

METRIC MEASUREMENT LAB

There are 7 stations set up in the classroom. Each station is numbered. There is a Task Card at each station with instructions. The equipment and supplies needed for each station are already at the station.

To insure a safe and successful lab...

1. SAFETY FIRST
2. Use IPADS to record Data.
3. READ everything before you do anything
4. *Everyone* must measure each item except for the room in longer lengths
5. Measure each item twice if you are unsure...you **MUST** know how to measure each item by yourself!
6. Clean up before you move
7. ALL members of the groups must travel from station to station together



You may use the internet and any notes you have to help you answer questions. Before you ask your teacher any questions you should have already asked your group and looked up answers!

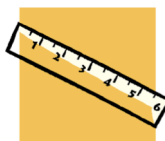
NOTES:

Always include the unit as part of the measurement. Example 10g, 32ml, or 543cm. **Please note that without the units, numbers are meaningless.**

Measuring Length

Background Information: There are four primary units used for length or distance: kilometers (km), meters (m), centimeters (cm), and millimeters (mm).

- 1000 meters = 1 kilometer
- 100 centimeters = 1 meter
- 10 millimeters = 1 centimeter



Kilometers are used for very long distances similar to how we use miles. Meters are slightly longer than yards. Centimeters are about half the size of an inch. Millimeters are quite small; they are about the width of your fingernail.

Pay Close attention to the signs and part on the lab sheet before you begin recording your answers!!!!

Metric Stations

1. LENGTH

Procedure:

1. Answer these questions before you begin measuring:
 - a. What symbol is used to abbreviate meter? _____
 - b. How many centimeters are on the **meter stick**? _____
 - c. What symbol is used to abbreviate centimeter? _____
 - d. Millimeters are abbreviated mm. How many mm are in 10 cm? _____
2. Read the instructions at this station and then fill in the data chart.

Object	Estimation of Length in cm	Actual length in cm	Actual length in mm
Spatula			
Unsharpened pencil			
IPAD screen (top to bottom)			
Tweezers			

2. LONGER LENGTH

Procedure:

1. Fill in the data chart.

Object	Estimation of Length in m	Actual length in m	Actual length in cm
Height of stool			
Height of Demo Table (floor to counter)			
Length of Demo Table			
Width of Demo Table			
BONUS***Volume of Demo Table			

3. Measuring Mass

Background Information: The amount of matter in an object is its **MASS**. We measure mass using an instrument called a triple beam balance. The metric unit of mass that the balance uses is the gram. The kilogram is another commonly used unit of mass. Kilograms are used for measuring the mass of large and heavy objects.

Procedure:

1. Answer these questions before you begin measuring:
 - a. What is the symbol used to abbreviate gram? _____
 - b. How many grams are in a kilogram? _____



2. Read the instructions at this station and then fill in the data chart.

Object	Estimation of mass in g	Actual mass in g	Actual ranking From lightest to heaviest
Unsharpened pencil			
Metal Rectangle			
Metal Cube			
Note card			
beaker			

4. Regular Volume

Background Information: Volume is the amount of space an object takes up. **Solid volume** is measured in cubic centimeters; **Liquid volume** is measured in milliliters or liters.

Procedure:

1. Fill in the data chart.
2. Show your work.

Object	Estimate Volume cm ³	Length cm	Width cm	Height cm	Volume cm ³
Metal Rectangle					
Block Wood					
Calc. Box					

5. Irregular Volume

Background Information: When an object is submerged in water, the water level will rise. The amount the water level rises is equal to the volume of the object. This is called **displacement**. Look up how to do displacement to find the volume of an irregular object. Explain exactly how you will do it:

Procedure:

1. Fill in the data chart.

Object	Estimation of volume in ml	Original volume of water	Volume of water with object	Actual volume of object
3 Pennies				
3 nails				
Rock				
Metal Block				

6. Measuring Capacity

Background Information: Capacity is the *volume a container will hold inside*. It is also a measure of the matter in a container.

Procedure:

1. Answer these questions(look them up if you need to):

- a. Define meniscus: _____
- b. Describe how to read a graduated cylinder: _____

2. Measure the capacity of each item using the volume equation. Fill in the data chart.

Volume of rectangular object _____

Volume of a cylinder _____

Kleenex Box					
Object	Estimate capacity volume cm³	Length cm	Width cm or radius cm	Height cm	Volume cm³
Plastic Box					
Medicine bottle		XXXXXXXXXXXX			

3. Explain a method you could use to determine the amount of water that could fit into the containers.

7. Capacity Continued amount of water

1. Fill each of the containers with water and measure the water that fits into them with the graduated cylinder. Be sure not to spill any water or that would be an error. Use all the tools provided.

Container	Estimation of volume of water	Actual volume of water in mL
Medicine bottle		
Small plastic box		

2. Look at the data from Step 6, container capacity, and Step 7, amount of water that fit into the container. Do you see any similarities? Explain what you noticed.

Conclusion:

Define the following words:

Mass-

Gram-

Volume-

Capacity-

Displacement-

Explain the difference in final units for measuring liquid volume vs. solid volume-