States of Matter—Dancing Raisins

AUTHOR:
Original lesson developed by D.M. Candelora, available on the Hands-on Technology web site, http://web.archive.org/web/20040603203643/www.galaxy.net/~k12/index.shtml, and was modified by Michigan Water Stewardship Program.

LESSON OVERVIEW:
In this lesson, students will develop a hypothesis and conduct a simple experiment to learn about the concept of buoyancy.

Michigan Grade Level Content Expectations (GLCEs):

- Make purposeful observation of the natural world using the senses (S.IP.03.11).
- Generate questions based on observation (S.IP.03.12).
- Manipulate simple tools that aid observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer (S.IP.03.14).
- Make accurate measurements with appropriate units (centimeters, meters, Celsius, grams, seconds, minutes) for the measure tool (S.IP.03.15).
- Communicate and present findings of observations and investigations (S.IA.03.13).
- Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities (S.SR.03.11).
- Use evidence when communicating scientific ideas (S.SR.03.15).

GRADE: 3

SUBJECTS: Science

DURATION: Each lesson one class period with follow-up

GLCEs: S.IP.03.11, S.IP.03.12, S.IP.02.14, S.IP.03.15, S.IA.03.13, S.SR.03.11, S.SR.03.15

MATERIALS:

- 1 clear plastic cup
- 6-8 raisins
- Clear soda (e.g. club or lemon-lime soda)
- Stopwatch or timer

OBJECTIVES:
Student will be able to:

1. Develop a hypothesis.
2. Observe the principle of buoyancy.

BACKGROUND INFORMATION:
This experiment is centered around the "weight" of a raisin. The property in effect is buoyancy - the tendency for a body to float or rise when placed in a liquid. In their natural state, raisins are not buoyant. If placed in a carbonated beverage for several minutes, the raisins will start to "dance". While they are sitting on the bottom, you can see gas bubbles start to collect on them. When there is sufficient amount of gas to make the raisins buoyant, they will rise. At the surface, some of the gas bubbles are exposed to the air and diffuse into the air. Once a sufficient number have "popped", the raisin is no longer buoyant and will sink.

VOCABULARY:
Solid, liquid, gas, buoyancy, hypothesis.

PROCEDURE:
Warm-Up (Anticipatory Set):
Introduce the concept of buoyancy to the students by asking them to explain why certain things float in water, for example a canoe, or a person laying on their back in a pool.

Activity:
Raisins are heavy enough to sink if placed in water. Ask students to develop a hypothesis about what will happen to raisins if they are put in soda? This is the hypothesis.

Test the hypothesis:
1. Fill the cup half way with soda. Add the raisins.

2. Use a stop watch to keep track of the cup for the next 10-15 minutes, recording all observations along with the time it was observed. What eventually happens?

3. What matter do you observe that is a solid? Liquid? Gas?

Wrap-Up (Closure):
How do you explain why the raisins are dancing?

ASSESSMENT OPTION:
Try this experiment again using other objects in place of the raisins. Do you get the same results? Why or why not? Ask students to explain their results.

EXTENSIONS:
Ask students to imagine that they are floating in a pool. What would happen if someone puts a 10 pound bag of sand on top of them?

RESOURCES:
Hands-On Technology Program:
http://web.archive.org/web/20040603203643/www.galaxy.net/~k12/index.shtml