

Name: _____ Section: _____

Exploring the Relationship Between Mass and Volume

Purpose: For this activity you will be performing a few measurements to help describe the relationship between mass and volume. Specifically, you will determine the mass of a given volume, incrementally increase the volume, and continue making mass measurements.

Hypothesis: _____

Materials:

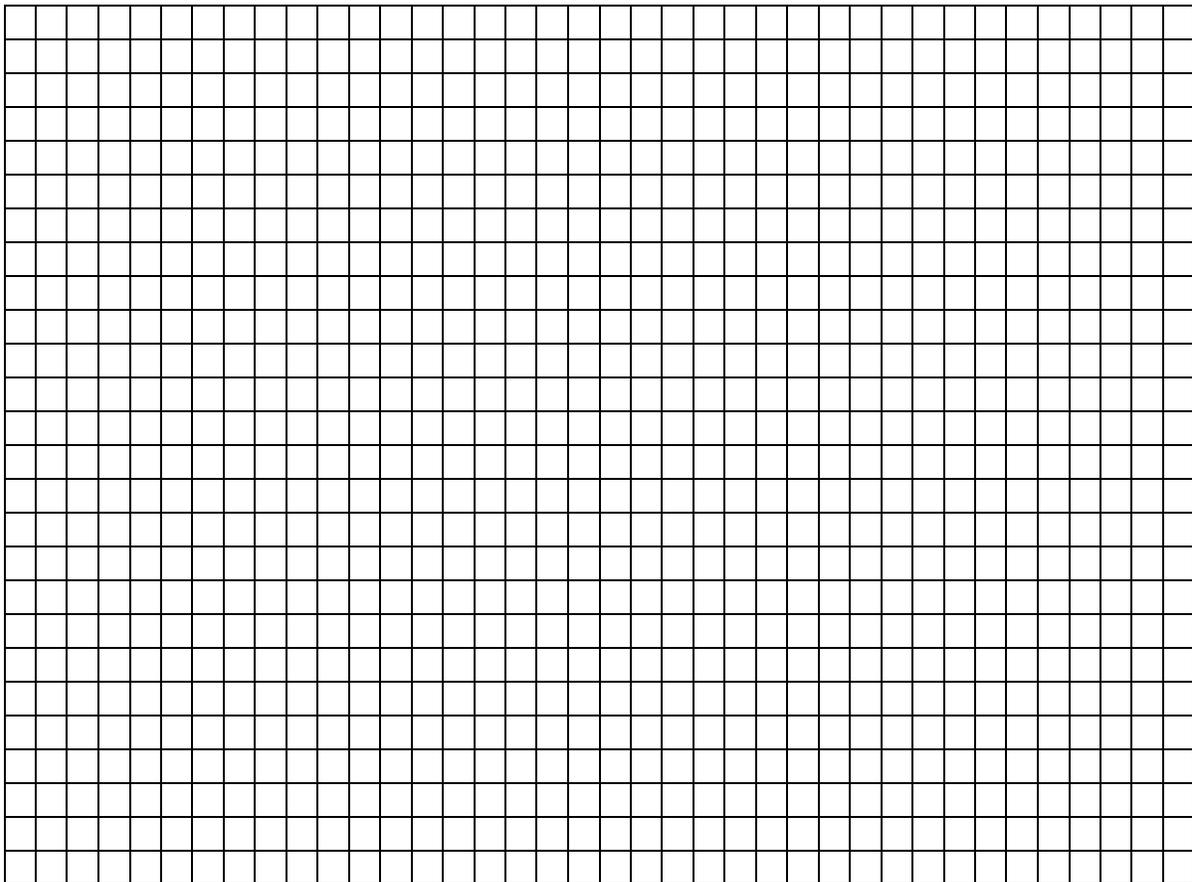
- Triple Beam Balance
- 100 mL Graduated Cylinder
- four different liquids (ex. - alcohol, corn oil, water, corn syrup)
- Writing Utensil

Procedures:

1. Obtain one of the four liquids.
2. Use the triple beam balance to determine the mass of the empty 100 mL graduated cylinder.
3. Determine the mass of the liquid at 10 mL. Be sure to subtract the mass of the empty graduated cylinder from this measurement.
4. Record the measurement in the data table.
5. Repeat steps three and four while determining the mass of the liquid at 20 mL, 30 mL, 40 mL, and 50 mL.
6. Create a **line graph** illustrating the data from the table with the x-axis representing the volume of the liquid and the y-axis representing the mass of the liquid alone. *As a class, we will create a graph that incorporates the data from all liquids.*

Liquid: _____
Mass of Graduated Cylinder: _____

| Volume | Mass | |
|-----------------------|---|--------------------------|
| Volume of liquid (mL) | Mass of liquid + Graduated Cylinder (g) | Mass of liquid alone (g) |
| 10 | | |
| 20 | | |
| 30 | | |
| 40 | | |
| 50 | | |



Questions/Conclusion:

1. What patterns/trends did you notice between the mass and volume of your liquid after analyzing the data and graph? **Please provide a detailed explanation.**

2. The table below contains volume and mass measurements of a liquid. Consider your liquid and any patterns/trends you noticed in your graph to fill in the empty cells of the table. **Explain why/how you came up with the answers.**

| Volume (mL) | Mass (g) |
|-------------|----------|
| 1 | |
| | 66 |
| 182 | |
| | 1050 |

3. Mercury is a liquid metal that is more dense than any of the liquids you used for this activity. Density is the amount of mass per unit volume and mercury's density is around 13.55 g/mL; whereas, the densities of the other liquids used are:

- rubbing alcohol = 0.79 g/mL
- vegetable oil = 0.92 g/mL
- fresh water = 1.0 g/mL
- corn syrup = 1.38 g/mL.

Consider the patterns/trends observed during this activity and create a **multiple line graph** that includes mercury and the other four liquids above. Based on the density of the liquids, it will be necessary to make some inferences and the graph should show how the mass of the liquid changes as its volume changes. The x-axis should represent the volume of the liquid (10 mL, 20 mL, 30 mL, 40 mL, 50 mL) and the y-axis should represent the inferred mass of the liquid alone.

