Sci 8 Name:

**Relating Mass and Volume Lab** Period:

**Purpose:**   
1. To investigate the relationship between two properties of matter (mass and volume) by interpreting data.

2. To reinforce skills required to measure matter.   
2. To formulate a definition of density.

**Materials:**   
Water

100ml Beaker   
10mL Graduated Cylinder   
Triple beam Balance

**Procedure:**

1. Use the triple beam balance to **find the mass** of an empty 100ml beaker to the nearest .01g.
2. **Record the mass** of the beaker in your data table on the next page. Carry this value down 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. Leave water in beaker.
4. **Measure another 10mL** water with the graduated cylinder. Add to the beakerof 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 back to bins.

**Data Table:**

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

**Graph:** Make a LINE Graph by plotting mass of **water** against volume of water on the graph below. Place volume on the x-axis and Mass on the y-axis. Label your graph, include units. Give it a title. Connect the dots.



**Conclusion Questions:**

1. Compare your results with two other teams. Are they close? Same?
2. Under normal circumstances would you expect your classmates to get similar results? Explain why.
3. 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.
4. For each corresponding volume of water, enter in **your mass** results in the 1st row in the chart below. **Round to one decimal point.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mass of water (g) |  |  |  |  |  |  |
| Volume of water (ml) | 10ml | 20ml | 30ml | 40ml | 50ml | 60ml |

1. Now **divide each mass** above by its **corresponding volume** and enter the results below. ROUND TO NEAREST WHOLE NUMBER (NO DECIMAL). This is the density.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Image result for density formula |  |  |  |  |  |  |

1. Was there a significant difference between any of these calculations once the answer was rounded to the nearest whole number?

|  |  |
| --- | --- |
| 1. As the MASS of water increases what happened to the DENSITY of water? | 1. As the VOLUME of water increases what happened to the DENSITY? |
| 1. Compare the DENSITY of 10ml of water to the density of 50ml of water: | 1. What do you think the density of 100ml of water would be? |

1. Write a summary statement about what you learned from this lab regarding the relationship between MASS, VOLUME, and DENSITY.
2. **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.

