

## Density Demonstration: Coke vs Diet Coke

### Objectives:

- define the term density
- identify and list similarities between Coke and Diet Coke in lab notebook
- identify and list differences between Coke and Diet Coke in lab notebook
- to see how much sugar we consume drinking one can of soda
- predict what will happen to the cokes when submerged and explain

### Materials:

- coke and diet coke
- water
- fish tank
- sugar
- Nutra Sweet
- Scale

### Procedure:

1. Pass the cans of coke around the room. Have each student take a good look at each can and ask them to make careful observations about what they see.
2. Ask the students to name as many similarities as they can about the 2 cans of coke. Make a list on the board.
3. Ask the students to list as many differences as they can about the 2 cans. Add to list

Some answers they may come up with.....

#### Similarities

1. are made by the same company
2. have the same shape
3. made of aluminum

#### Differences

1. one is red, the other is silver
2. one is diet, one is regular

4. Measure out the amount of sugar that is in a can of coke
5. Measure out Nutra Sweet
6. Drop sodas in water
7. Record observations
8. Write a conclusion explaining results and explain if your hypothesis was supported or not.

### **The "Why":**

Show the students what 39 g of sugar looks like (I found it effective to show the sugar in a small beaker while holding it next to the can so they can see how much space it would take up in the can) next to approx \*100 mg (on an index card) of Nutra Sweet. Explain that ALL that sugar is in the regular Coke can, and that small amount of Nutra Sweet is in the Diet Coke can. Explain that a small amount of Nutra Sweet is needed to make the Diet Coke sweet because it is so concentrated. Most students are surprised to actually SEE how much sugar there is!

Discuss how more "stuff" (matter) is crammed into the same amount of space, or VOLUME, and that increases the MASS. The relationship of Mass to Volume is Density. The more items (matter) you place into a defined space, the denser it becomes. For example, New York City is DENSELY populated because there are a lot of people in a small area. 20 people in an elevator is DENSER than 2 people in an elevator.

The Density of water is  $1\text{g/cm}^3$ . An object will float if the density is less than 1. An object will sink if its density is greater than 1.

\*Note: According to the Coca Cola company : "a soft drink sweetened with aspartame (8 oz., ranges from approximately 10 to 85 mg)" A can has 12 oz, so I approximated 100 mg for measuring purposes since my triple beam balance has a 0.1g bar. You can also say that there are 39,000 milligrams of sugar in a can of regular Coke!!!