

# Let It Rain

## Objective

Students will conduct experiments to demonstrate erosion and create a publication with photographic examples of erosion in your area.

## Background

Soil erosion is what happens when soil is washed or blown away. The slope of the land, the climate and the texture of the soil all play a part. In places where the land is covered with plants such as grass or trees, erosion takes place so gradually that the new soil is formed before erosion has time to occur.

That is not the case in places where the soil has little or no plant cover. The Grand Canyon is a very familiar example of erosion by water. Most of the erosion there was the work of nature rather than man. In that part of the country the hot, dry climate makes it difficult for plants to grow. The soil is sandy. Sand particles don't stick together very well, so they wash away easily. The land around the Grand Canyon slopes into the Colorado River, and that also makes erosion more likely.

Heavy rains cause soils to erode away in many parts of Oklahoma where the land slopes, and the soil is unprotected. One of the best examples of wind erosion in Oklahoma is the Little Sahara State Park in Major County. Windy conditions, sandy soils and sparse vegetation are the cause of the erosion there.

Keeping healthy soil is very important to farmers. For that reason, careful farmers do their best to protect their soil. The best way for farmers to do this is to keep their fields covered with vegetation at all times. Plant cover provides a cushion against the beating force of the rain and also slows the wind at the soil's surface.

Some farmers protect their soil by leaving stubble or residue in their fields after they have harvested their crops. Other farmers plant their fields with grass or cover crops during seasons when they are not growing their main crop. Bermuda grass provides the best cover but is difficult to use if the farmer plants row crops. Other cover crops, like alfalfa, clover and field peas, send roots deep into the soil and help hold it in place. Those crops also fix nitrogen from the air and make it available to the soil. When it is time to plant, the farmer will turn the stubble or cover crops under to add extra organic matter to the soil. The organic matter, in turn, helps the soil hold together and soak up moisture rather than wash away.

## Oklahoma C3 Standards

### GRADE 3

Science Process—1.2; 3.1,2,3,4; 4.3

Earth Science—3.2

### **COMMON CORE**

Math Process—MP.2,5

Math Content—3.MD.2

Language Arts—3.RIT.4.7; 3.W.7

### GRADE 4

Science Process—1.2; 3.1,2,3,4;  
4.4; 5.4

Earth Science—4.1

### **COMMON CORE**

Math Process—MP.2,5

Math Content—4.MD.2

Language Arts—4.RIT.4,7; 4.W.7

### GRADE 5

Science Process—1; 3.1,2,3,4; 4.4;  
5.4

Earth Science—3.1

Math Process—1.1; 3.3

Math Content—5.1b

Reading—1.1a

Visual Literacy—3

### **COMMON CORE**

Math Process—MP.2,5

Math Content—5.MD.4

Language Arts—5.RIT.4; 5.SL.5;  
5.W.7

## Materials

(for each group)

12 cups soil

8- to 10-inch aluminum pan

sprinkler can

water

measuring cup

grass clippings, sticks, dried or  
green leaves and other natural  
materials

basting syringe

## Ag in Your Community

Invite a local soil conservation district representative to your classroom to discuss erosion control in your community.

## Science/Math

1. Divide the class into two groups.
  - Provide each group with 12 cups of soil in an eight- or 10-inch pan and one pint of water in a sprinkler can.
  - The first group will construct a hill that slopes gently from one end of the pan to the other.
  - Provide the second group with an assortment of natural materials (grass clippings, sticks, dried or green leaves).
  - The second group will mix the natural materials with the soil in its pan and construct a sloping hill similar to the one constructed by the first group.
  - Students will predict what will happen when the first group sprinkles water on its hill. Accept all reasonable predictions.
  - Prop up the hill end of Group One's pan with a textbook.
  - One student from Group One will sprinkle the water from 12 inches above the sloping hill.
  - Discuss the results.
  - Students will predict what effect the water will have on the second group's hill.
  - Prop up the Group Two pan with the same textbook.
  - One student from Group Two will sprinkle water from 12 inches above the sloping hill.
  - Discuss the results.
  - Provide each group with a basting syringe to retrieve the runoff water.
  - Each group will measure the remaining liquid in a marked glass, beaker or measuring cup.
  - The two groups will compare their results and formulate a hypothesis, as a class.
  - A few hours later, students will observe the runoff water again to see what happened to the soil caught in the runoff.
  - Conduct the experiments again, using a variety of natural materials – green leaves, grass clippings, fresh or dried pencil shavings, peanut shells, straw, popcorn.
  - Students will determine which works best to slow down erosion.
2. Students will pair up to look for the effects of erosion on the school yard.
  - Give students ample time to scout their findings.
  - Students will brainstorm ideas for stopping or slowing the erosion.

## Language Arts

1. Read and discuss background information.
  - Students will develop a class definition for the term “erosion.”
2. Take pictures of erosion that is occurring on the school ground or in the community.
  - Students will make a collage.
  - Students will write captions describing what is happening in each picture, or write solutions to each erosion problem.

## Extra Reading

Bial, Raymond, *A Handful of Dirt*, Walker and Co., 2000.

Brendler, Carol, and Ard Hoyt, *Winnie Finn, Worm Farmer*, Farrar, Straus and Giroux, 2009.

Gardner, Robert, *Super Science Projects About Earth's Soil and Water*, Enslow, 2007.

Lindbo, David, *SOIL! Get the Inside Scoop*, American Society of Agronomy, 2008.

Nardi, James B., *The World Beneath Our Feet: A Guide to Life in the Soil*, Oxford, 2003.

## Vocabulary

**climate**— the average weather conditions of a particular place or region over a period of years

**erosion**— the wearing away by or as if by the action of water, wind, or glacial ice

**moisture**—a small amount of liquid that causes moistness

**nitrogen**—a colorless tasteless odorless element that occurs as a gas which makes up 78 percent of the atmosphere and that forms a part of all living tissues

**organic**—of, relating to, or obtained from living things

**residue**— whatever remains after a part is taken, set apart, or lost or after the completion of a process

**soil**—the loose surface material of the earth in which plants grow

**stubble**—the stem ends of herbs and especially cereal grasses remaining attached to the ground after harvest

**texture**—the structure, feel, and appearance of something