



The Rise and Fall of Raisins

Purpose

As students observe the effect of seltzer water on raisins, they learn about combined relative density.

Time Required

10–15 minutes

Lab Ratings



TEACHER PREP

CONCEPT LEVEL

CLEAN UP

MATERIALS

- large, tall transparent jar or glass
- 5–10 raisins
- seltzer tablet
- tap water

What to Do

1. Fill the jar or glass with water. Drop a seltzer tablet into the water, and then drop the raisins in the water. Ask students to observe what happens to the raisins.
2. Continue observing the behavior of the raisins for a few minutes. Again, ask students to describe their observations. *(The raisins rise to the surface after a short time and then sink again. This process continues as long as the water fizzes.)*
3. Ask students to predict whether the raisins would exhibit the same behavior without the seltzer tablet. Empty the glass or jar and refill it with water. Drop the raisins into the water. Ask students: What happens? *(Without the seltzer tablet, the raisins sink to the bottom of the jar and stay there.)*

Explanation

The density of the raisins does not change. However, the carbon dioxide bubbles that adhere to a raisin's surface cause a much lower combined density of the raisin and bubbles. The bubbles add little mass to the raisin, but they displace an additional volume of water, causing the raisins with bubbles attached to them to float.

Discussion

Use the following questions as a guide to encourage class discussion:

- What was the purpose of the seltzer tablet? *(The tablet provided the bubbles that caused the raisins to rise and sink.)*
- Water is denser than carbon dioxide but less dense than a raisin. How can this statement be used to explain the behavior of the raisins? *(A raisin by itself is denser than water and therefore sinks, but a raisin covered with many carbon dioxide bubbles rises. This is because the combined density of the raisin and carbon dioxide bubbles is less than the density of water. At the surface, some of the bubbles burst. When this happens, the combined density of the raisin and carbon dioxide bubbles increases, and the raisin begins to sink again.)*
- **Critical Thinking** Use what you have observed in this activity to explain how a lava lamp works. *(As the wax reaches the warm light, its density decreases and the wax rises. As it floats away from the heat source, the wax cools and condenses. The density increases and the wax sinks again.)*



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