

Measurement and Density Lab Activity

This lab activity has two parts. In Part 1 you will familiarize yourself with the basic units of the metric system and practice measuring accurately. In Part 2 you will use your measuring skills to determine the density of several objects.

Part 1

The metric system is based on standard units of length, mass and volume. The standard units are:

- Length – meter
- Mass – gram
- Volume (liquid) – liter
- Volume (solid) – cm^3
1 mL = 1 cm^3

1. Measure the length and width of this piece of paper in cm then convert to inches.
 - a. Length _____ cm, _____ in, Width _____ cm, _____ in
 - b. What is the area of the piece of paper? _____ cm^2 , _____ in^2
2. Grab an Earth Science textbook and measure the three dimensions in cm then convert to inches.
 - a. Length _____ cm, _____ in, Width _____ cm, _____ in, Height _____ cm, _____ in
 - b. What is the volume of the textbook? _____ cm^3 , _____ in^3
3. Grab a rubber stopper and mass it on the balance in grams, then convert to ounces.
 - a. Mass _____ g, _____ oz
4. Take a graduated cylinder and fill it **about** half-way full of water. (Don't worry about getting it exactly half).
 - a. Measure the volume of water in the cylinder. Be sure to read the level at the bottom of the meniscus. Volume of water _____ mL.
 - b. Now carefully add the rubber stopper to the cylinder and measure the new volume. Volume of water + rubber stopper: _____ mL.
 - c. Calculate the volume of the rubber stopper by subtracting your measurement in (a) from (b). Volume of rubber stopper _____ mL
 - d. How many cubic centimeters is the rubber stopper? _____ cm^3

Part 2

Now you will measure the density of 3 metal rods. Density is measured with the following formula:

Copy and fill in the following data table:

Metal	Mass (g)	Volume of Water (mL)	Volume of Water + Metal (mL)	Volume of Metal (mL)	Density (g/mL)
2 in gold					
2 in silver					
4 in silver					
Rock					
Item of your choice					

1. How does the volume of the 2-in silver rod compare to the 2-in gold rod?
2. How does the volume of the 2-in silver rod compare to the 4-in silver rod?
3. Which of the two metals has more mass in the same volume? **Explain.**
4. Explain in your own words what you think density is?
5. Use the table below to identify the metals.
 - a. Gold _____ Silver _____

Copper	Zinc	Gold	Aluminum	Brass
9.0 g/cm ³	7.1 g/cm ³	19.3 g/cm ³	2.7 g/cm ³	8.4 g/cm ³