Smooth It Out
4th Grade

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References:

- Lesson plan from CPS 4th grade Earth Science curriculum guide

Benchmarks:

(Benchmark B): Summarize the processes that shape the Earth's surface and describe evidence of those processes. ES-8: Identify and describe how freezing, thawing, and plant growth reshape the land surface by causing the weathering of rock.

Objectives:

Students should be able to describe how weather events such as hard rains and floods cause weathering of the Earth' surface and rocks. Students should be able to distinguish between erosion and weathering, and understand that water and friction show similar results in weathering rocks.

Materials:

- 2 Equal sized pieces of colored hard candy
- 2 Equal sized jars w/ lids
- 250mL beaker
- 4 TBS Rock Salt
- Hand Lenses
- Paper towels
- Water
- 3 Baby food jars w/ lids
- Tablespoons
- Lab sheet

Initial Demonstration:

In order to determine just how moving water or motion affects the process of weathering and erosion, shaking a jar with water and candy is a perfect example. Pour about 250mL of water into each jar and add one piece of hard candy to each. Close the jars off tightly and appoint two volunteers to shake the jars for the class. One student will shake vigorously, while the other student will just gently rock the jar. The students should shake the jars for two minutes, and then ask two more volunteers to shake for another round. Since the candy is soluble in water, the more vigorous the movement, the more the water rubs against the candy. This causes small pieces of candy to fall off and

dissolve in the water. When the shaking is complete, have the students pass the jars around to see the size differences in the pieces of candy.

Target Observations:

- Moving water causes the candy to get smaller.
- The more vigorous the shaking and movement, the more weathering that takes place (more dissolves).

Target Model:

- Squeezing or hitting rocks can cause them to crack.
- Weathering is caused by rocks tumbling around or by the Earth squeezing them.

Procedure:

Split students into groups of 4-5 and assign the following tasks: Shaker, Recorder, Timer, Materials Manager. Have the students label the three baby food jars with 1, 2, or 3. Have the materials manager put 2 TBS of rock salt into jars 1 and 2. Fill jar 3 with water. Take the three jars back to the group. Give each student a Student Lab sheet. Each student will take out one piece of rock salt from a jar. They will observe the rock salt with and without the hand lens. They will record their observations of the rock salt and sketch the rock salt on the lab sheet. Write a comparison between the rock salt and a real rock.

Students will then add one TBS of water to jar 1 and nothing to jar 2. Tighten the lid on both jars. On their student lab sheet, students will predict what will happen to the rock salt in jars 1 and 2 if they are shook in a swirling motion for 2 minutes each. Record predictions, followed by shaking the jars for two minutes each. Remove the lids and take out one piece of rock salt from each jar for each student. Observe the differences with the eye and the hand lenses 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 no water was used.

Discuss their observations asking;
"How are these pieces different from the pieces in the box?"
"Does the rock shaken in the water look different from the other? How?"
"What might account for these differences?"

Have students predict what will happen if the rock salt is swirled for two more minutes. Replace the lids and repeat the shaking for 2 more minutes using the same swirling motion. Take off the lids and take out a piece from each jar, observing and recording as before. Discuss differences from the previous time. Repeat the activity one more time, shaking for two minutes. Observe and record observations. Have students check their predictions at the end and write if their predictions were correct or incorrect.

Target Observations:

- Shaking the rock salt causes it to smooth out and break into pieces.

- Shaking with water and without water have similar effects on rocks.
- Shaking the rocks in water speeds up the weathering process by dissolving the salt.
- Water naturally breaks down certain types of rocks more quickly than others.

Summary:

In this hands on lesson, students have learned about the weathering and erosion on rocks. Rock salt is used to represent rocks. The water and friction show similar results to weathering and erosion of rocks from water and the abrasion of the materials that it carries.