

## Project: Density

**DUE DATE:**

### Instructions:

1. **Top Left of the page: Title of Project**
2. **Top Right of page: Name, Period, Date Due**
3. **Report must be typed or written in blue or black INK.**
4. **Pictures can be drawn on the computer or hand-drawn (in color)**

Why do objects that are the same size sometimes have different weights? The answer has to do with their *density*. An object's density is determined by comparing its mass to its volume. If you compare a rock and a cork that are the same size (they have equal volume), which is heavier? The rock is, because it has more mass. The rock is denser than the cork, because it has more mass in the same volume.

You will perform several experiments with different types of solids and liquids to determine which is denser. Then you will write or type up your lab report based on the data you collect from each experiment.

### Experiment 1: Float or Sink

#### Materials for Experiments 1

- 1 Large glass/plastic Vase
- 10 small objects – ice, raisins, paperclips, coin (only one type), small corks, metal nut or bolt, popcorn kernel, board game dice, grape tomato, plastic bead, soda cap, ping pong ball, crayon, eraser, corn, pasta, marble, etc.

Hypothesis: **Answer the following question IN DATA TABLE.**

Will small solid objects (10 total) sink or float if they are placed in water? Make predictions **before** you perform lab.

#### Procedure:

1. Pour water into a large cup/vase.
2. Gently set solid objects into the cup with water. Do they sink or float? Record what happens in your data table.

## Experiment 2: Density Tower

### Materials for Experiments 2

- ▶ 1 Large glass/plastic Vase
- ▶ Honey
- ▶ Corn Syrup (light not dark)
- ▶ Maple Syrup/Pancake Syrup
- ▶ Milk (whole milk, not fat free or soy )
- ▶ Dish soap
- ▶ Water
- ▶ Vegetable Oil
- ▶ Rubbing alcohol

### Procedure:

1. Pour about  $\frac{1}{2}$  cup each of liquid into the large cup/vase. Some of these will pour very slowly.
2. Start with pouring the honey into the cylinder.
3. Then pour the other liquids **SLOWLY** into the glass container, one at a time. It is very important to pour the liquids slowly and into the center of the cylinder. Make sure that the liquids do not touch the sides of the cylinder while you are pouring. It's okay if the liquids mix a little as you are pouring. The layers will always even themselves out because of the varying densities.
4. **Make sure you pour the liquids in the following order: Honey, Corn syrup, Maple/Pancake syrup, Milk, Dish soap, Water, Vegetable oil, Rubbing alcohol**
5. After letting the liquid layers settle, you'll notice that they remain in the order you poured them into the cylinder and that they are clearly distinguishable from each other.
6. Under your Data Table is a picture of a graduated cylinder, draw each layer with **COLOR and LABEL EACH** Layer to show the order.

Sample Report Format:

**Title of Project**

**Name  
Per  
Due Date**

**Experiment 1:**

Data Table:

<b>Name of Item</b>	<b>Hypothesis in H<sub>2</sub>O (float OR sink)</b>	<b>Results in H<sub>2</sub>O (float OR sink)</b>

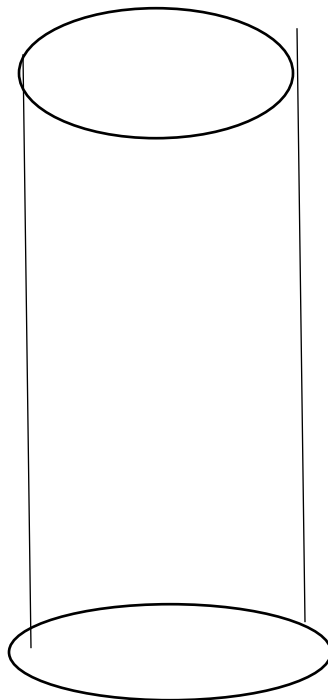
Picture: Draw **one picture with color** of all the items (either they float or sink) in the glass of water. Label each item! (Hand draw or computer – at least a half page or whole page for the picture)

Post-Lab Questions: Group the solids in two categories: List which items are the most dense and which are the least dense in water? (Make Chart as seen below)

<b>Most dense in H<sub>2</sub>O</b>	<b>Least dense in H<sub>2</sub>O</b>

**Experiment 2:**

Picture: Draw **one picture with color** of all the liquids in correct order in the glass. **Label each item!** (Hand draw or computer – at least a half page or whole page)



**POST-LAB QUESTIONS:**

If water's density (1.00g/mL) is the standard density that we use for all substances in life, then what can you conclude about each liquids densities? Are they more dense than water or less dense than water? List which liquids are the most dense and which are the least dense in water. (Make Chart as seen below)

More dense	Less Dense