

5th Grade: Wear it Away – Weathering & Erosion

Session I: Pollution & the Water Cycle – In Classroom

Sample Timeline

0:00 Arrive at the school, sign in at the office, and meet the teacher in their classroom. Make sure teacher has made copies of worksheets, organize supplies, and set up activity.

0:05 Introduction to educator, Jordan River Commission, and the outline for the day

0:10 Warm up: what is Erosion? What is weathering?

0:20 Activity I: Blowing, Flowing, and Melting

0:45 Discuss results of activity & why is erosion a problem?

1:00 JRC educator leaves school *Make sure to set a date for the 2nd field lesson plan

Behavioral reminder before you start:

Today we are staying in the classroom for our activity so that means:

- Use inside voices
- No running
- Leave materials in the pan
- Ask lots of questions

Note: It may be useful to chat with teacher beforehand to understand procedures they already use in the classroom. For example, some teachers are very strict about students raising their hands before and being called on before answering questions. Also, ask if they already have an attention grabber (teacher: 1,2,3 eyes on me. Students: 1,2 eyes on you)

Introduction

Today we will be staying in the classroom conducting an experiment on water erosion. Then in our next session, we will walk to the Jordan River to search for evidence of erosion. This means you need to be prepared with to make lots of observations. We will also be mapping our journey to help us better understand why erosion occurred at a particular place when we return to the classroom to share our findings.

Materials

Erosion Chambers

Pitcher (for water)

Erosion Lab Worksheet (make copies)

Key Concepts

- Describe how weathering and erosion change Earth's surface
- Identify the objects, processes, or forces that weather and erode Earth's surface (e.g., ice, plants, animals, abrasion, gravity, water, wind)

- Protection against erosion

Activity I – Erosion Chamber Experiment

Place the erosion chambers on a visible table in the classroom. Tell the students that they will be conducting an experiment on water erosion. Have the students discuss each of the three sections of the erosion chamber and label them as (1) bare soil, (2) scarce vegetation, and (3) vegetated.

*Use the Erosion Lab Worksheet to follow along with the experiment.

Have the students sketch the apparatus and label the sections. Ask the students to predict and record what they think will happen when 2 liters of water are poured into each section.

- What will the soil look like?
- What will the runoff look like?
- Will it make a difference if the water is poured on in a stream or "sprinkled?"

Begin the experiment with the vegetated section. Have the students make observations about what the soil looks like as the water runs over the surface.

- How much water soaks in?
- How much runs off?

Consider having students measure the time it takes for all excess water to run out of the chamber.

Start the timer when the water is poured on the soil and stop the timer when there is no additional water draining from the pan. Discuss student observations. You may need to pour in 2 or 3 liters of water to see water draining from the end of the pan. The amount of water needed will depend upon the amount of moisture in the soil before you began the lab.

Repeat the process in the other sections. Time each experiment and record the results in a journal. Invite students to think about an explanation for the results they recorded.

When all three of the sections have received the same amount of water, measure the amount of water that was collected at the end of each chamber.

Note: Marking the soil level in each of the jars with a transparency pen at the conclusion of the lab will allow students to compare the amount of soil that eroded in each pan.

Compare the amount of time that water continues to drain from each pan.

- It is similar or different?

Discuss the results of this activity. Soil erosion will be the greatest in the area with no vegetation, followed by the pan with scarce vegetation. There will be little erosion from the fully vegetated pan. It can take decades to millions of years to make new soil. Pose the following questions to the students.

- Why is soil erosion a concern?
- What can be done to prevent soil erosion?

Ask the students:

- does gravity affect the rate of erosion?
- Would a steep hill be more likely to erode than a gentle hill? Why or why not?

*Change the angle of the apparatus to compare the amount of soil erosion on a gentle incline versus a steep incline.

Ideas to Cover

Weathering and Erosion change Earth's surface

Erosion happens when rocks and sediments are picked up and moved to another place by ice, water, wind or gravity. **Weathering** is the process where rock is dissolved, worn away or broken down into smaller and smaller pieces.

Erosion in one area can actually build up lower areas

- Think about a mountain range and a river. As the mountain erodes, the river carries sediment downstream towards the ocean. That sediment slowly builds up and creates new wetlands at the mouth of the river.

Forces of Erosion, processes, or faces that weather and erode Earth's surface (e.g., ice, plants, animals, abrasion, gravity, water, wind)

There are mechanical, chemical and organic weathering processes.

Mechanical weathering physically breaks up rock.

- Mountains are rained on and become hills. The pieces of the mountain become smaller pieces and go down the sides of hills. Weathering and erosion always happen in a downhill direction.

Chemical weathering decomposes or decays rocks and minerals.

- Water dissolves limestone

Organic weathering happens when plants break up rocks with their growing roots or plant acids help dissolve rock.

Fighting Erosion

The only natural protection against erosion is plant protection.

Plants have root systems that provide strength and stability to the soil. The parts of the plant above the soil work as wind breaks and block the water as it runs in paths across the surface. Vegetation also protects the soil from the sun. Many bacteria that are vital to soil formation need the vegetation to thrive.

Session II: Field Day – Wear it Away Scavenger Hunt

Sample Timeline

0:00 Arrive at the school, sign in at the office, and meet the teacher in their classroom. Make sure teacher has made copies of worksheets, organize supplies, and set up activity.

0:05 Warm up activity: draw the water cycle & prepare to go outside

0:15 Water Cycle Walkabout

0:50 Go over worksheet and Q&A

1:00 JRC educator leaves school *Make sure to set a date for the 2nd field lesson plan

Behavioral reminder before you start:

Today we're going outside, so we have a few more rules:

- No running
- No pushing/shoving
- Stay on the path/trail
- No climbing on rocks or trees
- No throwing of any kind
- Stay with the group and away from the water
- Leave all wildlife alone
- Ask lots of questions

Note: It may be useful to chat with teacher beforehand to understand procedures they already use in the classroom. For example, some teachers are very strict about students raising their hands before and being called on before answering questions. Also, ask if they already have an attention grabber (teacher: 1,2,3 eyes on me. Students: 1,2 eyes on you)

Introduction

For our field session, we are going to search for evidence of erosion at the Jordan River. We will use the Wear It Away worksheet as a guide for our scavenger hunt. Make sure to record any other observations and field notes in your journals!

Key Concepts

- Describe how weathering and erosion change Earth's surface
- Identify the objects, processes, or forces that weather and erode Earth's surface (e.g., ice, plants, animals, abrasion, gravity, water, wind)
- Protection against erosion

Materials

Wear it Away Scavenger Hunt Worksheet

Journals

Pencil/Pen

Activity 2: Wear it Away Walkabout

Students will be given a copy of the Wear it Away Scavenger Hunt worksheet to record observations through drawings or written descriptions. Each student should record a minimum of two examples of each type of weathering.

Educators should work with small groups at a time. Encourage students to look for small details, point them in the right direction, and point out other observations like colors, specific plants, birds, or any other things they may miss.

Note: To help manage this outdoor activity, the teacher will explain the physical parameters of the search and review directions on the checklist.

Background Information

Jordan River

Upon entering the Salt Lake Valley, settlers found a meandering wildlife corridor with a fifty-mile-long ribbon of water at its center. Infused with water from Utah Lake and several mountain streams, the river flowed through the entire Salt Lake Valley before it emptied into the vast wetlands of the Great Salt Lake. The river was being neglected and abused for many years, and irrigation canals continue to draw away much of the water of the river. The river is home to many different species of native wildlife including deer, beaver, fox, and many more varieties of [mammals](#), [amphibians](#), [reptiles](#), [fish](#), and [birds](#). The water in sections of the Jordan River is considered to be impaired, or is not meeting state water quality standards. The river is at the bottom of the Jordan River watershed, and water quality in this river was never that of a pristine mountain stream. However, a clean, restored river can provide many opportunities for recreation and habitat and everyone can play a role in improving the quality of water in the river.

Weathering and Erosion

Weathering is the wearing away of the surface of rock, soil, and minerals into smaller pieces.

- Example of weathering: Wind and water cause small pieces of rock to break off at the side of a mountain.
- Weathering can occur due to chemical and mechanical processes.
 - Chemical Weathering: – Decomposition of rock and soil due to chemical reactions. – Examples: acid rain wears away statues and buildings, oxidation causes metals to rust
 - Mechanical Weathering: – Decomposition of rock and soil due to mechanical forces (pushes and pulls).
Examples: wind, water, ice/frost, gravity, compression and contraction of materials due to heat

Erosion is the movement of particles away from their source.

- Example of erosion: Wind carries small pieces of rock away from the side of a mountain.

Effects of weathering and erosion:

- Cause changes in the slopes and texture of rock structures, hills, and valleys
- Can cause landslides
- Cause buildings, statues, and roads to wear away
- Can wash soil, pollutants, and harmful sediment from the roads and farms into waterways
- Cause metals to oxidize (rust)
- Reduce the area of a beach or shoreline

Weathering and Erosion- Learning Objectives for Grades K - 3

- Different things in the environment around us can cause changes to the way objects look or feel.
- Water, wind, and ice can make objects, such as rocks, break into small pieces.
- Water, wind, and ice can also move pieces of rock or land to new places.

Skinny & Fat Questions

Below are examples of two types of questions. “Skinny” questions require lower level thinking and are the type to ask when you want simple recall of facts and information. These questions require simple one or two word answers. “FAT” questions require higher order thinking skills, and are reminiscent of Bloom’s Taxonomy type of questioning, and require more detailed answers

SKINNY

What is....?

What is...?

When did...?

Name...?

Did...?

Do you agree....?

Does ...?

Can...?

Will?

FAT

Give reasons why....?

Explain why...?

Why do you think....?

In what ways....?

In what ways are _____ and _____ alike/different?

Predict what would happen if...?

What it....?

Why do you agree with...?

Why would you disagree with....?

Sample EcoWalk Questions

What type of environment do we live in?

What is a wetland? Why are they important?

What are feathers? How do they help birds?

Why does the bark of this tree feel different than this tree?

Why are there more trees on North-facing slopes than South-facing slopes?

How are beaks useful to birds? Why are they different?

What about the sounds birds make? Are they all the same?

Why are nests different? How are they made? How do they help birds?

What is migration? Why do birds migrate? Do all birds migrate?

Why does puncturevine (goat heads) produce a hard, spiky shell?

What do you notice about the River? Why is it important?

What about the people? Where do we fit in?

Why is the sun important to the local ecology?

What would happen if all of the trees were destroyed?