

## Metric Lab (Lots of points possible)

**Objective:** This lab is designed to give the student hands on experience measuring Length, Volume, Mass Temperature and the Density of various objects using the metric system.

### Procedures:

1. Follow the directions at each station carefully.
2. Do not move samples or equipment from one station to another.
3. Students are required to do all work at each station themselves.
4. You may transition between stations w/ a partner but all work must be your own.
5. This lab requires each person to visit **each of 9 lab stations** and follow the directions at each station. It makes no difference where you begin.
6. If a station is occupied by two groups, wait until it clears before approaching.
7. Work safely and carefully throughout the lab exercise.
8. Immature, reckless, dangerous, or unsafe behavior **will not** be tolerated. Violators will be removed from the room and receive a zero on this lab-**no exceptions.**
9. Record your results on this lab worksheet
10. All work is due Wednesday at the beginning of the period.

### Station 1: Metric Measurements - Length

USE A **METER STICK** TO RECORD THE FOLLOWING MEASUREMENTS to the nearest **.01 meters** then calculate decimeters and centimeters.

Object	Meters	Decimeters	Centimeters
Table Top (Length)			
Height of Chair			
Whiteboard (Length)			
Classroom Door Width			
Tallest Person in group			
Width of the hallway			
Width of the Bull snake terrarium			

### Station 2: Metric Measurements - Length

USE THE CENTIMETER RULE TO MEASURE THE FOLLOWING (to the nearest millimeter). Then convert your answer to millimeters and decimeters:

Object	Millimeters	Centimeters	Decimeters
The diameter of a Quarter			
Piece of notebook paper (Height)			
Thickness of the table top			
Length of a Highlighter Pen			
Diameter of the CD-ROM			
Measurements of a dollar bill (Width)			

### Station 3: Metric Measurements – Volume of a solid

USE A MILLIMETER RULE TO CALCULATE THE VOLUME OF THE FOLLOWING OBJECTS. MEASURE TO THE NEAREST .1 CENTIMETER:

Remember the radius is ½ of the diameter

The formula for volume of a “box” is  $V = L \times W \times H$

The formula for a cylinder is  $V = 3.14 \times \text{Height} \times (\text{radius})^2$

“Box” Type Objects	Length x	Width x	Height =	Volume	
Whiteboard Eraser					
<i>Systematic Theology</i> Book					
White Box					
Band-Aid Box					
<i>Lonesome Dove</i> DVD Case					
Cylinder Type Objects	Pi x	Height x	Radius x	Radius	= Volume
Tomato Paste can	3.14				
Can of Soup	3.14				
Large Vial	3.14				

**Station 4: Metric Measurements – Volume of liquid displaced**

USE THE LIQUID, GRADUATED CYLINDERS AND MEASURING CUP TO CALCULATE THE VOLUME OF THESE IRREGULAR OBJECTS USING LIQUID DISPLACEMENT TECHNIQUES DISCUSSED IN LECTURE.

Object	mls of liquid in the Graduated Cylinder plus the object	mls of liquid in the graduated Cylinder Only	mls of liquid displaced by the object
Small Vial			
Large Vial			
Hex Bolt			
Rock #1			
Coral			
Rock #2			

**Station 5: Metric Measurements – Volume of liquid**

Accurately read the volume of the colored liquid in the pipettes and graduated cylinders at this station. **You must determine the scale used by each of the measuring devices.** Be sure to add the units of measure to each answer.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_

### Station 6: Metric Measurements – Mass

Use the electronic balances to determine the grams of each sample to the nearest .1 grams

Grams	Oz.	Grams	Oz.
1. _____	_____	2. _____	_____
3. _____	_____	4. _____	_____
5. _____	_____	6. _____	_____
7. _____	_____	8. _____	_____
9. _____	_____	10. _____	_____

### Station 7: Metric Measurements – Temperature

Accurately read the Temperature of the each sample at this station. **You must use the thermometer provided for each sample.** Provide both Fahrenheit and Centigrade units

F	C	F	C
1. _____	_____	2. _____	_____
3. _____	_____	4. _____	_____
5. _____	_____	6. _____	_____
7. _____	_____	8. _____	_____
9. _____	_____	10. _____	_____

**Station 8: Metric Measurements – Mass**

**Use the Triple Beam Balance to calculate the mass of the items numbered below to the nearest .1 grams:**

- 1. (empty test tube) \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**Station 9: Metric Measurements : Density= Mass / Volume**

**The volume of the capped test tubes has been calculated to be approximately 19 mls. Subtract the actual mass of the above 10 items from the actual mass of the empty test tube to get the actual mass of the material inside the test tube. Then calculate the density of each item and record your results below:**

- 1. XXXXXXXXXXXXXXXXXXXX \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_