Name _____ Partner _____
Lab Section M Tu W Th F

Chemistry 130
Experiment 1: Calculators, Unit Conversions, Density

You will need a calculator for this lab. Please make sure you have access to your own calculator! Any inexpensive calculator will be fine as long as it has an "exponent" key (the exponent function is usually an EXP or EE key).

I. Do these calculations, reporting each answer to the correct number of significant figures.

A. 3.787×5.2428

B. $7.227 \times 10^4 \times 1.1 \times 10^6$

C. $7.71 \times 10^9 \times 7.6 \times 10^4$

D. $6.54246 + 659.322 + 83.403856$

E. $6.433 \times 10^{-4} + 8.7395 \times 10^{-3}$

F. $8.442 + 2.43 + 2.0 \times 10^{-3}$

G. $\dfrac{8.349 \times 10^5}{2.31 \times 10^4}$

H. $\dfrac{(48.2 - 2.6)}{28.3041}$

I. $(23.541 / 1.32 \times 10^3) + 321.1$

J. $\dfrac{[(2.3 \times 10^{-2} + 1.24 \times 10^{-2}) / (43.214 - 0.0243)] + 312.6}{(103.2 - 28.178)}$

II. Unit Conversions

A. What is your "ideal weight"? [not necessarily your actual weight] _____ lb.

Convert your ideal weight in lbs to your weight in grams [1 lb = 453.6 g].

Now convert your gram value into kilograms [1 kg = 1000 g].

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Unit Conversions ..... continued

B. Use the tape measure (with the help of your partner) to measure the distance from your nose to the tip of your middle finger [measure to +/- one sixteenth of an inch].

Distance = _____ and _____ / 16 th inches.

First convert your measured value into inches *only* [that is change the 16ths of an inch into a decimal by actually dividing the number of 16ths by 16. *Example*: suppose the distance was 26 and 3/16ths. 3 divided by 16 = 0.1875; so the distance is 26.1875 inches].

Convert your inch value into centimeters [1 in = 2.54 cm].

Now convert your centimeter value into millimeters [1 cm = 10 mm].

Now convert your millimeter value into meters [1 m = 1000 mm].

III. Density

Density is a physical property of matter, and it has the dimensions of mass per unit volume. Densities are often given in units of grams per milliliter. In this experiment you will determine the mass by weighing "by difference," that is: weigh the empty container, then weigh the container with the substance, and then subtract the two weights to get the mass of the substance. You will measure the volume by using a volumetric transfer pipet, which when filled to the mark will hold 10.00 +/- 0.02 mL of the liquid. Techniques for the use of the balance and the pipet will be demonstrated by your laboratory instructor.

Both you and your lab partner will *each* do one evaluation of the density of a liquid and then you both can use the "average value" to compare with the "known value."

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Density ..... continued

Experimental Instructions

Weigh a *dry* 50-mL beaker to +/- 0.002 g on the balance. Record the value below. Remember that every measured value has a number part and a unit part.

Using the pipet, transfer 10.00 mL of the liquid into the beaker. Be sure that all the liquid goes into the beaker! The transfer pipet that you are using is calibrated to deliver the ten milliliters of liquid and still retain some liquid in the tip of the pipet - *do not try to get the last little bit of liquid out of the pipet!* Now weigh the beaker with the liquid (again to +/- 0.002 g). Record the value below.

Calculate the density of the liquid from your data. Record your value below.
[Density = mass of liquid (g) / volume of liquid (mL)]

Record the data from your partner below as well.

Calculate an "average value" for the density by adding both experimental values together and dividing the sum by two. How well does the average value compare to the known value for the density of your liquid?

Calculate your percent error. Your error will be the difference between the accepted value and your experimental average value (it may be positive or negative). To get the percent error, divide your error by the accepted value and multiply the result by 100.

	Your Data	**Your Partner's Data**
Mass of beaker + liquid	_____	_____
Mass of empty beaker	_____	_____
Mass of liquid used	_____	_____
Volume of liquid used	_____	_____
Density of liquid (expt)	_____	_____

Experimental average density _____

Accepted density _____

Percent Error _____