**Practice with Density Worksheet**

Dimensional Analysis

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| SUBSTANCE | DESCRIPTION/  CHEMICAL SYMBOL | DENSITY (g/mL for liquids, g/cm3 for solids) |
| gasoline | a mixture of hydrocarbons (l) | 0.67 (variable) |
| ethyl alcohol | C2H5OH (l) | 0.789 |
| pure water | H2O (l) at 4oC | 1.00 |
| sea water | a mixture of salts in water(aq) | 1.20 (variable) |
| ice | H2O (s) | 0.917 |
| quartz | SiO2 (s) | 2.20 |
| magnesium | Mg (s) | 1.738 |
| aluminum | Al (s) | 2.70 |
| iron | Fe (s) | 7.87 |
| copper | Cu (s) | 8.92 |
| lead | Pb (s) | 11.3 |
| mercury | Hg (l) | 13.5 |
| gold | Au (s) | 19.3 |

1. Calculate the volume, in quarts, of 439 mg of ethyl alcohol. (Don’t forget to change mg to g)
2. What is the mass, in lbs., of 2.50 x 104 mm3 of aluminum?
3. Calculate the density, in g/cm3, of a 3.48 kg rectangular solid object that measures 3.4 cm by 23.9 cm by 22.8 cm.
4. What is the volume, in gallons, of 6.6 kg of water?

Answers: (3) 1.9 g/mL (4) 1.7 gal

1. How many sig figs are in each of the following:

a. 30406 cm \_\_\_\_\_\_\_\_ b. 13030 L \_\_\_\_\_\_\_\_

c. 0.003040 g \_\_\_\_\_\_\_\_ d. 2.00 x 10-3 mL \_\_\_\_\_\_\_\_

e. 3005 kg \_\_\_\_\_\_\_\_ f. 3 ft/yd \_\_\_\_\_\_\_\_

1. Round the following to 3 sig figs:

a. 3.05900 L \_\_\_\_\_\_\_\_ b. 179,501 g \_\_\_\_\_\_\_\_

c. 199,624,428 g \_\_\_\_\_\_\_\_ d. 0.0034950 kg \_\_\_\_\_\_\_\_

e. 344,500 mm \_\_\_\_\_\_\_\_ f. 23,550 cm \_\_\_\_\_\_\_\_

g. 699,500 Mg \_\_\_\_\_\_\_\_ h. 99,950 km \_\_\_\_\_\_\_\_

1. Perform the following arithmetic operations and report your answer with the correct number of sig figs and correct units.

a. 23.098 cm + 0.040 cm + 2300.0 cm = \_\_\_\_\_\_\_\_

b. 450600 L - 0.4030 L =\_\_\_\_\_\_\_\_

c. (2300 mm)(2.3080 mm) = \_\_\_\_\_\_\_\_

d. (0.00340 km)(3.4 X 10-5 km) = \_\_\_\_\_\_\_\_

e. (2.03 x 10-6 m)(3.0 x 107m)(3.500 x 10-2 m) / 23.00 m = \_\_\_\_\_\_\_\_

1. An acre is 43,560 square feet. A hectare (ha) is a square plot of land 100 m on each side. How many hectares are in 25.0 acres?
2. What is the volume, in cm3, of a block of stone measuring 25.0 ft x 12.5 ft x 8 ft.?

1. Calculate the mass, in g, of 23.9 mL of benzene (d = 0.879 g/mL).
2. Calculate the volume, in L, of 34 kg of carbon tetrachloride (d = 1.59 g/mL)

Answers: 8) 10.1 ha, 9) 7 x 107 cm3, 10) 21.9g, 11) 2.1 x 104 mL

1. What mass of lead (Pb) has the same volume as 46.8 g of iron (Fe)?
2. A car is rated with a highway gasoline mileage of 41 miles per gallon of gas. How many liters of gasoline will be needed for a highway trip of 555 kilometers?
3. Suppose that a standard snail's pace is measured to be 0.040 ft per min. Measured in cm per second, what is the value of the snail’s pace?
4. A piece of aluminum foil (dAl = 2.70 g/cm3) measures 10.4 cm by 12.6 cm and has a mass of 1.334 g. Calculate the thickness, in mm, of the aluminum foil. (hint: you will need the density of aluminum)

Answers: 12) 167.2 g, 13) 31.7 L, 14) 0.020 cm/s, 15) 3.77 x 10-2 mm