Sci 8 Name:

**Relating Mass and Volume Lab** Period:

**Purpose:**   
1. To investigate the relationship between two properties of matter by interpreting data and to reinforce skills required to measure matter.   
2. To formulate a definition of density.

**Materials:**   
Beaker of water   
100-mL Graduated Cylinder   
Triple beam Balance

**Procedure:**

1. Use the triple beam balance to find the mass of an empty beaker to the nearest .01g.
2. Record the mass of the beaker in your data table for all six lines.
3. Measure 10mL of water using a graduated cylinder. Pour into beaker. Use the balance to find the mass of water. Record the mass of water in the table below.
4. Measure another 10mL water using the graduated cylinder. Add to the beaker of water already containing 10ml of water from step 3. Find the mass of the 20mL of water. Record.
5. Repeat step 4, continuing to add 10mL water to the beaker and recording each new mass, until you have a total of 60ml in your beaker.
6. Clean up: scales back to cart, beakers and cylinders on the drying rack.

**Data Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| Volume of Water | Mass of beaker and water | Mass of beaker (stays the same) | Mass of water |
| 10mL |  |  |  |
| 20mL |  |  |  |
| 30mL |  |  |  |
| 40mL |  |  |  |
| 50mL |  |  |  |
| 60mL |  |  |  |

Plot your measurements the graph below.

Volume (ml)

Mass (g)

**Conclusion Questions:**

1. Compare your results with those of another two teams. Is the mass of water a repeatable measurement? (can more than one person get nearly the same results)
2. Look at your graph and complete the following statements:
   1. For every 10mL increase in the volume of water, the mass changes by about \_\_\_\_\_g.
   2. 100mL of water should be about \_\_\_\_\_g.
   3. 2 ml of water should be about \_\_\_\_\_\_ g.
3. Write a summary statement describing the relationship between mass and volume of water.
4. Under normal circumstances would you expect your classmates to get similar results? Explain why.
5. For each corresponding volume enter in the masses of water in the 2nd row in the chart below. Round to one decimal point.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Volume | 10ml | 20ml | 30ml | 40ml | 50ml | 60ml |
| Mass |  |  |  |  |  |  |
| Mass / Volume |  |  |  |  |  |  |

Now divide each mass by its corresponding volume. ROUND TO NEAREST WHOLE NUMBER (NO DECIMAL). This is the density.

1. Was there a significant difference in all of your calculations?
2. As the MASS INCREASED what happened to the density?
3. Write a summary statement about what you learned from this lab regarding the relationship between MASS, VOLUME, and DENSITY.

**Going Further:**   
Mario wants to know how much water he will need to fill an aquarium with the following dimensions: Length= 50cm, Width=25cm, Depth=30cm.

a. How many ml of water will he need?

b. Mario’s aquarium stand can hold about 50,000 grams. If his empty aquarium weighs about 15,000 grams could filling up the aquarium with water cause his aquarium stand to collapse? Explain.