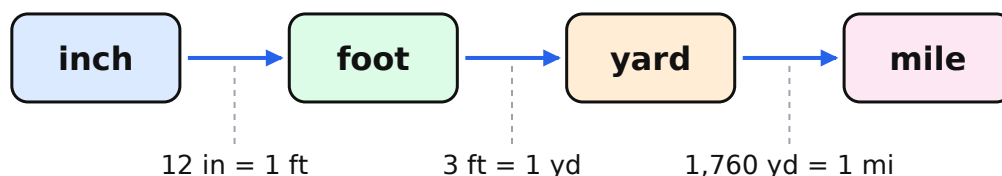
Key facts

- Customary length: $12 \text{ in} = 1 \text{ ft}$, $3 \text{ ft} = 1 \text{ yd}$, $5,280 \text{ ft} = 1 \text{ mi}$.
- Customary capacity: $2 \text{ c} = 1 \text{ pt}$, $2 \text{ pt} = 1 \text{ qt}$, $4 \text{ qt} = 1 \text{ gal}$.
- Weight: $16 \text{ oz} = 1 \text{ lb}$ and $2,000 \text{ lb} = 1 \text{ ton}$.
- Metric units use powers of 10: $100 \text{ cm} = 1 \text{ m}$, $1,000 \text{ m} = 1 \text{ km}$, $1,000 \text{ mL} = 1 \text{ L}$.
- Convert to the same unit first when a problem has several steps.

What is a conversion factor?

The same length, weight or amount can be written with different units. A **conversion factor** tells how many small units fit in one large unit. For example, 1 foot has 12 inches, so 12 is the factor between feet and inches.

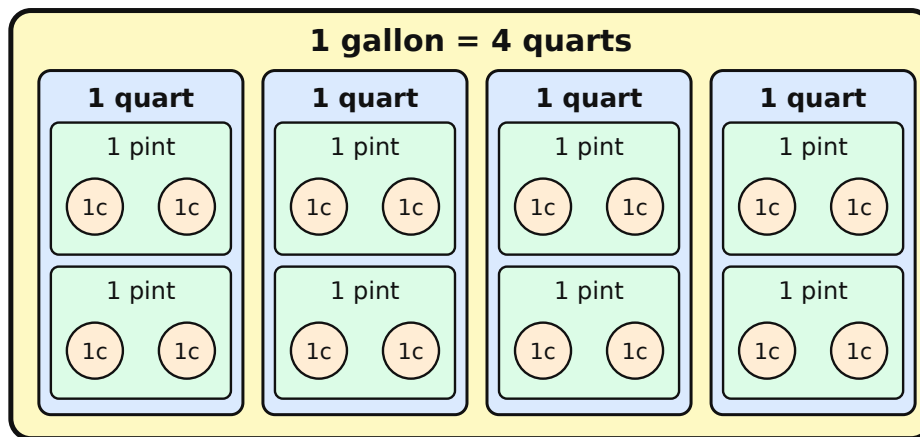
Measure	Customary	Metric
Length	$1 \text{ ft} = 12 \text{ in}$; $1 \text{ yd} = 3 \text{ ft}$; $1 \text{ mi} = 5,280 \text{ ft}$	$1 \text{ m} = 100 \text{ cm}$; $1 \text{ km} = 1,000 \text{ m}$
Weight and mass	$1 \text{ lb} = 16 \text{ oz}$; $1 \text{ ton} = 2,000 \text{ lb}$	$1 \text{ kg} = 1,000 \text{ g}$
Liquid volume	$1 \text{ pt} = 2 \text{ c}$; $1 \text{ qt} = 2 \text{ pt}$; $1 \text{ gal} = 4 \text{ qt}$	$1 \text{ L} = 1,000 \text{ mL}$



Each arrow links two neighboring units. $12 \text{ in} = 1 \text{ ft}$; $3 \text{ ft} = 1 \text{ yd}$; $1,760 \text{ yd} = 1 \text{ mi}$.

How do you convert a larger unit to a smaller unit?

Multiply. A smaller unit is needed in greater numbers to measure the same amount. To change 4 yd to feet, multiply by 3: $4 \times 3 = 12$, so 4 yd = 12 ft.



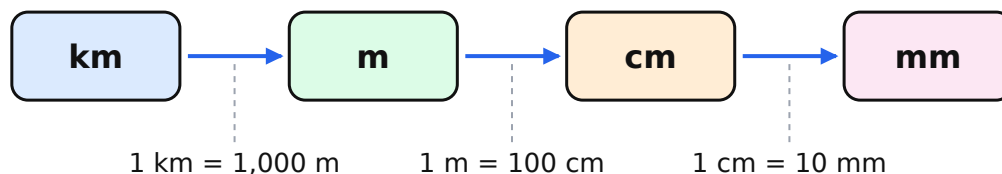
1 gallon = 4 quarts = 8 pints = 16 cups.

How do you convert a smaller unit to a larger unit?

Divide. You need fewer large units than small ones. To change 48 oz to pounds, divide by 16: $48 \div 16 = 3$, so 48 oz = 3 lb.

How do metric conversions work?

Metric units are linked by powers of 10, so you only move the decimal point. Going from meters to centimeters multiplies by 100, and going from milliliters to liters divides by 1,000.



Each arrow links two neighboring units. 1 km = 1,000 m; 1 m = 100 cm; 1 cm = 10 mm.

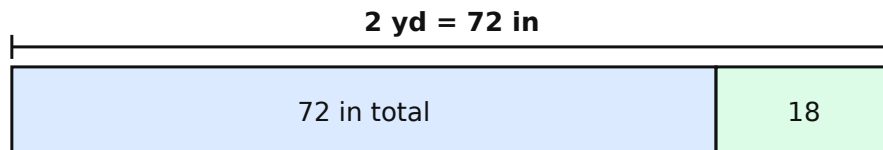
Rule of thumb

Big unit to small unit: **multiply**. Small unit to big unit: **divide**. Always write the unit with each number.

How do you solve a multistep problem?

1. Write what the problem asks and which unit the answer needs.
2. Convert every quantity to the same unit.
3. Add, subtract, multiply or divide.
4. Convert the result if needed, and check that it makes sense.

Example: A rope is 2 yards long. Jamal cuts off 18 inches. Convert: $2 \text{ yd} = 72 \text{ in}$. Subtract: $72 - 18 = 54$. The rope is now 54 inches, or $1\frac{1}{2} \text{ yd}$.



A 2-yard rope is 72 inches. Cutting off 18 inches leaves 54 inches.

Questions about converting measurement units

How do I know whether to multiply or divide?

Ask if you are changing to a smaller unit or a larger unit. A smaller unit means more of them, so multiply. A larger unit means fewer of them, so divide. Check that your answer makes sense.

How many cups are in a gallon?

A gallon has 4 quarts, each quart has 2 pints, and each pint has 2 cups. That gives $4 \times 2 \times 2 = 16$ cups in 1 gallon.

Why are metric conversions easier?

Metric units are based on powers of 10. To change meters to centimeters, multiply by 100. To change grams to kilograms, divide by 1,000. You move the decimal point instead of using a new factor each time.

How do I convert 3.5 kilometers to meters?

One kilometer is 1,000 meters, so multiply $3.5 \times 1,000$. The answer is 3,500 meters. Moving the decimal point 3 places to the right gives the same result.

What should I do when a problem has different units?

Change all the measurements to the same unit before you add or subtract. For example,

change feet to inches first, then compute, then change the answer back if the problem asks for it.