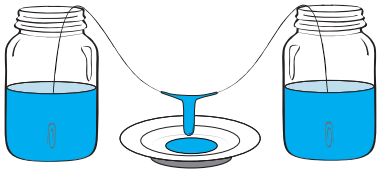
Growing Speleothems



Activity on Stalactites & Stalagmites

Grade Level: Modify for all ages

Lesson Objectives:
Students will
- Learn about the process of speleothem formation
- Stimulate the formation of stalagmites and stalactites
- Record observations at the end of each day

Timeframe:
30 minutes for preparing the demonstration, plus several days to grow the speleothems.

Materials:
- 1 small plate/saucer, or piece of aluminum foil
- 1 spoon
- Two paper clips
- 2 jars of the same volume/size
- Epsom salt
- Hot water
- Thick cotton string or yarn (natural fibers

Learn more about caves and karst; visit the NPS Cave and Karst Program

www.nature.nps.gov/geology/caves/index.cfm

U.S. Department of Interior
National Park Service
Geologic Resources Division

Overview:

Students construct a working model of mineral deposition and speleothem growth using a concentrated solution of salt. They can work in groups to interpret and record growth through observation on a daily basis.

Before

After

Growing Speleothems continued...

Background:

Caves are naturally occurring underground cavities large enough for human entry. Caves contain a large number of minerals, one of the most common minerals, is calcite. Speleothems, often called cave formations, are formed as rainwater passes through the soil and absorbs carbon dioxide. As water and carbon dioxide mix, a weak acid forms called carbonic acid which helps to dissolve underlying rock. When water seeps into the air-filled cave it loses carbon dioxide to the cave atmosphere causing the water to precipitate calcite deposits in different forms. Calcite precipitates on ceilings, walls, and floors as speleothems.

There are many types of speleothems, but the most common that people are familiar with are stalactites and stalagmites. Stalactites are formed by mineral rich dripping water and they grow down from the ceiling like icicles. Stalagmites are formed when mineral rich water drops from stalactites and accumulates on the cave floor growing upward like a cone. Sometimes a stalactite and stalagmite grow together to form a column.

Helpful Tip:

Having trouble identifying a stalactite from a stalagmite? Think of stalactites as holding tight ("***tite***") to the ceiling of the cave. Another way is to remember that stalactite has a "***c***" in it, as in "***ceiling***", and stalagmite has a "***g***" in it, as in "***ground***".

Procedure:

1. Fill both jars with hot tap water ⅔ of the way full.
2. Add enough Epsom salt to each jar until the salt will no longer dissolve in the hot water (approximately 8 or more ounces per jar).
3. Place 2-5 drops of food coloring into each jar and stir.
4. Cut string between 12-18 inches in length. You want it long enough so that each end remains submerged close to the bottom.
5. Tie a paper clip to each end of the string, to act as a weight in the jar.
6. Place a small plate between to the two jars to catch the water as it drops.
7. Wet the entire string in tap water.
8. Place the ends of the strings into each jar so that the clips rest on the bottom of the jar.
9. Leave enough slack between the jars so that the string sags in the middle (do not let the string touch the plate; you might need to cut the string if it is too long).
10. Place your experiment next to a window, in a safe location, with minimum sunlight. Direct sunlight can prevent crystallization, make sure to reduce exposure to sunlight. Make sure not to touch or move the experiment once the stalactites starts to grow, any movement of the string could cause breakage of the formation.
11. Check your "cave" at least once a day and record your observations in the observation tables.

Note: Results may vary depending on the temperature and humidity of your area.

Growing Speleothems continued...

Photo Instructions

Supplies you will need for the activity: 2 clear jars, food coloring, spoon, cotton string, 2 paperclips, hot tap water, & Epsom salt.

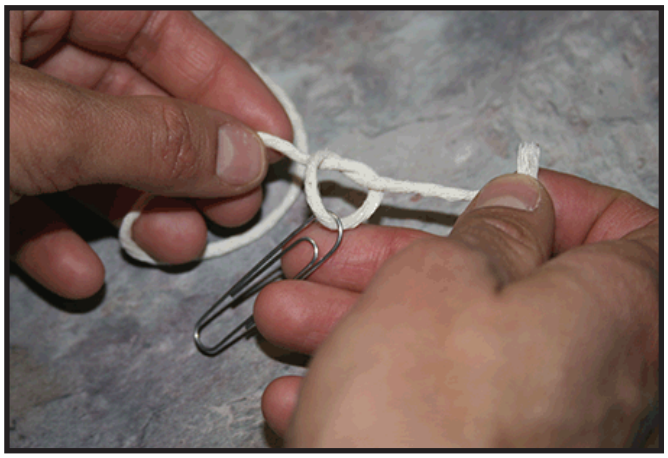
1. Fill each jar with equal parts of Epsom salt to hot tap water.

2. Place 3-5 drops of food coloring in each jar.

3. Stir the mixture until food coloring & Epsom salt dissolve.

Growing Speleothems continued...

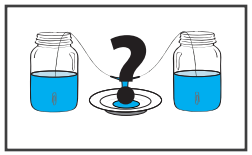
Photo Instructions continued...



4. Tie a paper clip to each end of the cotton string.

5. Place one end of the string into each jar so that the clips rest on the bottom of the jar.

6. Arrange the string and jars so that the string hangs loosely over the plate in the center.



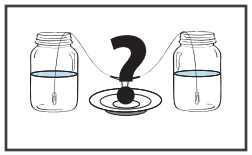
Growing Speleothems - Observation Sheet

Name: _____

Date: _____

Day	Observation	Illustrate water level and crystal growth
1		
2		
3		
4		
5		

Student Page



Growing Speleothems - Observation Sheet

Name: _____

Date: _____

Day	Observation	Illustrate water level and crystal growth
6		
7		
8		
9		
10		

Student Page

Name: _____

Date: _____

Student Page

Growing Speleothems

Questions:

1. What is your hypothesis?

2. How is carbonic acid produced?

3. What are speleothems?

4. What happens when a stalactite and stalagmite grow together?

Conclusion:

1. What kind of speleothem(s) were you able to grow? Explain

2. How is this experiment different from the way speleothems form in caves? How is this experiment similar to the way speleothems form in caves?

3. Why should we not touch speleothems in caves? What do you think might happen if we did?