



Names: \_\_\_\_\_

\_\_\_\_\_

Period: \_\_\_\_\_

# MEASUREMENT LAB

---

**Objective:** Your objective with this lab activity is to review and reinforce how to:

1. Record accurate & precise direct measurements
  2. Calculate accurate & precise derived measurements
- 

## **Station One:** Length, Area, and Volume

1. What is the standard *unit* for **length** in the metric system? \_\_\_\_\_
2. What is the *abbreviation* for this unit? \_\_\_\_\_
3. What *instrument* will you use in this lab to measure length? \_\_\_\_\_
4. Measure the length and the width of the picture provided. Measure it in centimeters and record your measurements below. *Be sure to label your measurements with the correct units!*  
Length: \_\_\_\_\_ Width: \_\_\_\_\_

5. Area and volume are examples of *derived* quantities. What are *derived* quantities?

\_\_\_\_\_  
\_\_\_\_\_

6. What *formula* will you use to measure the area of the picture? \_\_\_\_\_

7. Calculate the area of the picture. Show your work below and don't forget the label!

8. What formula will you use to calculate the *volume* of the box provided?

\_\_\_\_\_

9. Calculate the volume of the box. Show your work below and don't forget your unit labels!

Double check your units for area and volume. They are derived quantities, so the labels should be different from the units for length and width.

**Station Two: Mass**

1. What is mass?  
\_\_\_\_\_  
\_\_\_\_\_
2. What is the *standard unit* of mass in the metric system? \_\_\_\_\_
3. What is the *abbreviation* for that unit? \_\_\_\_\_
4. This is the only standard unit in the metric system that has a *prefix*. What does *this* prefix mean? \_\_\_\_\_
5. What *instrument* will you use in this lab to measure mass? \_\_\_\_\_
6. This instrument measures mass in grams. Find the mass of the items provided and record the values on the table below. Let everyone in your group practice finding the mass.

<b>Item Letter</b>	<b>Mass (in grams)</b>
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	

---

**Station Three: Weight**

1. What is weight? \_\_\_\_\_  
\_\_\_\_\_
2. How is *weight* different than *mass*? \_\_\_\_\_  
\_\_\_\_\_
3. What *units* are used to measure **weight** in the metric system? \_\_\_\_\_
4. What is the *abbreviation* for the unit above? \_\_\_\_\_
5. What *instrument* will you use to measure weight? \_\_\_\_\_
6. Find the side of the instrument that measures weight and study the scale. What is the value of each line? \_\_\_\_\_
7. Find the weight of the items provided and record the values. Don't forget the units!

<b>Item Letter</b>	<b>Weight</b>
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	

**Station Four:** Volume of an irregularly shaped solids and fluids

1. What is volume?  
\_\_\_\_\_
  2. What *metric units* are used to express the volume of solids? \_\_\_\_\_
  3. What *metric units* are used to express the volume of liquids? \_\_\_\_\_
  4. What is the *abbreviation* for the units from question 3? \_\_\_\_\_
  5. What *instrument* will you use in this lab to find the volume of irregularly shaped solids and of liquids? \_\_\_\_\_
  6. Study the scale on your instrument. What is the value of each line? \_\_\_\_\_
  7. Add 30 mL of water to your instrument.
  8. **Tilt the instrument to its side a bit and carefully lower the solid down into the water.** Make sure the water does not splash out.
  9. Record the new water level: \_\_\_\_\_
  10. The change in water level is equal to the amount of space taken up by the object. This is the *volume* of the object. What is the object's volume? \_\_\_\_\_
  11. Remember, the volume of solids is not expressed in mL. You must convert it to the correct units. Use the conversion factor to help you.  
1 mL = 1 cm<sup>3</sup>  
What is the volume of the object in cm<sup>3</sup>? \_\_\_\_\_
- 

**Station Five:** Density

1. What is density?  
\_\_\_\_\_
2. What formula is used to calculate density?  
\_\_\_\_\_
3. In this lab you will measure mass in grams and volume in cubic centimeters. What units will you use to express density? \_\_\_\_\_
4. Find the mass of the objects using the triple beam balance. Record their masses using the correct units in the table below.
5. Find the volume of the objects by measuring their lengths, widths, and heights. Record the data with the correct units in the table on the next page.

6. Determine the objects' volumes (**L x W x H**) and record these values on the table using the correct units.
7. Determine the density of both objects using the formula from question 2. Record these values on the table using the correct units.

<b>Object Letter</b>	<b>Mass</b>	<b>Length</b>	<b>Width</b>	<b>Height</b>	<b>Volume</b>	<b>Density</b>
<b>A</b>						
<b>B</b>						

8. The density of water is 1 gram per cubic centimeter (1 gm/cm<sup>3</sup>). Knowing this, which object listed above would *float* in water? How do you know?

**Station Six:** Time and Temperature

1. What metric units are used to measure time? \_\_\_\_\_
2. What is the abbreviation for these units? \_\_\_\_\_
3. What metric units are used to measure temperature? \_\_\_\_\_
4. What are the abbreviations for these units? \_\_\_\_\_
5. What instrument will you use in this lab to measure time? \_\_\_\_\_
6. What instrument will you use to measure temperature? \_\_\_\_\_
7. Complete the following steps and fill in the data table:
  1. Fill the cup 1/2 full with water
  2. Record the starting temperature of the water
  3. Keep the thermometer in the water
  4. Start the timer when you add an ice cube to the water
  5. ***Stop the timer when the temperature stops changing***

<b>Starting Temperature</b>	<b>Ending Temperature</b>	<b>Time for temp change</b>