

In this activity, the difference between regular and diet soda is uncanny!

## Materials:

- Can of regular Pepsi
- Can of diet Pepsi
- Bucket of water
- 2 plastic or paper cups
- 2 empty film canisters masking tape
- Ballpoint pen
- Sugar
- Artificial sweetener

## Procedures:

1. Fill a bucket with water. Place your cans of diet and regular soda in the water. Make sure no air is trapped under the cans. What do you notice? If these cans are exactly the same size and contain exactly the same amount of liquid, why would one sink and the other float? (HINT: Since one is diet and one is regular, they may contain different amounts of sweetener.) Which do you think contains more? Why?



2. Use your masking tape and pen to label one of your film canisters "regular" and the other "diet". Look at a pack of artificial sweetener. It says that it has the same sweetness as 2 teaspoons of sugar.



3. Place 1/4 cup of warm water in two separate cups. Add 4 teaspoons of sugar to one cup and stir until no more will dissolve. Add 2 packets of artificial sweetener to the other cup and stir until no more will dissolve.



4. Fill the "regular" film canister with the sugar solution. Fill the "diet" film canister with the artificial sweetener solution. Fill them both as high as you can. Place the tops securely on both canisters. Place both containers in a bucket of water. What do you observe?

## Think about this ...

When two objects are exactly the same size and shape but one is heavier than the other, we say that the heavier one is more dense and the lighter one is less dense. Since the cans of soda have the same amount of liquid in them, which one do

you think is more dense, the regular or the diet? How about in the film canister experiment? Which one was more dense? Can you come up with an experiment to see whether salt water is more dense than plain water?

## Where's the Chemistry?

In this activity, you placed a can of diet soda and a can of regular soda in water. The amount of soda in both cans are the same, yet the can of diet soda floats and the can of regular soda sinks. This happened because the contents of the regular soda is heavier than the contents of the diet soda. The reason why it is heavier is because regular soda has about 9 teaspoons of sugar dissolved in it while diet soda has less than 1/4 teaspoon of artificial sweetener. Since the sugar is heavier than the artificial sweetener, the can of regular soda is heavier than the can of diet soda.

In the film canister activity, you made up your own solutions using artificial sweetener and sugar. One packet of artificial sweetener has the sweetness of two teaspoons of sugar. To compare a sugar solution with an artificial sweetener solution, you dissolved 2 packets of artificial sweetener and four teaspoons of sugar each in 1/4 cup of water. When you tested them in film canisters, you could see that the sugar solution was more dense, since it sunk while the artificial sweetener solution floated.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at [www.acs.org/kids](http://www.acs.org/kids).

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## Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

### Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

**Never** eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

**Never** experiment on your own!

**For more detailed information on safety go to [www.acs.org/education](http://www.acs.org/education) and click on "Safety Guidelines".**

