

Geologic Setting

Standards

National Science Education Standards Grades K-4

- ◆ Earth and Space
 - Changes in the Earth and Sky*
The surface of the Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions and earthquakes.

- ◆ Science as Inquiry
 - Understanding about scientific inquiry*
Plans and conducts simple investigations.

- ◆ Science and Technology
 - Understanding about science and technology*
People have always had questions about their world. Science is one way of answering questions and explaining the natural world.

Overview

Devils Tower is part of the Black Hills, which are dome mountains. Dome mountains are formed when the rocks of Earth's crust are pushed upward. The layers of sedimentary rock above the uplifted dome are eroded away. In this activity students use clay to model the formation of a dome mountain. This demonstration also allows them to see the age of the sediment layers as they become exposed.

Materials

- ◆ Four colors of clay or dough to represent the layers of sedimentary rock. (See recipe below if needed.)

- ◆ Groups of students will need about a fourth of a cup of each color.

- ◆ Plastic knife for each group.

Procedure

1. Flatten out each color to a similar size.
2. Stack the layers of clay sandwich style.
3. Discuss the age of the layers (i.e., the oldest at the bottom with the youngest on top).
4. Make a slight dome with the layers so that they don't stick to the table.
5. Using their hands, have students push toward the center from all sides. The clay should dome upward.
6. Using the plastic knife cut the top inch from the dome to reveal the layers. The oldest clay should show in the center.

Recipe for soft dough

2 cups flour
1 cup salt
1 Tablespoons alum
2 cups boiling water
2 tablespoons baby oil
Food coloring

Mix dry ingredients. Add water and oil. Mix well. Color as desired. Stores a long time in baggies.

Results

Deposits of mud, silt, or sand form horizontal layers of sedimentary rocks like the layers made in your activity. Pressure within the Earth push the rock layers for millions of years until they dome. Erosion caused by wind, water, ice, and plants cause change. Old mountains such as the Black Hills show the effects of dome building, that is, you find the oldest rocks in the center and the youngest rocks on the edges. This is represented when you removed the top from your dome to reveal the age of the layers.

Discussion Questions

1. What did the clay represent?
2. What force was represented by your hands?
3. How is erosion involved?
4. How are domed mountains different from volcanoes?

Web Sites of Interest

<http://www.ugs.state.ut.us/education/tc/tc0399.htm>

<http://earthnet.bio.ns.ca/english/activities/landforms/activity15.html>

http://intranet.canacad.ac.jp/groups/grade_8/mssciexemp/vol/mountains/index.html

<http://www.sdnhm.org/fieldguide/fossils/timeline.html>

<http://www.ucmp.berkeley.edu/education/explorations/tours/geotime/gtpage9b.html>