

# How does water cause weathering?

## 4<sup>th</sup> Grade

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### References:

- CPS Curriculum guide – Smooth It Out! activity

### Benchmarks:

SLC/GLI #: ES-8

### Objectives:

In this hands-on lesson, students will learn about the weathering process of water on rocks. Rock salt will be used to represent rocks. The water and friction from other “rocks” during stirring will show similar results to weather of rocks from water and the abrasion of the materials that it carries.

### Materials:

- 4 TBS of rock salt per group
- 3 containers (baby food jars with lids or equivalent) per group
- measuring spoons
- magnifying glasses
- paper towels
- water
- craft sticks for stirring
- student lab sheet (in curriculum guide)

### Initial Demonstration:

Show students examples of plain rough rocks that you may find outside on the playground as well as rounded smooth rocks that one may find on a riverbed or beach. Have students compare the two types of rocks. Ask them to make inferences as to why rocks found on the playground are rough in texture, while those found in a river or on a beach are smooth and round.

### Target Observations:

- Students should come to the conclusion that the rocks are different because of the different environments that they were found. They may or may not get to the idea that running water weathered the rocks and made them smooth.

## Procedure:

Introduce the activity by the initial demonstration. Tell the students that they will be investigating how river rocks become smooth while rocks found away from water are rough. Have students fill out the lab sheet as they go.

- 1.) Split students into groups of 4-5. For each group assign the following tasks: shaker, recorder, timer, and materials manager.
- 2.) Label the 3 jars with a 1, 2, or 3.
- 3.) Have the materials manager put 2 TBS of rock salt into jars 1 and 2. Fill jar 3 with water. Take the 3 jars back to the group.
- 4.) Give each student a Student Lab Sheet (in curriculum guide). Each student will take out one piece of rock salt from a jar. Students will observe the rock salt with and without the hand lens. They will record observations and sketch the rock salt on their lab sheet. Write a comparison of the rock salt and a real rock.
- 5.) Students will then add one TBS of water to jar 1 and nothing to jar 2. Tighten the lids on both jars.
- 6.) On their Student Lab Sheet, students will predict what will happen to the rock salt in jars 1 and 2 if they are stirred in a swirling motion for 2 minutes each.
- 7.) Have the students stir the jars in a swirling motion for 2 minutes each.
- 8.) Remove the lids from each jar and take out one piece of rock salt from each jar for each student. Observe the difference with the eye and the magnifying glass between the two pieces. Students will write their observations of the two between the two pieces, making sure to write and sketch and note which observation was with water and which was with no water.
- 9.) Discuss their observations, asking:
  - a. *How are these pieces different from the original pieces?*
  - b. *Does the rock shaken in the water look different from the rock shaken without water? How?*
  - c. *What might account for these differences?*
- 10.) Have the students predict what will happen if the rock salt is swirled for 2 more minutes. Replace the lids and repeat the stirring for 2 more minutes, using the same motion as before. Take off the lids (if there are lids) and take out a piece from each jar, observing and recording as before. Discuss differences from the previous time.
- 11.) Repeat the activity one more time, stirring/shaking for 2 more minutes. Observe and record observations.
- 12.) Have the students check their predictions at the end and write if their predictions were correct or incorrect.

At the end, summarize what happened. The key points that you should make sure the students understand is that water causes weathering of rock. This weathering is called physical weathering because it happens through physical changes and processes (i.e. water and particles in the water rubbing against rock to smooth it and break it into a smaller pieces). In addition, they should understand that this is a very slow process and happens over very long periods of time. Make sure the students don't confuse weatherING with weather.

### **Target Observations:**

- Student should notice that the rock salt in the jar with the water is worn down and smoothed by the interactions with the water.

### **Target Revised Model:**

- Students should understand that water weathers rocks in nature, making them smaller and smoother by running over them for long periods of time.
- They should also understand that unlike the rock salt, water that weathers rocks in nature is a very slow process.
- The weathering of rocks by water is an example of physical weathering.

### **Summary:**

Students learned about weathering of rocks caused by water, as might be observed in rivers, streams, and oceans. Water weathering was demonstrated through an activity where rock salt was used as the rocks and stirred with water to simulate the water running over the rocks and weathering them. The important point that students should understand from this lesson is that *weathering causes rocks in rivers and streams to be smooth, and this weathering is caused by running water. This type of weathering is an example of physical weathering.*