

COKE vs. DIET COKE

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MATERIALS NEEDED:

large container such as a battery jar or aquarium
cans of soda and diet soda
packet of Nutrasweet
3 packets of sugar

SAFETY PRECAUTIONS:

There are no safety hazards in the experiment.

DISPOSAL:

There are no disposal hazards in this experiment.

PROCEDURE:

Add water to the large container so that the depth is higher than a can of soda.

Place cans of soda and diet soda into the water. (No comments are necessary.) If desired, do this early in the class and, occasionally, walk over and push the cans of diet soda down to the bottom of the container (Look annoyed as you do this). If desired, add cans of regular and diet soda from a second brand (such as Pepsi), and also a third brand.

Ask the class what is happening and why. As time permits, test class hypotheses.

EXPLANATION:

The diet soda does not contain the same amount of dissolved solids as the regular soda. This is an excellent way of introducing the concept of density. Note that one packet of Nutrasweet is equal in sweetness to about three packets of sugar and the Nutrasweet weighs less. Thus the regular soft drink has more material, the soft drink ingredients and sugar, dissolved in a certain amount of liquid (the carbonated water) than the diet soft drink. This can be demonstrated by dissolving one packet of Nutrasweet and three packets of sugar in separate containers with measured amounts of water and measuring the volume increase along with changes in weight. This experiment is an excellent way of introducing the concept of density. (Note: This experiment does not work with beer and lite beer. Why?)

TESTING HYPOTHESES:

Some of the hypotheses suggested and responses or actions are:

The cans are not filled to the same level.

Open cans and measure contents with a graduated cylinder or measuring cup.

One can contains more carbonation.

Measure amount of gas by pouring a measured amount (about 250 mL) of soft drink into a baby bottle with a nipple that has no hole and shake it. See how much liquid will fill expanded nipple. (Nipples without holes are available from Evenflo Customer Service, 800-356-BABY)

The cans are different.

Compare and weigh two empty cans.

The sugar makes the regular soft drink heavier.

Weigh equal volumes of regular and diet soft drink (NOTE: Shake samples well to remove carbonation). A quick laboratory investigation showed that 100 mL of regular Coca Cola weighed 5 grams more than 100 mL of Diet Coke.

Alternative: Read and compare the ingredients of regular and diet soft drink. Ingredients are listed in order by largest amount (by weight) first.