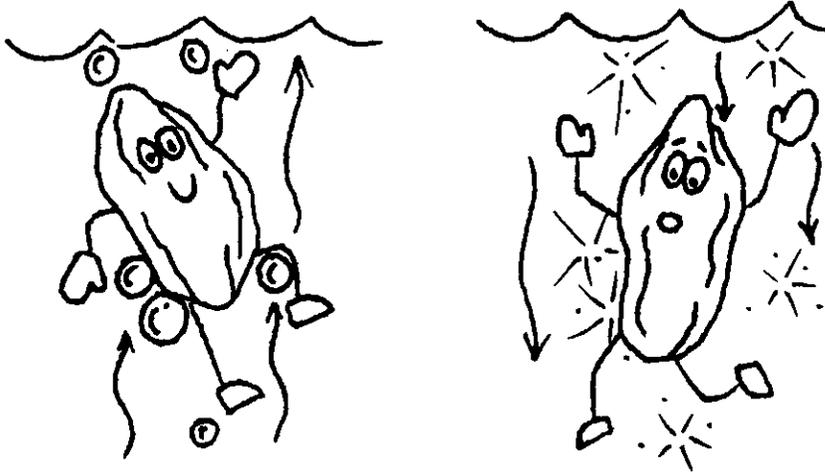


# THE DANCING RAISINS

Grades 4-6



## Overview

In this lesson, the students are learning about density; they analyze why the raisins pop up to the surface in a jar of water and then sink back down. At first they are not told that Alka Seltzer has been added to the water. The students end the lesson by drawing a cartoon of raisins explaining density as they bob up and down.

## Objectives

- To help students better understand the property of density.
- To help student understand cohesion & adhesion.

## Vocabulary

**Density:** The amount of something per unit measure, i.e., volume. The mass per unit volume of a substance under specified conditions of temperature and pressure.

## **Materials**

*For the presenter:*

### Activity 1

- two narrow tall, glass jars
- twelve raisins (Six raisins for each experiment.)
- one or two Alka Seltzer tablets
- one can of 7-up for the second experiment

### Activity 2

- six fresh grapes the same size
- 7-Up in a clear jar / glass from the first experiment
- water in a clear jar / glass.
- 1 Alka Seltzer tablet

*For the student:*

- white drawing paper for cartoon

## **Getting Ready**

- Write the word *density* and its definition on the overhead / blackboard.
  - Have all the materials set up on a table and ready to go.
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## **Procedures**

1. Fill one jar with water.
2. Drop tablets that produce carbon dioxide gas into the water; i.e., two Alka Seltzer tablets. (If possible do this without the students seeing you.)
3. Immediately after adding the Alka Seltzer tablets, drop the raisins into the jar.
4. Have the students observe the raisins bobbing up and down.

## Questions

1. "When the raisins were dropped into the water why did they sink?"
2. "Why did some of the raisins bob up?"
3. "About how long do the raisins float at the water's surface?"
4. "Tell the class that you added the Alka Seltzer tablets and ask them why they think you did this?"
5. "Would the raisins bob up and down without the Alka Seltzer tablets?"
6. "Remind the class that they are young scientists and as young scientists they are to observe very carefully before answering the next question. What is the difference between the rising and sinking raisins?"
7. "What liquid would give off carbon dioxide bubbles by itself?"

## Explanation

The raisins' density is a little over 1, so they sink in the water when they are first dropped into it, but then the gas bubbles from the Alka Seltzer tablets adhere to their surfaces causing the raisins to rise to the surface. The rising raisins have CO<sub>2</sub> bubbles attached to them, and the sinking raisins do not. When they get to the surface, the bubbles burst making them heavier than the water again, and they sink. Soda pop, like 7-up, has gas already dissolved in it, so when it is poured into a glass or jar the bubbles escape producing the same results as the Alka Seltzer tablet's bubbles.

## Closure

Have a student pour a can of 7-up in another glass jar. Have other students drop six raisins into the 7-up. Have all the students team up in pairs to explain:

1. Why did the raisins first began to sink, rise to the surface, and sink again?
2. The students are to draw the jar with raisins rising and sinking. Draw cartoon raisins showing the difference in how the rising/sinking ones look. Have one that is rising and one that is sinking explaining to each other what is happening to them. The raisins must explain how changing *density* affects their bobbing up and down. Ask the students to be creative and give them enough time to draw. If they are sitting in groups, have the students share their cartoons first with their groups for feedback. They should make any necessary changes at this time to have accurate cartoon explanations. Then, if time permits, have one or two students from each group share their cartoon with the class.

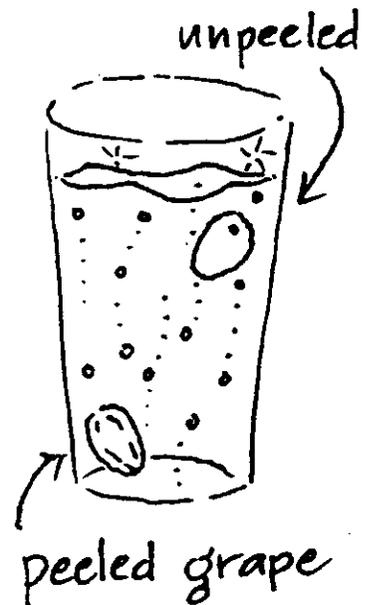
## Activity 2: The Heavier Grape - Density

### Objectives

- To help students understand density.
- To help students understand cohesion and adhesion.

### Materials

- 6 fresh grapes the same size
- 7-Up in a clear jar / glass from the first experiment
- water in a clear jar / glass.
- 1 Alka Seltzer tablet



### Procedure

1. Show two grapes to the students.
2. Peel one grape by taking its skin off, but leave the other grape with its peeling on.
3. Again, show the two grapes to the class, but this time ask them: "Which of the two grapes is heavier, the whole grape or the peeled one?" (*The students will usually answer correctly 'the unpeeled one'*)
4. Explain to the students that you are going to drop the grapes into the 7-Up and ask the class to predict what will happen, with reasons that support their predictions.
5. Drop both of the grapes into the 7-Up and have the students observe what happens.

### Questions

- "Why does the peeled grape sink to the bottom?"
- "Which of the two grapes is lighter in weight?"
- "Why does the unpeeled grape float?"
- "Would an unpeeled grape also float in water?"

6. Show two more grapes to the students
7. Peel one grape by taking its skin off, but leave the other grape with its peeling on.
8. Explain to the students that you are going to drop the grapes into water and ask the class to predict what will happen, with reasons that support their predictions.

## Questions

“What happened?”

“Why is there a difference in what happened when we dropped the grapes into 7-Up and then into water?”

“What property does the grape peel have?”

## Explanation

The unpeeled grape has **hydrophobe**: water repelling properties; consequently, the **carbon dioxide** ( $CO_2$ ) bubbles from the 7-Up can adhere to the unpeeled grape. The peeled grape doesn't have hydrophobe properties and the 7-Up bubbles can't adhere to it, but it is **hydrophilic**: water-attracting. The Alka Seltzer puts  $CO_2$  into the water and make it like 7-Up.

## Closure

Explain to the students that you are going to drop two grapes (one peeled and one whole) into water with Alka Seltzer and ask the class to predict what will happen on paper, and they must support their predictions. *(If they understand the concepts of density, adhesion and cohesion, they will predict that the unpeeled grape will float and the peeled grape will sink.)* Have them share their conclusion with two other students.