

## High School Erosion Unit

### Lab: Factors Affecting the Rate of Erosion

#### **Materials:**

Effect of flowing water on the rate of erosion different types of materials  
Sand, gravel, and other types of local soil and beach materials; food coloring (to dye the sand), Styrofoam plates (one for each pair or group of students), Dice or monopoly hotel to represent a house, plastic cups, water. Kleenex® or other tissues.

You may need to collect sand, gravel, etc. locally in the fall before the ground freezes and further north, before shorefast ice forms on beaches. You can also order sand, moss, potting soil, peat moss, etc. from garden supply companies.

**Teacher Preparation:** Review the instructions on the Student Worksheet and photos below to see the lab set-up and examples of student results. Use the food coloring to dye the sand before the lab or have the students do this.

**Extension:** Effect of wind on the rate of erosion of different soil types. See Lab set up in photo below using cardboard, tape, and a source of air. You can also use a cardboard box for a funnel to keep the soil and sand confined and a hand-held hair dryer with different speeds. Students can use a stop watch to make observations concerning the speed and pattern of the collapse of the dome of different types of materials at different wind speeds and compare their results to what happened with the water.

Alaska State Science Standard (NGSS):

HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes [HS-ESS2-5](#)

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (Review) [MS-ESS2-2](#)



Students dyeing sand for water/gravity erosion experiment.



Set-up for wind erosion experiment. Sand has already been blown by the wind.

Lesson plan developed by Pam and Glenn Sobey, Marilyn Sigman, and Anne Garland for the North Slope Borough School District.

## Examples of Student Results



Slumping has occurred on the water-saturated sand mound that did not have any protective covering. The dice on top (house) also toppled over when the sand slumped.



The Kleenex (represented the grasses) and dice (house) has just been removed from the water-saturated sand mound. Due to the protective cover, no slumping occurred.

Lesson plan developed by Pam and Glenn Sobey, Marilyn Sigman, and Anne Garland for the North Slope Borough School District.

## Lab: Factors Affecting the Rate of Erosion Student Worksheet

Name:

**Directions:** Build a dome-shaped mounds of sand on two styrofoam plates. Label one plate as Dome #1 and the other plate as Dome #2. Dome #1 will be the uncovered sand mound; Dome #2 will be the covered sand mound. Cover Dome #2 with a Kleenex that has been cut out so that it completely covers the sand mound. Place a “house” on the top of each mound. Fill two plastic cups with water. Using 3 pipets for each cup, drop water as evenly as possible on each sand mound. Start out slow. The teacher will tell you when to increase the amount of “rain” on the mound. Continue dropping the water on the mound until the teacher tells you to stop.

After the Dome #1 sand mound had been saturated with water, what significant event (s) occurred?

Was the event(s) gradual or sudden?

What did the Kleenex represent?

After saturating Dome #2 with the same amount of water, carefully remove the Kleenex. How did the rate of erosion differ on the dome that was covered by the Kleenex?

Try the experiment again, using several layers of Kleenex. Did this affect the rate of erosion?

Why do you think there were differences?

Repeat the experiment with other materials provided (gravel, dirt, etc.). How did changing the material affect the rates of erosion?

Brainstorm other ways that people can slow the rate of erosion.