

Chem 1020
Conversions Worksheet

Practice setting each of these up as a single string of conversion factors with units cancelling. Each conversion may have several different methods to solve it. Answers are given in scientific notation if they're less than 1 or greater than 100.

A. English/Metric Conversions

1. How many ounces are in 4.83 kg?

$$4.83 \text{ kg} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ oz}}{28.35 \text{ g}} = 1.70 \times 10^2 \text{ oz}$$

2. 2.93 miles = ? cm

$$2.93 \text{ mi} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{30.48 \text{ cm}}{1 \text{ ft}} = 4.72 \times 10^5 \text{ cm}$$

3. 9.2 L corresponds to how many cups?

$$9.2 \text{ L} \times \frac{1.057 \text{ qt}}{1 \text{ L}} \times \frac{2 \text{ pt}}{1 \text{ qt}} \times \frac{2 \text{ cups}}{1 \text{ pt}} = 39 \text{ cups}$$

4. How many square centimeters (cm²) are in 6.95 acres?

$$6.95 \text{ acres} \times \frac{1 \text{ mi}^2}{640 \text{ acres}} \times \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right)^2 \times \left(\frac{30.48 \text{ cm}}{1 \text{ ft}} \right)^2 =$$
$$6.95 \text{ acres} \times \frac{1 \text{ mi}^2}{640 \text{ acres}} \times \frac{2.78784 \times 10^7 \text{ ft}^2}{1 \text{ mi}^2} \times \frac{9.290304 \times 10^2 \text{ cm}^2}{1 \text{ ft}^2} = 2.81 \times 10^8 \text{ cm}^2$$

B. Word-problem conversions

5. One can of Coca-Cola (12 fluid ounces) contains 39 g sugar. How many grams of sugar are in 1.0 mL of Coca-Cola?

$$1.0 \text{ mL soda} \times \frac{1 \text{ fl oz}}{29.57 \text{ mL}} \times \frac{1 \text{ can}}{12 \text{ fl oz}} \times \frac{39 \text{ g sugar}}{1 \text{ can}} = 0.11 \text{ g sugar}$$

6. You are to administer to a patient theophylline 6.0 mg/kg. The patient weighs 145 lbs. Your supply of theophylline comes in 125 mg tablets. How many tablets do you give? Tablets can be only given whole or broken in half, so round your answer to the nearest half-tablet.

$$145 \text{ lbs} \times \frac{435.6 \text{ g}}{1 \text{ lb}} \times \frac{1 \text{ kg}}{1000 \text{ g}} \times \frac{6.0 \text{ mg tph}}{1 \text{ kg}} \times \frac{1 \text{ tablet}}{125 \text{ mg tph}} = 3 \text{ tablets}$$

7. Your leaky faucet fills up a 10-mL graduated cylinder in 5.2 hours. How many gallons of water leak out of the faucet in a year?

$$1 \text{ year} \times \frac{365 \text{ days}}{1 \text{ year}} \times \frac{24 \text{ hours}}{1 \text{ day}} \times \frac{10 \text{ mL}}{5.2 \text{ hours}} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1 \text{ gal}}{3.785 \text{ L}} = 4.5 \text{ gallons}$$

8. How many minutes does it take a 600.-watt hotplate to supply 450. kilojoules of energy to a sample of water? (watt = W, kilojoule = kJ, 1 W = 1 J/s)

$$450 \text{ kJ} \times \frac{1000 \text{ J}}{1 \text{ kJ}} \times \frac{1 \text{ s}}{600 \text{ J}} \times \frac{1 \text{ min}}{60 \text{ s}} = 12.5 \text{ min}$$