FACTivity

Note: This FACTivity was adapted from the National Park Service "Grow Your Own Stalactite" Lesson Plan. For more information, visit: https://www.nps.gov/ozar/learn/education/growown.htm.

Time Needed

Set-up: One class period

Follow-up: 5-10 minutes per day for 4 days

Materials

(for each student or group of students)

- Pictures of decorated cave passages
- Epsom salts, washing soda, or baking soda (Epsom salts and washing soda are more likely to form larger formations)
- Warm water
- 2 plastic cups the same size (preferably clear/see-through)
- 1 piece of aluminum foil to make a "tray" or a small plate/saucer
- 1 spoon
- 1 piece of cotton string or yarn (30-50 cm in length)
- 2 paper clips
- Permanent markers

Caves are well known for the formations that grow inside of them, called speleothems. In "A Tale of Two Caves," the scientists noted that speleothems were common and diverse in Hurricane Crawl Cave. They were so common, in fact, that some speleothems blocked the movement of water and sediment through the cave. Review the images of the speleothems from the "Thinking About the Environment" section.

Speleothems are formed when groundwater and rainwater absorb carbon dioxide, making the water slightly acidic. The acidic water dissolves calcite from nearby rocks as it moves through the Earth into the cave. When the water enters a cave, the carbon dioxide moves from the water, and the calcite is deposited on cave surfaces. This process is an important reminder of the natural cycling of water and chemicals through the environment.

At the end of this FACTivity, you answer the following question: What does this activity tell us about the formation of speleothems?

Methods

1. Using a spoon, dissolve as much of the chosen material (Epsom salt, washing soda, or baking soda) as possible into two cups that are filled at least halfway with very warm water. It will be easier to see the material being dissolved if the cups are clear/see-through, but it is not necessary. Repeat this process until the solution is well concentrated. A 2:1 ratio of material to water is best.

2. Mark the water level of each cup using a permanent marker. The water level should be similar between the two cups.

3. Tie a paperclip to each end of the piece of cotton string.

4. Soak the piece of string in the solution until it is completely saturated. Set the cup and the string aside.

5. Fold the piece of aluminum foil to form a small tray. This can be done by folding in the edges and molding the corners. Alternatively, use a small plate or saucer.

6. Your teacher will pick a couple of different locations within the classroom where you can place your tray and cups. Regardless of location, ensure that it is a place that will remain undisturbed for a few days.

7. Lay the string on the cup so that one end of the string (with paperclip) is well inside the solution in one cup and the other end of the string (with paperclip) is well inside the solution in the other cup. The middle section of the piece of string needs to dip below the water levels in the cups (**figure 13**).

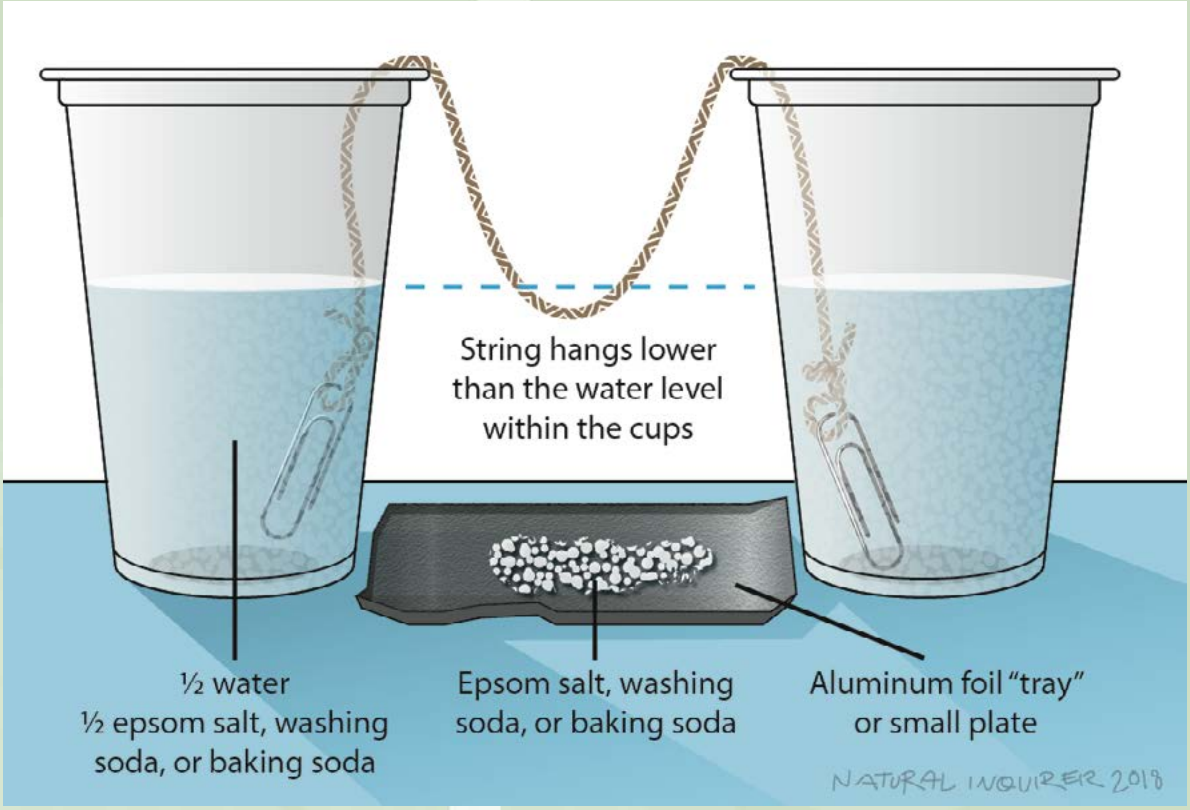

Figure 13. The string should be saturated, and the middle section should dip just below the water level of the cups. Illustration by Stephanie Pfeiffer.

8. Adjust the distance between the middle section of the piece of string and the tray to minimize the amount of splattering that may occur. This distance will depend on the height of the cups being used.

9. Place a small amount of dry material (Epsom salt, washing soda or baking soda depending on the solution being used) on the tray directly beneath the lowest part of the string.

10. Leave the cups for about 4 days.

11. Revisit the experiment to compare results with other students or groups of students. If the results are different, how? Why?

12. Your teacher will discuss with you how speleothem growth is dependent on a number of factors, including air temperature in the cave, precipitation on Earth's surface, the amount of calcium dissolved by groundwater, and the amount of carbon dioxide absorbed by groundwater.

13. How does this experiment, and the differences between the results, illustrate the potential differences in speleothem growth? Were there differences in the location of the experiments? Check the water level marked by permanent marker. Were the original water levels different between groups? Did the water drip or splash?