

Chemical weathering- Making Caves

4th Grade

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References:

- CPS Curriculum guide
- Pictures of Caves: Ohio Caves <http://www.cavern.com/ohiocaverns/photos.htm>
Carlsbad caverns <http://www.photodonation.org/carlsbadcavernsnp.htm>

Benchmarks:

SLC/GLI #: ES-8, ES-10, and Benchmark B: Summarize the processes that shape Earth's surface and describe evidence of those processes.

Objectives:

Students should be able to tell the difference between physical and chemical weathering and give examples of both. Physical weathering has mainly been covered in the past couple weeks, and students should be able to draw on those experiences, and compare them to what is learned about chemical weathering in this lesson.

Materials:

- Clear plastic cups
- Sugar cubes – enough to cover bottom of cup
- Cookie crumbs – enough to cover sugar cubes
- 2 Tbsp vinegar per cup and eye droppers

Initial Demonstration:

Use activity as initial demonstration. Try to make lesson as inquiry based as possible. Simply tell the students that they are going to learn about a different kind of weathering. Start a discussion about types of weathering they've already learned about. Make a list of the types weathering they can think of, and the cause of the weathering.

Procedure:

- 1.) Place the sugar cubes in one layer in the cup's bottom to represent underground limestone.
- 2.) Pour the cookie crumbs over the sugar cubes. Press them down so that there are no holes between the sugar cubes, and the crumbs form an even layer on top to represent the ground.

- 3.) Fill the eyedropper with vinegar to represent acid rain. Hold the dropper above the cup. Squeeze the vinegar over the crumb surface. Repeat until all of the vinegar is used.
- 4.) Have the students observe the cookie crumb surface.

Ask them questions, or have them write about it. *What happened to the cookie crumb surface? What happened to the sugar cubes?* (Like limestone, the sugar cubes dissolve easily. Vinegar seeps through the crumbs, dissolving the sugar. The cookie surface collapses, creating a sinkhole. Or, in other places, where the cookies may not have collapsed, a cave is formed.)

Target Observations:

- Students should notice that the vinegar seeped between the cracks in the cookies, and then dissolved the sugar cubes.
- They should also notice that the cookie crumbs either fell to create a sink hole, or possibly held up and created a cave underneath

Target Revised Model:

- Students should understand that chemical processes, such as acid rain also play a role in shaping the earth through weathering. This process is responsible for creating incredible caves such as Carlsbad Caverns, and also those found here in Ohio.

Follow-up Observations:

Add chemical weathering to your list of weathering types and sources. Keep this poster hung in the room for future reference. In addition, great pictures of both Carlsbad Caverns and the caves in Ohio can be found at the above websites. Show the pictures to the students, and then have a follow-up activity by having students draw their own pictures of caves being created, and then write a paragraph about what and how chemical weathering happens.

Summary:

In this lesson, students completed an inquiry-based activity in order to learn about chemical weathering, and compared it to physical weathering. They learned that chemical weathering is responsible for reshaping the earth and creating incredible natural wonders such as Carlsbad Caverns and the caves found here in Ohio. They also completed an art and writing assignment about chemical weathering.