

Lab: Metric Volume (ec printing 5pts) Name _____ Per _____

Objective: To accurately measure volume of (1) liquids, (2) irregular shaped solids, and (3) regular shaped objects using the rule method and the water displacement method.

Materials: graduated cylinders, beaker, irregular shaped objects, rectangular objects, calculators

Part One: Volume of Liquids

You will measure the volume of a liquid using a graduated cylinder with your partner.

Procedure:

1. Obtain a graduated cylinder and a beaker of water.
2. Pour some water in the graduated cylinder.
3. Read the number of milliliters on the graduated cylinder (be careful of the meniscus).
4. Record the answer in your table. Remember to **INCLUDE THE UNITS**.
5. Have your teacher to check your measurement by raising your hand. Do not pour out the water until you get the stamp of approval.

Volume of Liquid	Teacher stamp

Part Two: Irregular-shaped solids

You will measure the volume of odd shaped objects using a graduated cylinder and water (the water displacement method). You may choose any 3 objects of the ones provided.

Procedure:

1. Fill the graduated cylinder about half full with water. This is the **starting** volume. Record the number of milliliters in your table (A).
2. Lower the object into the cylinder by sliding it down the side while the cylinder is tilted (this is to prevent spillage)
3. Observe the new volume of the graduated cylinder to the nearest 0.5 mL. Record this number as the **ending** volume in your table (B).
4. To get the volume of the object, subtract the starting volume from the ending volume. Record the volume of the object in your table (B minus A). Remember to **INCLUDE THE UNITS**.
5. Repeat steps 1 through 4 for all three objects.

	Name of Object	Starting Volume (A)	Ending Volume (B)	Volume of the object (B - A)
Object 1:				
Object 2:				
Object 3:				

Conclusion:

1. In your own words, **describe** how to find the volume of an irregular-shaped solid using a graduated cylinder.

Part Three: Regular-shaped solids using two different methods

You will measure the volume of regular-shaped solids using both the water displacement method (graduated cylinder) and the ruler method. You will then be able to compare the results.

Procedure:

1. Using a metric ruler, measure the length, width, and height of each object to the nearest 0.1 cm.
2. Calculate the volume using the formulas below.
3. Record all your measurements in your table. Remember to include the units.

Volume using the RULER method

Object	Formula	Length (cm)	Width (cm)	Height (cm)	Volume of the object
	$L \times W \times H$				
	$L \times W \times H$				

4. Measure the volume of the same objects using the procedure described in part two of this lab.
5. Record your measurements in your table. Remember to include the units.

Volume using the WATER DISPLACEMENT METHOD (graduated cylinder)

Object	Starting volume (A)	Ending volume (B)	Volume of the object (B-A)

Conclusion:

1. What **units** did you use for the **volume of the object** using the ruler method? _____
2. What **units** did you use for the **volume of the object** using the water displacement method? _____
3. Record the results for both methods of volume below.

Object	Ruler Method Volume	Water Disp. Method Volume

4. Fact: $1 \text{ ml} = 1 \text{ cm}^3$. How well do your results show this relationship between ml and cm^3 ? Hypothesize why your results do or why they don't show that relationship.