Experiment 1C: Analysis of Experimental Results

(Adapted from Heath Laboratory Experiments)

INTRODUCTION:

Density is an *intensive property* of matter, since it does not depend on the amount of material measured. A cupful of water has the same density as a teaspoonful. Properties such as mass and volume are known as *extensive properties*, because they depend on the amount of material measured.

Since density is an *intensive property*, there is a direct relationship between the mass and volume of a specific sample of matter. In this lab, you will measure the mass and volume for various samples of water. Then, this data can be plotted on a graph to give a linear relationship. By calculating the slope of the line of best fit you will determine the density of water in g/mL.

OBJECTIVES:

1. To use a graduated cylinder to measure volume and a balance to measure mass.
2. To plot a graph of data collected in an experiment.
3. To analyze experimental data and calculate the slope of a line of best fit for a linear relationship.

MATERIALS:

**Apparatus Reagent**

Balance Beaker Safety glasses Graduated cylinder Tap water

PROCEDURE:

1. Put on your safety glasses.
2. Use the balance to determine the mass of a clean, dry, empty beaker. Record the mass in the data section.
3. Choose 5 different volumes of water to use in this experiment.
4. Measure the first volume of water in a graduated cylinder and record the exact volume in the data table.
5. Pour the water into the beaker.
6. Use the balance to determine the mass of the beaker and the water. Record the mass in the data table.
7. Repeat steps 3 – 5 for the remaining volumes of water.

DATA AND OBSERVATIONS:

Mass of empty beaker \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g

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| Volume of water (mL) | Mass of beaker + water (g) | Mass of water (g) |
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DATA ANALYSIS

1. Plot a graph of your data (mass of water vs. volume of water) using the graph paper provided.
2. Calculate the slope of the line of best fit. Show your work on the graph and include units.
3. The accepted density of water is 1.0 g/mL. If your experiment gave a different value for density, analyze the experiment to determine three possible causes.
4. Make a list of possible causes suggested by other students.
5. Evaluate each suggested cause and indicate which are most likely to be true. Then, select one cause that you think is the most probable cause and **explain** your selection.