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LESSON PLAN

WEATHERING & EROSION GRADES 3-5

SUMMARY

Students will explore the science of weathering and erosion to understand how Earth's surface changes. They will discover what happens during weathering, and the different ways this material is moved through erosion.



4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Science & Engineering Practices	Connections to Classroom Activity
<p>Planning and Carrying Out Investigations</p> <ul style="list-style-type: none"> • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. <p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> • Analyze and interpret data to make sense of phenomena using logical reasoning. <p>Constructing Explanations</p> <ul style="list-style-type: none"> • Identify the evidence that supports particular points in an explanation 	<ul style="list-style-type: none"> • Students investigate and analyze the different changes in Earth's surface and the environment due to weathering and erosion. • Students use evidence to explain the process of weathering and erosion.
Disciplinary Core Ideas	Connections to Classroom Activity
<p>ESS2.A</p> <ul style="list-style-type: none"> • Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, 	<ul style="list-style-type: none"> • Students describe how natural weather events like wind and rain contribute to changes in Earth's surface through weathering and erosion.

wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change

Connections to Classroom Activity

- Students identify the pattern or sequence of events for weathering, erosion and deposition.
- Students identify if weathering or erosion caused an observable change in Earth's surface and explain how this change affects the environment over time.

DURATION

One to two 45-minute classroom periods.

PRE-ASSESSMENT QUESTIONS

Please see Discussion Questions. These can be discussed as a group or answered individually in student science notebooks.



ENGAGE/PHENOMENA

Show students a picture of a tree growing through a rock. Ask students to describe what they see in the image. Focus the discussion on the actual crack formed from the plant growing. Ask students to think of other places they have seen cracks in Earth's surface. Examples include potholes in the road or cracks on the sidewalk. Explain that there are many different natural processes in our environment that change the surface of Earth. A process known as weathering causes these changes. Mention that even humans cause weathering and erosion. For example, each time we dig soil, or just walk along the ground, we are slowly changing Earth's surface.



EXPLORE

Explain to students that they will be exploring the process of weathering and erosion. They will examine different causes of weathering and some different types of erosion. They will also recognize that weather events like rain, snow, and wind are not the only factors that contribute to weathering and erosion.

MATERIALS

- Science notebooks
- Pencils

Station 1

- Sugar cubes
- Plastic tray
- Plastic bag (Ziploc)

Station 2

- Watering can
- Potting soil or sand
- Clear basin

Station 3

- Coarse sand paper
- Limestone, calcite, or other soft stone.

STATION 1: PHYSICAL WEATHERING

Have students model the process of physical weathering using sugar cubes. Place a tray on the table and put six sugar cubes in a plastic bag. Put this plastic bag containing the sugar cubes on the tray. Have students press down on the sugar cubes so that they crush apart. Encourage students to discuss and make note of what they observe.

STATION 2: WATER EROSION AND DEPOSITION

Take a clear basin and fill one side of the basin with a steep slope of soil. Have students take a watering can and pour water over the steep slope. They should see water and soil falling down the slope. They should also see evidence of deposition based on where the soil settles on the other side of the basin.

STATION 3: WIND EROSION

Place a rock on the table with coarse sandpaper. Have students sand the rock for a few minutes to demonstrate wind erosion with sand. Make sure a new rock is provided for each group as well as a fresh piece of sand paper.

STATION 1

FOCUS QUESTION: WHY DID THE SUGAR CUBES CRUSH?

If you apply enough pressure to a rock what do you think will happen? Write down in your notebook the answer to this question. Also write down anything you observe about the sugar cubes, and why this is an example of weathering.

STATION 2

FOCUS QUESTION: WHICH PART OF THE DEMONSTRATION MODELED EROSION AND WHICH PART MODELED DEPOSITION?

There are many ways to erode a surface. There are also many places where eroded particles can settle or deposit. Think about how this demonstrates the process of water erosion and deposition. Write down in your notebook what you observe and what could be done to prevent or slow down the process of erosion.

STATION 3

FOCUS QUESTION: WHAT HAPPENS WHEN SAND TRAVELS IN THE WIND AND IS CONSTANTLY BLASTED AGAINST A ROCK?

What happened to the rock as you sanded it down with sandpaper? Write your answer in the notebook. Also include in your notebook how this demonstration explains how the shape of a rock can change due to wind erosion.

Divide students into three groups. Allow the groups to rotate through each station, using their science notebooks to record their observations.



EXPLAIN

After students complete all stations facilitate a classroom discussion about the differences between weathering and erosion. Reiterate that for weathering, weather is not the only



contributing factor. Human activities, plants, and other factors can also cause weathering. Review the different types of erosion and features of each. Explain that Station 1 provided a visual of what happens to soft pieces of rock during weathering. Station 2 demonstrated what happens during water erosion, and Station 3 showed what happens when the wind blows particles such as sand against rock over a period of time



WATCH THE *GENERATION GENIUS WEATHERING AND EROSION* VIDEO AS A CLASS. THEN FACILITATE A CLASS DISCUSSION USING THE DISCUSSION QUESTIONS.



ELABORATE

Students can use the DIY Activity to model what happens during weathering, erosion, and deposition just like Zoe did. They should be able to describe the causes of each process, and be able to recognize at what step each process is occurring within their model demonstration.



EVALUATE

Continue the discussion about the differences between weathering and erosion in the context of how they change Earth's surface over time. Use the stations completed in the Explore section of this activity to facilitate this discussion, as students were able to visualize key differences between the processes of weathering and erosion. Ask students to list examples of things they may have seen in nature that could have been caused by either weathering or erosion. For example, students can say they saw weeds growing through cracks or saw a large pothole in the ground. Have students state whether their example could have been caused by weathering or erosion. Provide time for students to explain why they believe this to be true.

