

Customary Length, Capacity, and Weight

You can use these charts to help you convert between customary units of measurement.

Customary Units of Length	Customary Units of Capacity	Customary Units of Weight
1 feet (ft) = 12 inches (in.)	1 cup (c) = 8 fluid ounces (fl oz)	1 pound (lb) = 16 ounces (oz)
1 yard (yd) = 3 feet (ft)	1 pint (pt) = 2 c or 16 fl oz	1 ton (T) = 2,000 lb
1 yard (yd) = 36 inches (in.)	1 quart (qt) = 2 pt or 4 c or 32 fl oz	
1 mile (mi) = 5,280 ft or 1,760 yd	1 gallon (gal) = 4 qt	

Complete. $4 \text{ yd} = \blacksquare \text{ ft}$

You are changing from a larger unit to a smaller unit, so multiply.

$$1 \text{ yd} = 3 \text{ ft}$$

$$4 \text{ yd} = 4 \times 3 \text{ ft} = 12 \text{ ft}$$

So, $4 \text{ yd} = 12 \text{ ft}$.

Complete. $64 \text{ fl oz} = \blacksquare \text{ qt}$

You are changing from a smaller unit to a larger unit, so divide.

$$1 \text{ qt} = 32 \text{ fl oz}$$

$$64 \text{ fl oz} \div 32 \text{ fl oz} = 2 \text{ qt}$$

So, $64 \text{ fl oz} = 2 \text{ qt}$.

Complete.

1. $10 \text{ gal} = \blacksquare \text{ qt}$

$$1 \text{ gal} = \underline{\hspace{2cm}} \text{ qt}$$

$$10 \text{ gal} = 10 \times \underline{\hspace{2cm}} \text{ qt} = \underline{\hspace{2cm}} \text{ qt}$$

2. $52 \text{ fl oz} = \blacksquare \text{ c}$

$$1 \text{ c} = \underline{\hspace{2cm}} \text{ fl oz}$$

$$52 \text{ fl oz} \div \underline{\hspace{2cm}} \text{ fl oz} = \underline{\hspace{2cm}} \text{ c}$$

3. $330 \text{ ft} = \underline{\hspace{2cm}} \text{ yd}$

4. $60 \text{ in.} = \underline{\hspace{2cm}} \text{ ft}$

5. $\frac{1}{2} \text{ mi} = \underline{\hspace{2cm}} \text{ ft}$

6. $5,280 \text{ yd} = \underline{\hspace{2cm}} \text{ mi}$

7. $\frac{1}{4} \text{ mi} = \underline{\hspace{2cm}} \text{ yd}$

8. $20 \text{ yd} = \underline{\hspace{2cm}} \text{ ft}$

9. $6 \text{ gal} = \underline{\hspace{2cm}} \text{ qt}$

10. $3 \text{ qt} = \underline{\hspace{2cm}} \text{ pt}$

11. $96 \text{ fl oz} = \underline{\hspace{2cm}} \text{ qt}$

12. $4\frac{1}{2} \text{ qt} = \underline{\hspace{2cm}} \text{ c}$

13. $4,000 \text{ lb} = \underline{\hspace{2cm}} \text{ T}$

14. $20 \text{ fl oz} = \underline{\hspace{2cm}} \text{ c}$

Metric Length, Capacity, and Mass



Estimate the length of each line segment. Then find its length to the nearest centimeter or millimeter as shown.

1. to the nearest centimeter.



Estimate: _____

Measurement: _____

2. to the nearest millimeter



Estimate: _____

Measurement: _____

Complete.

- 3. 40 mm = _____ cm 4. 10 km = _____ m 5. 90 g = _____ kg
- 6. 0.1 L = _____ mL 7. 8,560 mm = _____ m 8. 7.88 mL = _____ L
- 9. 0.05 km = _____ cm 10. 5 g = _____ kg 11. 0.0042 kg = _____ g
- 12. 3 L = _____ mL 13. 25 kg = _____ g 14. 8 mL = _____ L

Circle the best estimate of the volume or mass of each object.

- 15. a soccer ball
 - a. 400 g b. 40 g c. 4 g
- 16. a bicycle
 - a. 5 kg b. 50 kg c. 500 kg
- 17. a fish tank
 - a. 4 L b. 40 L c. 400 L
- 18. a water bottle
 - a. 10 L b. 1 L c. 0.1 L
- 19. a feather
 - a. 50 g b. 5 g c. 500 g

Problem Solving

20. Ken is 1.8 m tall. His sister is 1.48 m tall. How many centimeters taller is Ken than his sister? Explain.

21. Tracy has a 5-liter punch bowl. She buys two containers of juice that hold 1.75 liters and 2.75 liters. Can she empty the two containers into the bowl? Explain.

Metric Length, Capacity, and Mass



The **meter (m)** is the basic unit of length in the metric system.

A compact disc is about 1 millimeter thick.

A doorknob is about 1 meter above the floor.

The **liter (L)** and the **milliliter (mL)** are metric units of capacity.

A soup spoon holds about 1 mL of liquid.

A bottle holds about 1 L of liquid.

Mass is the amount of matter in an object.

The **kilogram (kg)** and the **gram (g)** are metric units of mass.

A paper clip weighs about 1 g.

A dictionary weighs about 1 kg.

Metric Units of Length

1 kilometer (km) = 1,000 meters (m)
 1 meter = 100 centimeters (cm)
 1 centimeter = 10 millimeters (mm)

Metric Units of Capacity

1 liter (L) = 1,000 milliliters (mL)
 1 liter (L) = 100 centiliters (cL)
 1 centiliter (cL) = 10 milliliters (mL)

Metric Units of Mass

1 metric ton (t) = 1,000 kilograms (kg)
 1 kilogram (kg) = 1,000 grams (g)
 1 gram (g) = 1,000 milligrams (mg)

Complete. $4 \text{ kg} = \blacksquare \text{ g}$

You are changing from a larger unit to a smaller unit, so multiply.

$$4 \text{ kg} = 4 \times 1,000 \text{ g} = 4,000 \text{ g}$$

Complete. $40 \text{ mL} = \blacksquare \text{ L}$

You are changing from a smaller unit to a larger unit, so divide.

$$40 \text{ mL} \div 1,000 \text{ mL} = 0.04 \text{ L}$$

Choose an appropriate metric unit of measurement for each.

- | | |
|-----------------------------------|-----------------------------------|
| 1. the width of a TV screen _____ | 2. the height of a building _____ |
| 3. the mass of a grapefruit _____ | 4. the capacity of a mug _____ |

Complete.

5. $4.5 \text{ m} = \blacksquare \text{ cm}$

$1 \text{ m} = \text{_____ cm}$

$4.5 \text{ m} = 4.5 \times \text{_____ cm} = \text{_____ cm}$

6. $7,000 \text{ mg} = \blacksquare \text{ g}$

$1 \text{ g} = \text{_____ mg}$

$7,000 \text{ mg} \div \text{_____ mg} = \text{_____ g}$

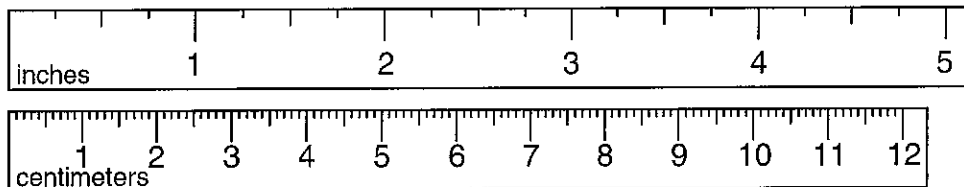
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|---|---------------------------------------|---------------------------------------|
| 7. $4.5 \text{ L} = \text{_____ mL}$ | 8. $5 \text{ kg} = \text{_____ g}$ | 9. $45 \text{ mm} = \text{_____ m}$ |
| 10. $895 \text{ kg} = \text{_____ t}$ | 11. $450 \text{ cm} = \text{_____ m}$ | 12. $65 \text{ mL} = \text{_____ L}$ |
| 13. $2,500 \text{ mg} = \text{_____ g}$ | 14. $11 \text{ m} = \text{_____ cm}$ | 15. $6.3 \text{ L} = \text{_____ cL}$ |

Explore Conversions between Systems



You can get a better sense of metric units by comparing them to customary units you already know.

Compare the inch ruler and the centimeter ruler.



1 inch is about 2.5 centimeters.

You can also use this table to help you estimate equivalents between one system of measurement and another.

Distance Measures		
1 in. \approx 2.5 cm	1 yd \approx 0.9 m	1 mi \approx 1.6 km
1 cm \approx 0.4 in.	1 m \approx 1.1 yd	1 km \approx 0.6 mi
Mass Measures		Capacity Measures
1 oz \approx 30 g		1 qt \approx 0.9 L
1 kg \approx 2 lb		1 L \approx 1.1 qt

Complete. $100 \text{ cm} \approx \blacksquare \text{ in.}$

$$1 \text{ cm} \approx 0.4 \text{ in.}$$

$$100 \times 0.4 = 40$$

So, 100 cm is about 40 in.

Complete. $18 \text{ L} \approx \blacksquare \text{ qt}$

$$1 \text{ qt} \approx 0.9 \text{ L}$$

$$18 \div 0.9 = 20$$

So, 18 L is about 20 qt.

Complete. Round to the nearest whole number.

- | | | |
|--------------------------------------|---|--|
| 1. $2.5 \text{ km} \approx$ _____ mi | 2. $3 \text{ in.} \approx$ _____ cm | 3. $5 \text{ oz} \approx$ _____ g |
| 4. $1.5 \text{ L} \approx$ _____ qt | 5. $100 \text{ yd} \approx$ _____ m | 6. $15 \text{ kg} \approx$ _____ lb |
| 7. $1 \text{ ft} \approx$ _____ cm | 8. $50 \text{ m} \approx$ _____ yd | 9. $900 \text{ g} \approx$ _____ oz |
| 10. $5 \text{ lb} \approx$ _____ kg | 11. $2.5 \text{ L} \approx$ _____ qt | 12. $150 \text{ km} \approx$ _____ mi |
| 13. $20 \text{ qt} \approx$ _____ L | 14. $2,000 \text{ mi} \approx$ _____ km | 15. $2 \frac{1}{4} \text{ in.} \approx$ _____ cm |

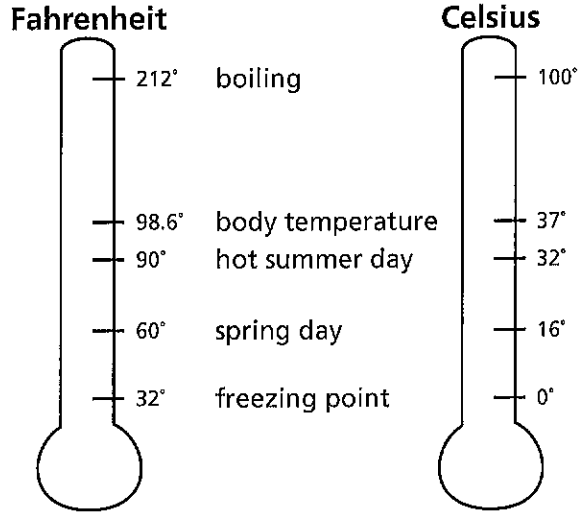
Temperature



Two common temperature scales are the Celsius (°C) and Fahrenheit (°F) scales.

The boiling point of water is 100°C or 212°F.

The freezing point of water is 0°C or 32°F.



You can use these formulas to convert temperatures between the two scales.

$$C = \frac{5}{9} \times (F - 32)$$

$$F = (1.8 \times C) + 32$$

Complete. $48^\circ\text{F} \approx \blacksquare^\circ\text{C}$

$$\frac{5}{9} \times (48 - 32) = \frac{5}{9} \times 16 = 8\frac{8}{9}$$

So, 48°F is about 9°C .

Complete. $20^\circ\text{C} \approx \blacksquare^\circ\text{F}$

$$(1.8 \times 20) + 32 = 36 + 32 = 68$$

So, 20°C is about 68°F .

Write true or false.

1. 20°C is colder than 20°F .

2. You need a sweater at 40°C .

3. You need a sweater at 40°F .

4. It might snow at 20°F .

Write each temperature in degrees Celsius. Round to the nearest degree.

5. 60°F _____

6. 95°F _____

7. -12°F _____

Write each temperature in degrees Fahrenheit. Round to the nearest degree.

8. 18°C _____

9. 32°C _____

10. -2°C _____