Lesson 21: Getting the Job Done—Speed, Work, and Measurement Units

Classwork

Conversion tables contain ratios that can be used to convert units of length, weight, or capacity. You must multiply the given number by the ratio that compares the two units.

Opening Exercise

Identify the ratios that are associated with conversions between feet, inches, and yards.

12 inches = 1 foot; the ratio of inches to feet is 12:1.

1 foot = 12 inches; the ratio of feet to inches is 1:12.

3 feet = 1 yard; the ratio of feet to yards is 3:1.

1 yard = 3 feet; the ratio of yards to feet is 1:3.

Example 1

Work with your partner to find out how many feet are in 48 inches. Make a ratio table that compares feet and inches. Use the conversion rate of 12 inches per foot or $\frac{1}{12}$ foot per inch.

1 ft = 12 inches or 1 in = $\frac{1}{12}$ ft.

$$\frac{1 \text{ foot}}{12 \text{ inches}} \times \frac{48 \text{ inches}}{1} = \frac{48}{12} = 4 \text{ feet.}$$

Example 2

How many grams are in 6 kilograms? Again, make a record of your work before using the calculator. The rate would be 1,000 grams per kilogram. The unit rate would be 1,000.

1 Kilogram (kg) = 1000 grams

$$\frac{6 \text{ Kilograms}}{1} \times \frac{1000 \text{g}}{1 \text{ kg}} = \frac{6000}{1} = 6000 \text{ grams.}$$

Exercise 1

How many cups are in 5 quarts? As always, make a record of your work before using the calculator. The rate would be 4 cups per quart. The unit rate would be 4.

1 quart = 4 cups.

$$\frac{5}{1} \text{ quarts} \times \frac{4 \text{ cups}}{1 \text{ quart}} = \frac{20 \text{ cups}}{1} = 20 \text{ cups.}$$

Exercise 2

How many quarts are in 10 cups?

1 quart = 4 cups

$$\frac{10 \text{ cups}}{1} \times \frac{1 \text{ quart}}{4 \text{ cups}} = \frac{10}{4} \text{ quarts} \div 2 = \frac{5}{2} \text{ quarts} \qquad 2\overline{)5}\ R1 = 2\frac{1}{2} \text{ quarts}$$

U.S. Customary Length	Conversion
Inch (in.)	$1 \text{ in.} = \frac{1}{12} \text{ ft.}$
Foot (ft.)	$1 \text{ ft.} = 12 \text{ in.}$
Yard (yd.)	$1 \text{ yd.} = 3 \text{ ft.}$ $1 \text{ yd.} = 36 \text{ in.}$
Mile (mi.)	$1 \text{ mi.} = 1{,}760 \text{ yd.}$ $1 \text{ mi.} = 5{,}280 \text{ ft.}$

Metric Length	Conversion
Centimeter (cm)	$1 \text{ cm} = 10 \text{ mm}$
Meter (m)	$1 \text{ m} = 100 \text{ cm}$ $1 \text{ m} = 1{,}000 \text{ mm}$
Kilometer (km)	$1 \text{ km} = 1{,}000 \text{ m}$

U.S. Customary Weight	Conversion
Pound (lb.)	$1 \text{ lb.} = 16 \text{ oz.}$
Ton (T.)	$1 \text{ T.} = 2{,}000 \text{ lb.}$

Metric Capacity	Conversion
Liter (L)	$1 \text{ L} = 1{,}000 \text{ ml}$
Kiloliter (kL)	$1 \text{ kL} = 1{,}000 \text{ L}$

U.S. Customary Capacity	Conversion
Cup (c.)	$1 \text{ c.} = 8$ fluid ounces
Pint (pt.)	$1 \text{ pt.} = 2 \text{ c.}$
Quart (qt.)	$1 \text{ qt.} = 4 \text{ c.}$ $1 \text{ qt.} = 2 \text{ pt.}$ $1 \text{ qt.} = 32$ fluid ounces
Gallon (gal.)	$1 \text{ gal.} = 4 \text{ qt.}$ $1 \text{ gal.} = 8 \text{ pt.}$ $1 \text{ gal.} = 16 \text{ c.}$ $1 \text{ gal.} = 128$ fluid ounces

Metric Mass	Conversion
Gram (g)	$1 \text{ g} = 1{,}000 \text{ mg}$
Kilogram (kg)	$1 \text{ kg} = 1{,}000 \text{ g}$