Chem 1 Hour\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Dr. Wexler  
Lab: Measurement and Unit Conversion  
Date:

**Introduction:** Measuring accurately and knowing how to convert from one measurement unit to another is a critical skill set for doing science as well as for many other things you will encounter in daily life such as home maintenance, construction, cooking, and finance.

For example, you need twenty 6 inch long sections of 1x4 pine. You find one 10 footer in your garage. Is this enough wood, or do you have to buy another plank? Well, if you know that there are 12 inches in a foot, then you have 10 feet x 12 inches/foot = 120 inches of wood. You need twenty 6 inch sections, therefore you need a total of 20 x 6inches = 120 inches. Therefore you have enough wood. (In reality, you will be slightly short. Do you know why?)

In today’s exercise you will figure out how much you have to spend to apply one coat of heat-resistant paint to the top of your lab bench. Be sure to show all calculations and write all units!!!!!!!!!!!!!!!!!!!!!!!

**Procedure and Results: (work in teams)**  
**Step 1.** Measure the length of the benchtop in centimeters (cm) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
**Step 2.** Measure the width of the benchtop in centimeters (cm) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
**Step 3.** Calculate the surface area of the benchtop. SA = L x W = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Step 4.** Calculate what volume of paint you need for one coat. You read on the internet that in general 1 gallon of paint will cover 400 square feet. How do you do this? It is tricky because in the U.S. we still use English units of measurement in daily life instead of metric (which is much easier to do calculations with).

Perhaps the easiest way to solve this problem is to convert 400 square feet from English units to metric units:  
1 square foot (ft2) = ? cm2   
  
I can tell you that 1 foot = 30.48 centimeters.   
Therefore, 1 ft2 = \_\_\_\_\_\_\_\_\_\_\_\_\_cm2, and 400ft2 = \_\_\_\_\_\_\_\_\_\_\_\_\_cm2 (note: express all numbers to two decimal places for now).

So, your conversion factor is now 1gal/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cm2

Now, you calculated in step 3 above that the surface area of the benchtop was \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm2   
To determine the volume of paint needed, **multiply** your tabletop surface area (cm2) by the conversion factor (gal/cm2).

Important! We know to multiply because we follow the units: cm2 x gal After canceling, we are left with gal.  
 cm2

Do this: \_\_\_\_\_\_\_\_\_\_\_cm2 x \_\_\_\_\_\_\_\_\_\_\_\_gal/cm2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_gal.

**Step 5.** Choose which size paint container to purchase. Your choices are:  
 A. 5 gal ($75)  
 B. 1 gal ($25)  
 C. 1 qt ($8)  
 D. 1 pt ($5)

Note: There are four quarts in a gallon, so 1qt = 1/4 gal  
 There are eight pints in a gallon, so 1pt = 1/8 gal

**Step 6.** Calculate your dollar cost to buy paint for one benchtop. = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Discussion:**

1. Why is it important to write all measurement units when measuring and doing calculations?

2. What kind of math term is a conversion factor?

3. If you want to paint all seven benchtops in the room with two coats each, how many gallons of paint do you need and how much will it cost? (Show all calculations and units).