Name ______________________________ Date __________________ Period _______

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, but may work in groups of 3 or 4.
4. 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

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			

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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	Decimeters	Centimeters	Millimeters
The diameter of a Quarter			
Piece of notebook paper (Height)			
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 x W x 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					
Systematic Theology Book					
Band-Aid Box					
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				

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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			
Rock #1			
Coral			

Station 5: Metric Measurements – Volume of liquid

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

1. ____________________________ 2. ____________________________

3. ____________________________ 4. ____________________________

5. ____________________________ 6. ____________________________

7. ____________________________ 8. ____________________________

9. ____________________________ 10. ____________________________

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.	_____________	_____________

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Station 7: 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. ____________________________

Station 8: 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. XXXXXXXXXXXXXXXXXX 2. ____________________________

3. ____________________________ 4. ___________________________

5. ____________________________

Station 9: Metric Measurements: Density= Mass / Volume

Use the density blocks, use the electronic scales to determine the mass, use the volume provided and now calculate the density:

1. ___________________________ 2. ____________________________

3. ____________________________ 4. ___________________________

5. ____________________________ 6. ___________________________

7. _____________________________ 8. ___________________________

9. _____________________________ 10. __________________________

11. _____________________________ 12. __________________________

_________________ Which block is densest?

_________________ Which block is least dense?

_________________ What is the average density of the blocks?

____ Water has a density of 1.0 g/ml. Which, if any, of the above blocks do you think would float?