

Density Column Lab

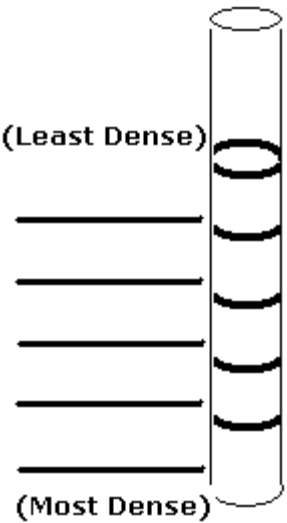
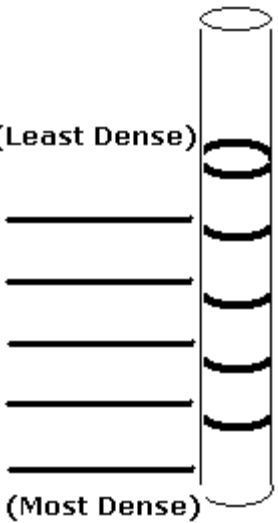
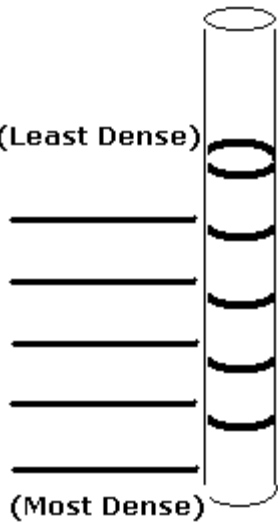
Name: _____

Objective: Demonstrate an understanding of density by calculating the density of five liquids and three solids. Then create a density column where the least dense liquid is on top and the most dense liquid is on the bottom.

LIQUIDS: Alcohol, Cooking Oil, Dish Soap, Syrup, Water
(green) (clear) (orange) (brown) (blue)

SOLIDS: Plastic, Wood, Metal
(clear) (tan) (silver)

INITIAL PREDICTION - Examine the list of liquids (5) and solids (3) above. In the first column below, make a prediction of the relative densities of each item by identifying which liquid is the least dense (on top) and the most dense (on bottom). Also include your predictions of where the three solids will end up if they were added to this density column.

<u>Initial Prediction</u>	<u>Calculated Prediction</u>	<u>Final Observation</u>
		

Measurements & Density Calculations

Density = Mass/Volume

$$D = M/V$$

Using a graduated cylinder, measure between 3 – 4 mL of each liquid in order to calculate the density. Remember that each of these measuring devices is precise to **two decimal places**. (*SIG FIGS*)

<u>LIQUIDS</u>	Mass (g) of empty Graduated Cylinder	Mass of G-Cylinder with 3-4 mL liquid	Mass of Liquid	Volume of Liquid (3-4 mL)	Density of Liquid (g/mL)
1)					
2)					
3)					
4)					
5)					
<u>SOLIDS</u>	Volume (mL) of water <u>without</u> the solid	Volume (mL) of water <u>with</u> the solid	Volume of Solid	Mass of Solid (g)	Density of Solid (g/mL)
1)					
2)					
3)					

CALCULATED PREDICTIONS – Based on the density calculations above, make a second (new) prediction as to the order of the liquids from least dense (top) to most dense (bottom). Also include the positions of the three solids.

STOP – Show this information to your teacher before moving on to the next step.

Making OBSERVATIONS When Mixing the Liquids – Add the most dense liquid first (about 2 cm). Before adding the second liquid, be prepared to make some observations.

- 1) What did you observe when you added the **SECOND** liquid?
- 2) What did you observe when you added the **THIRD** liquid?
- 3) What did you observe when you added the **FOURTH** liquid?
- 4) What did you observe when you added the **FIFTH** (Last) liquid?
- 5) Now add **ONE** of the solids to your density column and record your observations below.

FINAL OBSERVATIONS – You will need to observe the other two solids from other groups to determine where the solid settled within the density column. Now complete the last drawing based upon all of your observations – This drawing should include the correct arrangement of liquids AND where all three solids ended up.

- 6) What happened to the alcohol (green) and water (blue) when they were mixed?
- 7) Based on your answer to #6 above, **WHY** do you think this occurred?
- 8) Which object is more dense, the plastic ball or the syrup? **EXPLAIN** using your data.
- 9) Is it possible for a liquid have a higher density than a solid? **EXPLAIN** with examples.
- 10) If a new liquid (with a density of 0.52 g/mL) were added, where would it be located within the column?
- 11) Imagine an oil tanker crashed and spilled all of its oil into the ocean. What happens to the spilled oil?