Name_____Date_____Hour_____

Sink or Float That is the Question!

Density is a physical property of matter, each element and compound has a specific density. Density is defined as the amount of matter in a given volume. In other words, how many atoms are packed into a specific space. In chemistry and physics, the density of many substances is compared to the density of water. Does an object float on water or sink in water? In order for something to float on something else it must be less dense. For example: Dry Ice (solid CO_2) sublimes easily at room temperature, you see the "smoke" drift across the floor/table this is because CO_2 is denser than air so it stays close to the surface/floor. To calculate the density of an object or substance we need to know its mass and volume, then simply divide the mass by the volume.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Materials:	Different Pop Samples	Balance	Graduated Cylinder
	Dropper	Salt Water	Distilled/Bottled water

Procedure:

1. Determine the mass of one clean graduated cylinder. Record it in the data table.
2. Fill the graduated cylinder with some volume of water, use the eye dropper to bring the volume up to a whole number. REMEMBER READ THE BOTTOM of the MINISCUS!
3. Determine the mass of the water, by placing it on the balance. Record it in the data table.
4. Empty and rinse the graduated cylinder. Roll the paper towel around your glass stirring rod and carefully dry out the graduated cylinder.
5. Repeat steps 1 and 2 for each sample of liquid until you have completed the information for all 4 different solutions.
6. Clean up your lab station, place materials together and wipe down table top with a Clorox wipe.
7. Return to class, calculate the density for each solution.

Table 1	
Mass of Empty G. Cylinder	
Mass of G Cylinder and water	
Mass of water	
Volume of water	
Density of water	

Table 2	
Mass of Empty G. Cylinder	
Mass of G Cylinder and Regular Coca Cola	
Mass of regular Coca Cola	
Volume of regular Coca Cola	
Density of Regular Coca Cola	

Table 3	
Mass of Empty G. Cylinder	
Mass of G Cylinder and Diet Coke	
Mass of Diet Coke	
Volume of Diet Coke	
Density of Diet Coke	

Table 4	
Mass of Empty G. Cylinder	
Mass of G Cylinder and saltwater	
Mass of saltwater	
Volume of saltwater	
Density of saltwater	

Lab Analysis Questions

1. Rank the four solutions in order starting with the solution with the greatest density.

2. Explain why the can of diet coke floated in the fish tank of water in the class demonstration. **Justify using your data as evidence.**

3. Which of the pop cans would float in the salt water solution we tested in lab? **Justify your answer using your data as evidence.**

4. Cooking oil has a density of 0.93 g/mL, if we were to add oil to a sample of water what would happen, why?

5. A friend of yours claims that they cannot float in a swimming pool, even though the human body has a density of about 1.0 g/mL, they maintain they sink. What advice do you give this friend as they travel to the east coast to swim in the ocean?

6. Calculate your % error for each of your solutions. The accepted value for water is 0.99 g/mL, the accepted value for salt water is 1.1g/mL, the accepted value for diet coke is 0.97g/mL and the accepted value for coke is 1.03g/mL. **Show your work.**

7. Based on your calculated error for each sample, how accurate were you in your measurements today? (Hint were you within 1-2% error)