Sewer Lice

Scientific Method Learning Activities

Introduction

Use this popular, simple exercise to introduce some levity into the classroom and as an opportunity to demonstrate the importance of careful observations.

Concepts

- Observation
- What is life?

Materials

Raisins, 10 to 20

Beaker or similar transparent container, 1000-mL

Carbonated beverage that could pass for "sewer-water" (i.e., 50/50,® Squirt,® or Mountain Dew®), 500 mL

Safety Precautions

There are no real hazards involved with this exercise as long as scrupulously clean beakers or non-lab containers are used. Laboratory glassware that may have previously contained any chemicals or solutions should be avoided. Normally food should not be eaten in the laboratory—this may be one exception for dramatic effect. Remind students to never eat in the lab—this is a "special" demonstration.

Procedure

Begin by telling some variation of the following story: "I just got something in the mail today from an old schoolmate of mine that he thought I might like to share with you. Dr. Louis Johnson from the University of Wisconsin sent me a totally new form of life. Perhaps you or your parents read about it last week in the newspaper. Some workers involved in a sewer reconstruction project in Rhinelander discovered what seems to be a mutated form of a familiar insect—the louse. I suppose the most familiar form would be the human head louse, *Pediculus humanus capitus*, which is a parasite sometimes found in people's hair.

The lice found in the Rhinelander sewers have evolved into very different creatures. They are as much as 100 times larger than normal and they are no longer parasitic—they live by eating sewage! They've gotten so large they can only swim and not walk. All they seem to do is swim down into the sewer water to eat and swim back up to the surface to breathe. Would you like to see them?"

Go into a prep or store room (or position yourself to conceal what you are doing from the class), pour about 500 mL of your carbonated "sewer-water" of choice into the beaker and drop in about a dozen raisins. Bring the "sewer lice" out to the class and continue the story.

"Do you see them swimming? Can you see their little legs kicking? How many legs do they have? Do you see their mouths open to eat?"

Walk up and down the aisles to give them a closer look. It might surprise you how many of your students will actually "see" legs kicking and mouths opening. When you are back at the front continue the story.

"Dr. Johnson has done a little preliminary research on these lice. He feels that they could possibly help to solve two of mankind's biggest problems—hunger and pollution. These lice have been found to contain a great deal of easily digested protein—they are edible."

A student always says, "Then eat one!! Ha! Ha!"

Eat one of the raisins after briefly protesting and offer one to the suggesting student. At this point some may start to gag and ask to be excused. Then continue:

"Not only are they edible but when they eat the sewage they apparently purify the water. It still looks a little cloudy but I understand it's quite drinkable."

Guess what happens.

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Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures governing the disposal of laboratory waste. Sewer lice may be disposed of according to Flinn Suggested Disposal Method #26b.

Discussion and Tips

- Do this demonstration early in the course when you are considering the scientific method and are discussing the importance of careful observation.
- The wrinkles and convolutions on the raisins catch the carbon dioxide (CO_2) bubbles released from the carbonated beverage. When sufficient bubbles have collected on the surface of the raisins they "swim" to the surface. At the surface, the CO_2 bubbles break and the raisins "swim" back down. Be careful not to use carbonated beverages that have been sitting out for more than a few minutes; they will be too "flat" to do the job.
- Do not immediately reveal the secret of the "sewer lice." After a while, or even the next day, ask the students what their impressions of the demonstration were. Perhaps they will be able to explain it to you!
- A modification can easily be made. Bring several jars of "sewer lice" labeled Week—1, Week—2, and Week—3. Use your relatively clear carbonated beverage as Week—3, mix a small quantity of a dark (cola) carbonated drink in the Week—2 and a larger quantity of the dark beverage in Week—1. Explain that the "sewer lice" have made the "sewer-water" nearly drinkable in three weeks but after only one week it still looks pretty bad.
- Use fresh, plump raisins for this demonstration. Practice with your raisins first to make sure they work properly. Sometimes soaking the raisins in water overnight will make them more "lively."

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Flinn Scientific Best Practices for Teaching Chemistry Video Series

A video of the *Sewer Lice* activity, presented by Bob Lewis, is available in *Scientific Method Learning Activities* and in *Discrepant Event–Classroom Lessons*, part of the Flinn Scientific Best Practices for Teaching Chemistry Video Series.

Materials for *Sewer Lice* are available from Flinn Scientific, Inc.