

**Do Now: Sig Figs and Density Warm-Up**

1. Solve each of the following problems. Report your answers with the correct number of significant figures.

a.  $16.5 + 8 + 4.73 =$

d.  $35 / 0.0622 =$

b.  $23.27 - 12.058 =$

e.  $3400 \times 0.00800 =$

c.  $0.0853 + 0.05477 + 0.0002 =$

f.  $\frac{(43.1 + 27.250) \times (22.514 - 18.0)}{0.00155 \times 22.1011} =$

2. Solve the following density problems:

a. The density of a copper cube is 8.92 g/mL. If that cube had its volume computed to be 74 mL, what is the mass of that cube?

b. Using water displacement, a fine young chemist decides to submerge an iron ( $D = 7.6$  g/mL) chunk into a graduated cylinder with 20.0 mL of water. If the cylinder has a mass of 67 grams, what is the final volume in the graduated cylinder?

c. You go fishing and obtain some lead weights for your trip. Since you are the smartest chemistry student in the land, you know that lead's density is 11.34 g/mL. If there are 50 weights in a 250. mL box, what is the mass of each weight?

d. A student pipettes 5.00 mL of ethanol into a flask that has a mass of 15.25 grams. She finds the mass of the flask plus ethanol is 19.17 grams. Calculate the density of ethanol.



- 4) Water has a density of 1 g/mL. This means, for water, 1 g = 1 mL. 1 kg = 1,000 g. Find the following:
- the number of milliliters (mL) in 1.6 kg of water
  - the number of kilograms (kg) in 75 mL of water
7. Your plumber discovers a small leak that is leaking water at a rate of 1.2 mL per hour. How many Liters of water are leaked in exactly one week?
8. You visit the Willis Tower. You notice that every room in the Willis Tower has 18 lights on the ceiling and get curious about how many lights are in the whole building. There are 110 floors in the Willis Tower, and each floor has 98 rooms in it. Wow! How many total lights are in the Willis Tower?
9. Dr. Ott can run a marathon (26.2 miles) in 2.925 hours. What is his average speed in meters per second? (1 meter = 3.28 feet, 1 mile = 5280 feet)



## Dimensional Analysis Problem Set

1. The lung capacity of the blue whale is  $5.0 \times 10^3$  L. convert this volume into gallons.
2. The Statue of Liberty is 151 feet tall. Calculate its height in meters.
3. A bumble bee flies with a ground speed of 15.2 meters per second. Calculate its speed in kilometers per hour.
4. Bamboo can grow up to 60.0 cm/day. Convert this growth rate into inches per hour.
5. You have \$300.00 in gas money to spend on a vacation. If your car gets 32km/liter and current gas prices average \$1.15 per liter, how far can you drive?

6. Your parents have offered to buy pizzas for you and your friends. You are having 8 friends over and each will eat 2.0 pieces of pizza. Each pizza has eight slices and costs \$10.99. How much money will your parents have to spend on pizza?

7. You get paid \$7.00 per hour working at a restaurant. You want to buy a car that costs \$9500. If you work an average of 15 hours a week, how long will it take you to earn the money to buy the car?

8. Precious metals and gems are measured in troy weights in the English system:

24 grains = 1 pennyweight                      20 pennyweights = 1 troy ounce

12 troy ounces = 1 troy pound    1 grain = 0.0648 gram

The most common English unit of mass is the troy pound. What is 2.0 troy pounds in kilograms?

9. How much would it cost to buy nails used to build a fence 125m long if it requires 30 nails per meter? Assume that 50 nails are sold per box at a cost of \$0.75 per box.