

Chapter 2 Practice

2.1 Measurement: A Foundation of Good Science

1. Write the following in standard notation:

- 1.62×10^{-5}
- 2.992×10^5

2. Write the following in scientific notation:

- 150,000,000
- 0.0008923

3. Fill in the appropriate values. See how many you can do without looking them up.

- a. 1 milliliter = _____ liters b. 1 kilogram = _____ grams
c. 1 mm = _____ m d. 1 MJ = _____ J

4. Identify the unit represented by each abbreviation.

cm kg ng μL mL ML kJ

5. Find the number of significant figures in each measurement:

- 4.300 km
- 0.0052 g
- 0.308 kJ

6. Complete the following calculations. Answer to the correct number of significant figures.

- a. $(1.4 \times 10^6)(9.1 \times 10^{-5})$
b. $(5.4 \times 10^5)/(3.7 \times 10^{-5})$
c. $(2.1 \times 10^4) \div 3.0$

2.2 Unit Conversion

7. Solve the following, including units: $(2.021 \times 10^{12} \text{ kJ}) \times \frac{1,000 \text{ J}}{1 \text{ kJ}} \times \frac{1 \text{ cal}}{4.184 \text{ J}} =$

8. Solve the following, including units: $\frac{5.20 \times 10^8 \text{ g}}{7.85 \times 10^6 \text{ g/m}^3} =$

9. How many milliliters are in 5.9 L?
10. How many grams are in 5,300 mg?
11. You are laying tile in a kitchen with an area of 9.4 square meters. What is this area in square feet? (1 meter = 3.28 feet)
12. A large soft drink has a volume of 0.950 L. What is this volume in cm^3 ?
13. A stream flows at a rate of 10.4 liters per hour. Convert this rate to cubic meters per day.
14. A waterway contains 10.3 milligrams of an impurity per gallon of water. How many micrograms of impurity are present per liter of water?

2.3 Density: Relating Mass to Volume

15. A student working in the laboratory needs 500 g of a liquid chemical whose density is 1.41 g/cm^3 . What volume of this liquid should he measure?
16. What is the mass of a 5.31-mL sample of a liquid with a density of 2.10 g/mL ?

2.4 Measuring Temperature

17. The average human body temperature is 98.6°F . Convert this temperature to degrees Celsius and to Kelvin.
18. In July, the average high temperature in New York City is 25°C . Convert this temperature to degrees Fahrenheit and to Kelvin.

Challenge

19. Upon graduating with a good GPA and work experience, you are pleased to receive two job offers. Company A offers a salary of \$42,000/year. Company B offers an hourly pay of \$25.00/hour. Assuming that you will work 50 weeks per year at 40 hours/week, use the factor-label method to find your annual income at Company B. Which offer is more lucrative?
20. You recently started a candle-making business and need to purchase a large amount of a unique scented wax. You plan to charge \$9.95 per large candle. The wax you need is available from a U.S. supplier for \$24.00/lb and also from a German supplier for $\text{€}9.20/\text{kg}$. If the current exchange rate is $\$1 = \text{€}0.76$ and $1 \text{ kg} = 2.20 \text{ lb}$, which supplier is giving the better price?