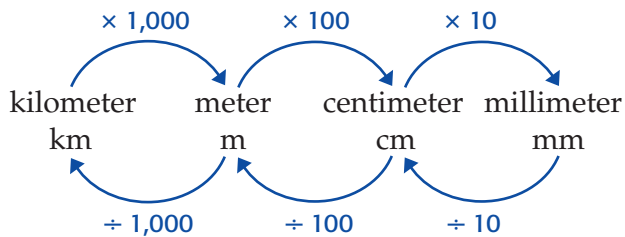


Converting Measurements within the Metric System

All units of length in the metric system are defined in terms of the meter (m). The diagram shows the relationships between some common metric units.



| Comparing Metric and Customary Units of Length |
|---|
| 1 mm \approx 0.04 inch (height of a comma) |
| 1 cm \approx 0.4 inch (half the width of a penny) |
| 1 m \approx 1.1 yards (width of a doorway) |
| 1 km \approx 0.6 mile (length of a city block) |

- To convert from larger units to smaller units, multiply.
- To convert from smaller units to larger units, divide.

There will be a greater number of smaller units than larger units.

| Converting From Larger Units to Smaller Units | Converting From Smaller Units to Larger Units |
|---|---|
| 1 km = $1 \times 1,000$ = 1,000 m | 1 mm = $1 \div 10$ = 0.1 cm |
| 1 m = 1×100 = 100 cm | 1 cm = $1 \div 100$ = 0.01 m |
| 1 cm = 1×10 = 10 mm | 1 m = $1 \div 1,000$ = 0.001 km |

There will be fewer larger units than smaller units.

EXAMPLES Convert Metric Units of Length

Complete each sentence.

1 $7 \text{ km} = \square \text{ m}$

$$7 \text{ km} = (7 \times 1,000) \text{ m}$$

$$= 7,000 \text{ m}$$

2 $123 \text{ cm} = \square \text{ m}$

$$123 \text{ cm} = (123 \div 100) \text{ m}$$

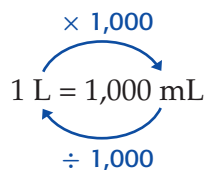
$$= 1.23 \text{ m}$$

3 $38.9 \text{ cm} = \square \text{ mm}$

$$38.9 \text{ cm} = (38.9 \times 10) \text{ mm}$$

$$= 389 \text{ mm}$$

The basic unit of capacity in the metric system is the liter (L). A liter and milliliter (mL) are related in a manner similar to meter and millimeter.



| Comparing Metric and Customary Units of Capacity |
|--|
| 1 mL \approx 0.03 ounce (drop of water) |
| 1 L \approx 1 quart (bottle of ketchup) |

EXAMPLES Convert Metric Units of Capacity

Complete each sentence.

4 $14.5 \text{ L} = \square \text{ mL}$

$$14.5 \text{ L} = 14.5 \times 1,000 \text{ or } 14,500 \text{ mL}$$

5 $750 \text{ mL} = \square \text{ L}$

$$750 \text{ mL} = 750 \div 1,000 \text{ or } 0.75 \text{ L}$$

The *mass* of an object is the amount of matter that it contains. The basic unit of mass in the metric system is the kilogram (kg). Kilogram, gram (g), and milligram (mg) are related in a manner similar to kilometer, meter, and millimeter.

$$1 \text{ kg} = 1,000 \text{ g} \quad 1 \text{ g} = 1,000 \text{ mg}$$

| Comparing Metric and Customary Units of Mass |
|---|
| 1 g \approx 0.04 ounce (one raisin) |
| 1 kg \approx 2.2 pounds (six medium apples) |

EXAMPLES**Convert Metric Units of Mass**

Complete each sentence.

6 $53 \text{ kg} = \blacksquare \text{ g}$

$$53 \text{ kg} = 53 \times 1,000 \text{ or } 53,000 \text{ g}$$

7 $4,500 \text{ g} = \blacksquare \text{ kg}$

$$4,500 \text{ g} = 4,500 \div 1,000 \text{ or } 4.5 \text{ kg}$$

Sometimes you need to perform more than one conversion to get the desired unit.

EXAMPLES**Convert Metric Units Using Two Steps**

Complete each sentence.

8 $35,000 \text{ cm} = \blacksquare \text{ km}$

$$35,000 \text{ cm} = 35,000 \div 100 \text{ m}$$

$$= 350 \text{ m}$$

$$350 \text{ m} = 350 \div 1,000 \text{ km}$$

$$= 0.35 \text{ km}$$

$$\text{So, } 35,000 \text{ cm} = 0.35 \text{ km.}$$

9 $4.5 \text{ kg} = \blacksquare \text{ mg}$

$$4.5 \text{ kg} = 4.5 \times 1,000 \text{ g}$$

$$= 4,500 \text{ g}$$

$$4,500 \text{ g} = 4,500 \times 1,000 \text{ mg}$$

$$= 4,500,000 \text{ mg}$$

$$\text{So, } 4.5 \text{ kg} = 4,500,000 \text{ mg.}$$