Layer Cake

This program is available to schools with teleconference equipment and as park staff member availability allows.

Grades: 6 to 8
Length: 30 minutes

Main Idea

You can think of the geologic layers (rocks) at Badlands National Park as being like ancient landscapes frozen in time. From studying each sedimentary rock layer, you can learn about different ancient environments ranging from 70 to 25 million years ago.

Objectives

Students will be able to ...

1. Explain why this area is named "The Badlands".
2. List three different ancient depositional environments that contributed sediments to the Badlands layers (sea, flood plains, rivers, open woodlands, volcanic ash from distant volcanoes).
3. Insert Badlands mammalian fossils on a timeline of Earth's history (between modern times and the time of the dinosaurs).
4. Define erosion.

Procedure

Introduction and Welcome

Camer Pan

- Have students think of descriptive words.
- Give an overview of Badlands National Park. Explain why it is called the Badlands.
    - Meet the Badlands. Now, I don't think it is such a bad place, but let me tell you about how it got its names (rugged terrain, lack of water, lack of vegetation, and extreme climate).
    - "The Wall" is 60 miles longs. What is a town that is 60 miles from where you live? These same formations cover a big area - in fact, these same formations are found in Toadstool State Park in western Nebraska.

- We are going to talk about how these badlands got here and why they look like they do.
- Call on students to list some of their descriptions. Have them share what it looks like around their school. (Is it prairie? Flat? Any rivers nearby?)

Geology Overview

- Ancient sea covered the Great Plains. It drained away and left a basin as the Rocky Mountains uplifted in the West.
- Sediments from the Rocky Mountains wash downhill and fill in the basin.
- Climate dries out and cools.
- Modern rivers begin eroding the sediments, leaving the Badlands standing today.

Close-up of Layers

Explain the depositional environments and sedimentary layers.

- Red stripe = ancient soil horizons
- Sandstone ridges = ancient river channels
- Rockyford Ash = ancient volcanoes
- Mudstone/siltstone = flood plain

Fossils

Show a few skulls that represent the mammals of the Oligocene Epoch.

Erosion

Close-up of rock slide and slump. Explain erosion is the opposite of deposition. White, Bad, and Cheyenne rivers.

Conclusion

The Badlands are a modern environment that look like this. However, the Badlands are also a rock record of ancient environments. What we see today is not just rock - it is an ancient, preserved landscape, including the fossils. National parks protect special places like this so that everyone can enjoy them and learn from them.

Questions and Answers