

Questions:

1. The smallest increment on the metric rulers we use in class is the _____
2. The numbered increments on the metric rulers we use in class is the _____
3. How many millimeters are there in a centimeter? _____
4. Distinguish between volume and area. _____

5. Use your graph to describe the relationship between surface area and volume.

Part II: Obtaining the Volume and Mass of Irregularly Shaped Objects

Use a graduated cylinder to obtain the volume of the various objects by displacement. Graduated cylinders are calibrated in milliliters. A milliliter is often used to measure liquid volume. However, a milliliter and a cubic centimeter (cc or cm^3) are identical. Record the following data in **Table 1**.

- a. Fill the graduated cylinder about half way and record the initial volume (ml).
- b. Slowly slide in one of the objects and record the final volume (ml).
- c. Subtract the initial volume from the final volume to obtain the volume of the cylinder (cm^3)
- d. Use a balance to obtain the mass (g) of each object.

Table 1: Volume and Mass of Irregularly Shaped Objects

Object	Initial Volume (ml)	Final Volume (ml)	Object Volume (cm^3) ($V_f - V_i$)	Mass (g)
1				
2				
3				

Questions:

1. What instrument is used to measure volume? _____

2. What is the meniscus and how is it used to measure volume? _____

3. What instrument is used to measure mass? _____

4. Distinguish between mass and volume? _____

Part III Obtaining the Mass of Water (or other Liquid)

You will obtain the mass of water for all of the volumes listed in **Table 2**.

- Obtain the mass of a 100 ml beaker and record in **Table 2**. This will become the tare mass.
- Use the graduated cylinder to measure out the required volumes in milliliters.
- Pore each volume into the 100 ml beaker and obtain the total mass (beaker and water).
- Subtract the mass of the beaker (tare mass) to obtain the mass of the water and record.

Table 2: Mass of Water

Volume of water (ml)	Mass of the Beaker (g)	Mass of water (g)
5		
10		
25		
50		

On graph paper create a graph that shows the relationship between the volume of water and its mass.

Study **Table 2** and your graph. What do you notice about the relationship of the volume and mass of water?

