

Keeping Soil in its Place-Virtual Lesson

Grade Level(s)

4th-5th

Estimated Time

30 minutes

Purpose

Students will be able to demonstrate a rain drop splash (*splash erosion*) and determine its impact on bare soil, ultimately being able to visually identify types of erosion.

Materials

Materials included in kit (if you didn't receive a kit, the worksheets are available on our website and you can collect the supplies, we also have a video if you would rather show the demonstration- links below)

- Splash Zone Target (these could be made on a transparency, this way they could be washed and used year after year)
- Graph handout
- Soils on the Move worksheet
- 5 teaspoons of dry soil
- Eyedroppers
- Water
- Rulers
- Erosion Control Practices worksheet
- Iowa Ag Today Issue 3

Links:

- Experiment video link: Soil on the move
<https://www.youtube.com/watch?v=Zr4ebrhSukY>
- Website with worksheets <https://www.linncoag.com/september>
- Iowa Ag Today Issue 3
https://www.iowaagliteracy.org/page/file?path=Files%2Fwebsite%2Fiowa-ag-today%2FIALF_IAT_issue3_digital%20FINAL.pdf

Vocabulary

Erosion: process of the gradual destruction or diminution of something; eroding or being eroded by wind, water, or other natural agents

Furrows: small ditches, usually 2-6 inches deep, between the rows of plants used to convey water

Mulch: a covering placed on bare soil to keep it from eroding; loose leaves, straw, bark chips, etc

Row crops: plants grown in a row to facilitate harvesting and watering

Interest Approach – Engagement

1. Show your students pictures of famous landmarks that were created by erosion. Examples include the Grand Canyon, Zions National Park, or Arches National Park (below).
2. Ask your students how these unique rock and land formations were created. Allow students to offer their answers and use guided questions to lead them to the answer of *erosion*.
3. Explain that they will be learning about different types of erosion and methods farmers use to prevent erosion of their soil.

Background - Agricultural Connections

Erosion is a naturally occurring process. Erosion has given us some of our most beautiful landscapes. There are beautiful erosion formations such as the Grand Canyon and Bryce Canyon, Utah. Erosion is the loosening, transportation, and relocation of soil particles from one place to another. Erosion occurs primarily due to the action of wind and water. The rate and extent of erosion are determined by soil type and condition, slope of the land, plant cover, land use, and climate. Erosion does not occur only on wilderness landscapes, and the effects are not always positive, especially when you are talking about productive topsoil. Landslides, can bury towns and claim thousands of lives. Streams or rivers loaded with eroded soil can turn sources of clean drinking water into major health hazards.



Water erosion includes raindrop splash, sheet erosion, rill erosion, gully erosion, and slumping or mass erosion. Raindrop splash is the most obvious on bare ground during a torrential rainstorm. The raindrops strike the ground and upon impact break soil particles apart, splashing these particles into the air. The impact of raindrops can be lessened by plant cover. Plants break the fall of the raindrops and allow for water infiltration or percolation.

Sheet erosion is the washing away of a thin surface layer of soil over a large area of land. Because sheet erosion occurs evenly, it is generally not obvious until most of the topsoil is removed.

Rill erosion may be noticeable on sloping bare ground after a rainstorm. Water forms small, well-defined channels that carry soil away from the sides and bottom of these channels. The rills of channels erode more soil as they move downslope and increase in size. When rills become large, the process is called gully erosion. This severe form of soil erosion removes tons of soil from the sidewalls and bottom of the gully.

Streambank erosion (and similarly, coastal erosion) is the cutting away of the banks by water. It is generally a slow process which represents the normal situation occurring

along most streams. It is most active during floods when the amount and velocity of water are the greatest and when the bank soils are submerged under water and saturated. To control erosion, plant cover is usually the best solution. But to grow our food farmers make **furrows** in the land for **row crops**. A farmer can use a variety of methods to “keep soil in its place.” A farmer may plant his or her crops around the curve of a hill rather than up and down the hill, this is called contour planting. Plowing will also be done on the contour. Farmers may also build terraces. Terraces are wide ridges that go around a hill to prevent water from rushing down the hill too fast. On steep hillsides, rather than clear the area for cropland, farmers will maintain the area in forest and grass. Water always runs down hill, so farmers do not plow in low areas where water collects; instead they maintain low ditch areas as grassed waterways. Soils susceptible to wind erosion should be kept covered with some kind of vegetation. If this cannot be done year-round, a windbreak of trees and shrubs may be planted. Windbreaks are rows of trees planted to slow down the wind and prevent soils from blowing away in the wind.

Procedures

1. SHOW PICTURES of erosion
 - Why do we want to reduce erosion?
 - Is all erosion bad?
 - How can erosion negatively impact agriculture?

Experiment (conduct experiment or watch video)

- PASS OUT the “Keeping Soil in its Place” packet (1 to student)
 - Pass out an eye dropper, ruler, cup of water and a clump of soil.
 - Add 5 drops of water to the soil that is in the middle circle from the top of your ruler (12 inches).
 - Count how many splashes of soil are in each zone.
 - Graph when finished
2. COMPLETE the erosion worksheets on your own.
 - Discuss the answers
 3. Read Iowa Ag Today Issue 3 (middle of magazine)- How are farmers reducing erosion?
 4. Review with the following questions:
 - a. What did you observe? How did the soil particles move from the center of the target? (they were picked up and moved with the water)
 - b. Which zone contained the greatest number of water drops with soil particles? Why?
 - c. Which zone contained the least number? Why?
 - d. What would happen if the drops were larger? (splashes would travel further)

- e. How might you prevent splash erosion? (plant vegetation, cover the soil with mulch)
- f. How do farmers decide which erosion control methods to use? (it depends on the slope, soil types, and what he or she wants to plant)

Organization Affiliation

Adapted from the National Agriculture in the Classroom “Keeping Soil in its Place” lesson to a virtual version by Morgan Hibbs (Linn County Farm Bureau).

Original lesson plan:

https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=22&search_term_lp=keeping%20soil

Agriculture Literacy Outcomes

Agriculture and the Environment

- Explain how the interaction of the sun, soil, water, and weather in plant and animal growth impacts agricultural production (T1.3-5.b)
- Identify land and water conservation methods used in farming systems (wind barriers, conservation tillage, laser leveling, GPS planting, etc.) (T1.3-5.c)
- Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals) (T1.3-5.e)

Plants and Animals for Food, Fiber & Energy

- Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber and shelter (T2.3-5.b)
- Understand the concept of land stewardship and identify ways farmers care for land, plants, and animals (T2.3-5.e)

Iowa/ Common Core Standards

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, wind, ice or vegetation.

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

Grand Canyon



Zion's National Park



Wind erosion



Water erosion



Crop field



Bank erosion

