Mountains of Erosion

Target Grade Level: 4^{th} – 5^{th}

Objectives: Students will:

1. realize that water may change the appearance of land formations.
2. acquire more knowledge about the concept of erosion.
3. build what they believe to be the strongest mountain possible to withstand water erosion through group consensus and using the assigned materials design.

Materials:

- 6 dish pans
- Water
- Watering can
- Rocks
- Potting soil
- Sand
- Building plan sheet for each student

Scientific Explanation:

Erosion is comprised of natural, physical, and chemical processes by which the earth's rocks and soil are continuously worn down. Running water is a major cause of erosion. Stones carried with a river's current scour and abrade the banks and beds. Ocean waves and currents erode rocky cliffs and sandy beaches, especially during storms. Much of the coastlines and riverbanks on the North Slope of Alaska are made up of sea ice and permafrost (frozen soil). When these areas warm up, the ground can soften, slump, and be eroded away by rainstorms and waves. When an area receives more water than the ground can absorb (saturation point), the excess water flows to the lowest level, carrying loose soil with it. Erosion causes constant changes in land.

Procedure:

Focus Phase:
Present land formation pictures to the class. What earth formations are pictured? What are they made up of? Are some of the materials harder than others? Do you think that these formations ever change in shape? How?

Challenge Phase:
The students are placed into six small groups. Explain to the class as a whole that their task will be to build a mountain in their dishpan that will withstand the effects of having water poured over it. Two groups receive sand, two groups receive potting soil, and the remaining two groups receive rocks as their building medium (as a NSA localized extension: have another group try using a previously frozen small pot of saturated soil to mimic permafrost ground). Students are instructed to observe and describe their material. The group

records their observations onto their building plan sheets. Then each group devises a building plan. They draw and label their plan on their building plan sheet. Then students construct their mountain. Each group must only use the material provided in their dishpan. After the mountains have been built, the students develop a written prediction of the effects water will have upon their mountain.

Concept Introduction:
The whole class gathers around each mountain as the water is poured over them from a watering can. Discussion follows each result. Then students record and draw the results of their own mountain. Were your predictions right on? If not, what was different? Why did some of the mountains change more than others? What materials were used in the mountains that withstood the water? In what ways did our mountains change from the effects of water? In what ways did they stay the same? Ask the students to compare and contrast the composition of the sand, potting soil, and rocks. To reinforce student understanding, the class will collectively build a mountain using any combination of materials.

Concept Application:
Discuss the erosion concept. Then as a class, devise a definition for erosion. Provide pictures of various land formations subject to erosion (canyons, rivers, deserts, glaciers, beaches, tundra, etc.). Discuss events that may have caused these formations. Apply to students' surrounding area by asking which formations are found in the Barrow area? Coastal erosion is affecting some areas of the North Slope- have students seen coastal or any other erosion firsthand? Share stories of what they have seen.

Extension:
Remind the students that erosion occurs in the Earth's crust.
Review the layers of the earth by using an apple and a poster of the Earth's layers.
Cut the apple in half across the core.
Explain that the skin represents the crust, the heart represents the mantle, the seed coat represents the outer core and the seed represents the inner core.

Crust: 6 - 40 miles
Mantle: 1,800 miles
Outer core: 1.375 miles
Inner core: 1,750 miles

Explain that the apple skin (crust) is smooth and even but the crust of the Earth is uneven, varying in thickness from 6 to 40 miles deep.
Review the physical features of the earth's surface.

Related Internet Resource:
* Welcome to Mrs. Barth's Water Erosion Site
http://lincoln.midcoast.com/~wps/barth98.99/water/erosion.htm

Source:
www.askeric.org

NSBSD Science Standards,
Fourth grade: 1. A-D, 7. A-E
Fifth grade: 7. A, E

Building Plan Sheet

Mountain Builders Names:
_____.

Mountain Name:
_____.

Supplies Used:
_____.

Write three words that describe your land material:
_____
_____.

Draw and label a picture of what you want your mountain to look like:

Predict what will happen when water is poured on your mountain:
_____
_____
_____
_____.

Draw and label a picture of what your mountain looks like after water has been poured over it: