This AMAZING Student is: _____

Station #1: Does Size Affect Density?

Color of blocks: white, black, clear, milky white, paper white (*circle one color!!!*)

Block 1: mass = _____g
length = _____cm
width = _____cm
height = _____cm
volume: _____ cm^3

Block 2: mass = _____g
length = _____cm
width = _____cm
height = _____cm
volume: _____ cm^3

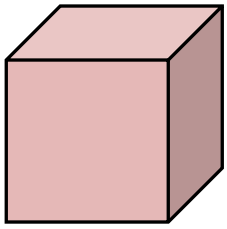
Block 1 density = _____g/cm^3

Block 2 density = _____g/cm^3

Activity Questions:

1. Did the density of Block 1 differ greatly from the density of Block 2? Why or why not?
   _____
   _____
   _____
   _____

2. Calculate the density of the metal cube shown. The mass is 8 grams and the volume is 4 ml. What is the density? Write the problem and answer below.

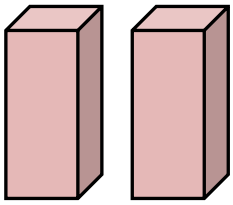


3. Imagine that the cube is split in half exactly.

   What is the mass of one half of the cube? _____

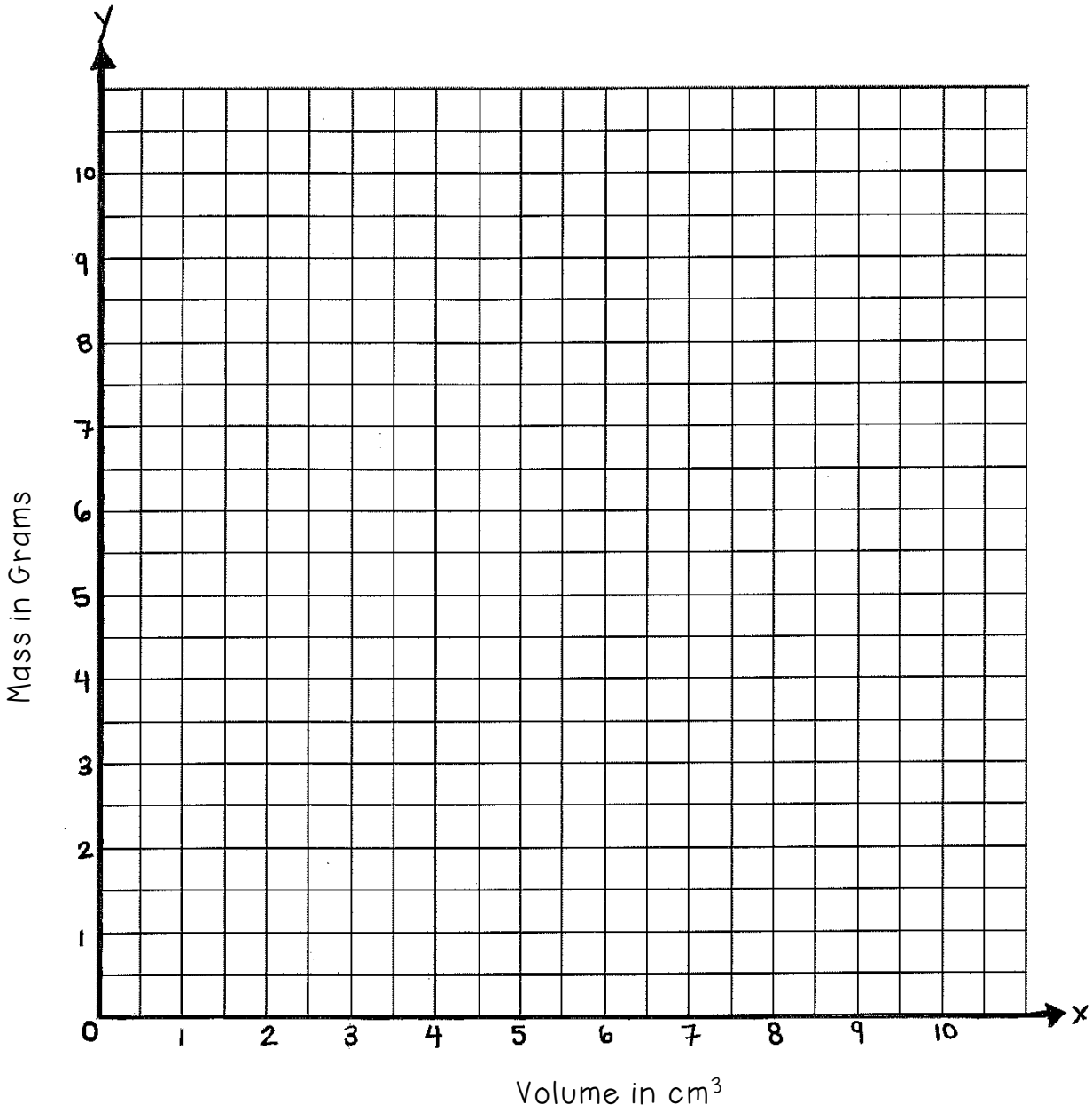
   What is the volume of one half of the cube?_____

   Calculate the density. Write the problem and the answer below.



4. Does size affect density? Why or why not? _____
   _____
   _____
   _____

Station #2: Graphing Mass and Volume



Below you have the data to plot <u>three different lines</u>. Each line represents the same type of object but with different masses and volume. Use <u>three different colors</u> to draw the lines representing the objects after you have plotted the points with a pencil. Make sure you <u>EXTEND THE LINES OFF OF THE GRAPH</u>.

Pencil --------

Volume (cm^3)	Mass (g)
1	0.5
5	2.5
10	5

Water --------

Volume (cm^3)	Mass (g)
3	3
6	6
10	10

Rock --------

Volume (cm^3)	Mass (g)
1	2
2	4
3	6

1. Do the lines cross anywhere on this graph? _____
2. Can an object have 0 mass and 0 volume in real life?_____

   _____
3. According to the graph can an object have 0 mass and 0 volume? _____
4. Does it make sense to have lines that extend into the negative region of the graph?

   _____

   _____
5. Using any one point of each object can you tell me the density of each of the objects?
   a. Pencil? b. Water? c. Rock?

$$D = \frac{m}{V}$$

6. Using your rock line, what is the mass of a rock if its volume is $5cm^3$?_____

7. Using your water line, what is the volume of water if the mass is 9g?_____

8. Using your pencil line, what is the mass of a pencil if its volume is $7cm^3$?_____
9. Shade lightly the ENTIRE REGION on your graph where objects will sink in green.
10. Shade lightly the ENTIRE REGION on your graph where objects will float in purple.

Station #3: Sink or Float

Directions: Predict if you think the objects listed will float or sink in BOTH salt water and fresh water. Write your predictions in the chart below. Then, test your predictions and write your results in the table below.

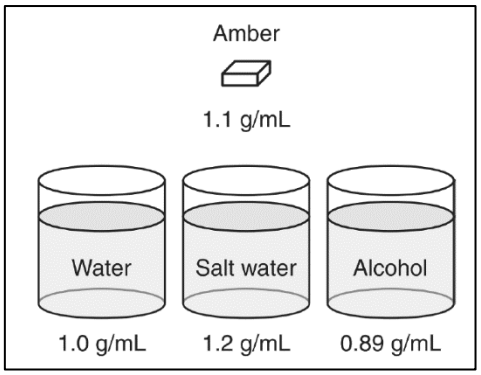
Objects	Predictions? (Y or N)		Saltwater (Y or N)	Fresh Water (Y or N)
	Saltwater	Fresh Water		
Marble				
Paperclip				
Ping Pong Ball				
Coin				
Bottle Cap				

In the following chart determine if the object with the given mass and volume will float, sink, or neither.

Volume	Mass	Sink ---Float--- Neither
3.5	9	
2.5	2.5	
10	1	
3	6	
11	5	
4	5	

The density of amber is 1.1 g/mL Determine the following:

1. Which liquid(s) would amber float in? _____
   Why? _____
   _____
2. Which liquid(s) would amber sink in? _____
   Why? _____
   _____



Station #4: Density of Liquids

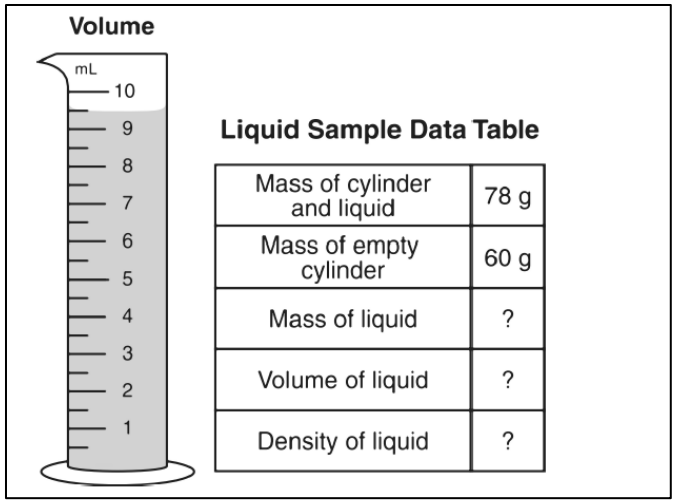
Procedure:

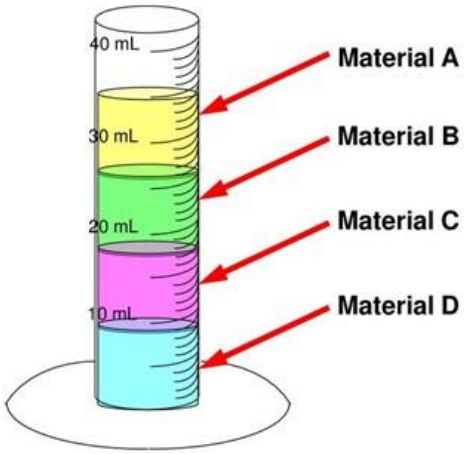
1. Zero the balance scale.
2. Use the balance scale to determine the mass of an empty 10.0-mL graduated cylinder.
3. Add 10.0 mL of liquid to the graduated cylinder.
4. Measure the mass of the cylinder and liquid on the balance scale.
5. Subtract to determine the mass of the liquid.
6. Calculate the density of the liquid.
7. Clean and dry the graduated cylinder.
8. Repeat the necessary steps to complete the experiment with the other liquids.

Data:

Liquid	Mass of Cylinder	Mass of Cylinder + Liquid	Mass of Liquid ONLY	Volume of Liquid	Density of Liquid
Water					
Soda					
Rubbing Alcohol					

1. Determine the mass, volume, and density of the liquid with the given data.
   a. Mass of liquid: _____
   b. Volume of liquid: _____
   c. Density of liquid: _____

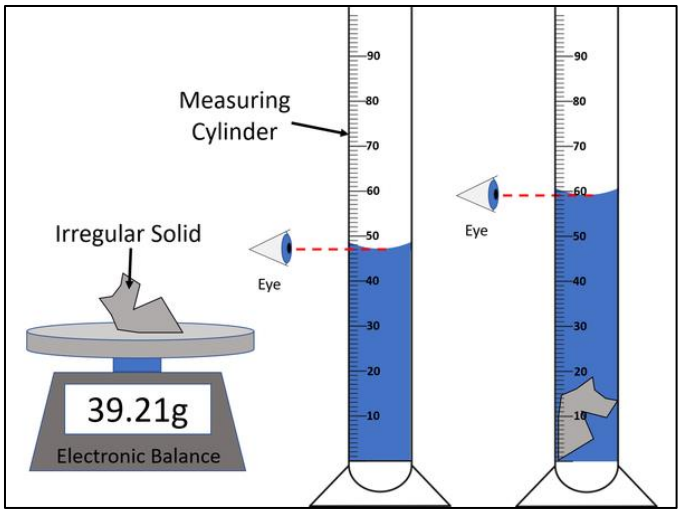




2. Use the following data to determine the correct liquid for each layer of the density column.

Liquid	Mass (g)	Volume (mL)	Density (g/mL)	Which material?
Water	8	8		
Vinegar	17.6	8		
Baby Oil	6.56	8		
Honey	10.88	8		

Station #5: Density of Irregular Shaped Objects



1. Place the solid on the electronic scale. Write the mass in the data table. BE CAREFUL!!! There is a SMALL decimal on the scale screen.
2. Add water to your graduated cylinder (around 25 – 30 mL). Record this as the STARTING volume.
3. Add the irregular solid to the graduated cylinder CAREFULLY!!! You do not want any of the water to splash out!! Record the new volume as the FINAL volume.
4. Subtract FINAL volume – STARTING volume to get the volume of the irregular solid.
5. Calculate density (D = m ÷ v).

Object	Mass of the object (g)	Volume of the object in cm^3 (FINAL volume – STARTING volume)			What is the density of the object? (g/cm^3)
		Starting Volume (mL)	Ending Volume (mL)	Volume of the Object (mL)	
Hex Nut 					
Marble					
Rock