

Landscaping with Wind and Water



When

During the expedition

Disciplines

Geology

Description

Students demonstrate the destructive forces of erosion on small “mountains” and survey an area in the park, such as Lamar Valley, to identify evidence of erosion. Students interview a petrified tree in its natural setting to learn more about the changing landscape of Yellowstone.

Learner Outcomes

The student will:

- Demonstrate how wind, water, and ice are major agents of erosion.
- Identify erosion caused by wind and water in Yellowstone National Park.
- Develop and conduct an interview with a petrified tree to learn about the geologic changes of the Yellowstone landscape.



Natural Bridge, Yellowstone National Park

Materials

Erosion Investigation handout, plastic cups, plastic misting bottles, hand lenses, drinking straws, toothpicks, dirt, rocks, water, ice cubes, journals

Background

Landforms are created by constructive and destructive forces. In Yellowstone, constructive forces include uplift, volcanic eruptions, and sedimentation from inland seas and rivers. Destructive forces include weathering and erosion. Both types can change land forms dramatically.

Suggested Procedure for Activity 1: Change a Landscape

The park ranger will:

1. Discuss background information. Geologic Event Cards from the Through the Ages activity are helpful for this purpose.
2. Divide the students into small groups. Explain that each group will create a landscape using wind and water.
3. Have each group build a “mountain” from a pile of dirt. The dirt should include a variety of soil, sand, and rocks.
4. Distribute an Erosion Investigation handout to each group. Allow groups access to the materials listed so they can alter their mountain with landscape-changing forces.
5. Have students follow the steps listed on the handout. As groups investigate, they may wish to record predictions and observations.
6. Have students draw their mountains in their journals. They should include all signs of erosion and label the cause of each eroded area.
7. Allow students to visit landscapes created by other small groups.
8. Ask groups to remove a large cupful of soil from their mountains. Have them reconstruct a mountain using only the remaining dirt.
9. Instruct groups to plant trees on the mountain using toothpicks.
10. Have students simulate a volcanic eruption by pouring the cupful of soil onto the mountain. Discuss the impact of trees and volcanic ash on erosion patterns.

Suggested Procedure for Activity 2: Explore Petrified Trees

The park ranger will:

1. Hike with the students to search for evidence of erosion and to locate petrified trees.
2. Have students “interview” a petrified tree. Allow a student volunteer to be the tree’s voice and have other students take turns asking the “tree” questions about its experiences as it stood in that one spot over the ages.
3. Have students on the hike survey the views and point out large and small evidences of a changing landscape.



Petrified Trees, Yellowstone National Park



Erosion Investigation

Student Handout

The Force of Wind on Your Landscape

1. Using a drinking straw, blow on different parts of your mountain to demonstrate how air that is moving across the landscape changes it.
2. Focus a group discussion with the following questions pertaining to wind.
 - Which types of soil move the easiest?
 - Which types of soil don't move very easily?
 - Which types of soil don't move at all?
3. Predict how your landscape would look if the wind blew across it for a long time. Brainstorm how your group might set up such an experiment to test your prediction?

The Force of Water on Your Landscape

1. To observe how liquid water changes a landscape, follow the steps listed. Be sure to make predictions before observing what actually happens.
 - Pour a little water slowly in a one place.
 - Pour a little water all at once in a second place.
 - Use the mist bottle to mist a lot of water in a third place.
 - Mist a little water in a fourth place.
 - Mist a little water all over the pile of dirt.
 - Mist a lot of water all over the pile.
2. Create a valley using an ice cube on your mountain landscape to illustrate erosion caused by a glacier. Discuss how you could demonstrate the great expanding force that water exerts when it freezes.

Inspecting Other Landscapes

1. Have one volunteer from your group remain with your mountain to check the observations made by visiting groups and to answer questions.
2. At each mountain site, identify locations where liquid water caused erosion. Point out the glacial valley in each of the landscapes.



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