SOIL EROSION LAB OVERVIEW

* **QUESTION:** What is soil?
  ANSWER: Soil is made up of small pieces of broken rock and decaying plants (called organic matter).

* **QUESTION:** Where does soil come from?
  ANSWER: The small rock-like particles that make up soil come from larger rocks. Over time, rain rain and other weather events cause small particles to break loose from the larger rocks. These particles combine with decaying plant parts (organic matter) to form soil.

* **QUESTION:** Why is soil important?
  ANSWER: Soil is where plants grow and plants provide us with food, the cotton in our clothes and the wood used in our houses…what would life be like without soil?

* **QUESTION:** What is soil erosion?
  ANSWER: Erosion is the movement of soil by wind, water or ice (glaciers).

* **QUESTION:** What are some examples of soil erosion?
  ANSWER: The sand dunes northeast of town were formed by **wind erosion** of sand from the lake basin. The Grand Canyon was formed through millions of years of **water erosion**. Blitzen Canyon on Steens Mountain was formed by a combination **water and glacial erosion**.

* **QUESTION:** Why should we care about soil erosion?
  ANSWER: Only about 3% of the surface of the Earth is suitable for growing crops and raising food (go through attached lab exercise with an apple). Erosion can cause loss of the limited soils we have for crop production. In an extreme example, in 1982, a wind storm in Oklahoma blew away over 100 million tons of valuable soil.

* **QUESTION:** What are some things we can do to help control erosion?
  ANSWER: Students will help answer this question by using a controlled experiment to see if planting vegetation on a simulated hillside will help reduce soil erosion during simulated rainfall.

  Experimental procedures:

  1) Students divide into 2 group
  2) Each group builds a “mountain” with 2 coffee cans of soil inside of a large plastic storage container.
  3) One of the groups plants their hillside with grass plants and the other is left bare.

4) Each group makes a hypothesis (testable guess) about which hillside would lose the most soil in a rain event.
5) Each group simulates a rainfall event using a soda can with holes in the bottom. Two cans of water are applied to each hillside.

6) Each group measures the amount of rainfall that runs off their hillside by collecting the runoff water with a turkey baster and emptying it into a measuring cylinder.

7) The hillside without plants should have much higher runoff. The instructor points out to students that the runoff water is cloudy, indicating that it contains soil. So the more runoff, the higher the soil lose.

8) Students are asked to use the experiment to form an opinion about the value of plants in preventing soil erosion on hillsides.

Earth's valuable soil

Materials
- Large unpeeled apple(s)
- Sharp knife
- Cutting board
- Pie chart (on page 2) for each student
- Globe or world map

Objective
Illustrate how little of the Earth can be used to grow crops

Suggested grade levels
K-4

Alaska Content Standards
Math A1; C1; E1-3; Science A14; Geography A1,2; C1; Government F2,9; G1-3.

Terms to define
arable
resources
regions
desert
swamp
Arctic
Antarctic

This project presented by Alaska Agriculture in the Classroom through funding from the Alaska Division of Agriculture and the Alaska Farm Bureau. For information, visit www.agclassroom.org/ak

adapted by Victoria Naegele, AAITC

Introduction

What are some of our important natural resources? *Students may provide such answers as oil, water, air, coal, trees, animals, gold, etc.*

All of those are important natural resources, but we often forget to mention one of our most important resources: soil.

Directions

Pass out pie chart graphs. Cut the unpeeled apple as you explain the fractions.

Imagine the apple is the planet Earth. *Cut the apple in quarters.* Oceans occupy three quarters of our earth. (Ask older students if they know what percentage that is — 75 percent.) *Set three of four quarters aside.*

That leaves just one quarter (25 percent) of our earth as land area. *Take this quarter and cut it in half.* Of the remaining two one-eighth sections of land, one represents the land that is not suitable for farming. This includes deserts, swamps, mountains and the Arctic and Antarctic regions. Do we have some of those lands in Alaska? Yes, only about 4 percent of Alaska land is suitable for farming. That means 350 million of 365 million acres in Alaska is not arable. *Set one of the eighths aside.*

The other one-eighth represents where man can live and grow crops. *Slice this one-eighth section lengthwise into four equal parts.* Now I have four 1/32nds of an apple. The first of these represents land too wet for food production. It isn't swampland, but it may flood during the growing season.

Another section represents land that is too rocky and poor to grow food. A third 1/32nd represents areas that are too hot. *Set three of the 1/32nd sections aside.*

The last section represents the area of the world developed by man and used for farming. *Carefully peel the last 1/32nd section.* This small bit of peeling represents all of the soil of our earth on which humans depend for food.

Like water and air, soil is a very important resource.

Follow-up activities

Have older students rank resources in order of importance. Are some resources equally important for life? Our others important because we rely on them in our modern world?

Have students (or show younger students) areas on a map or globe where crops cannot grow.

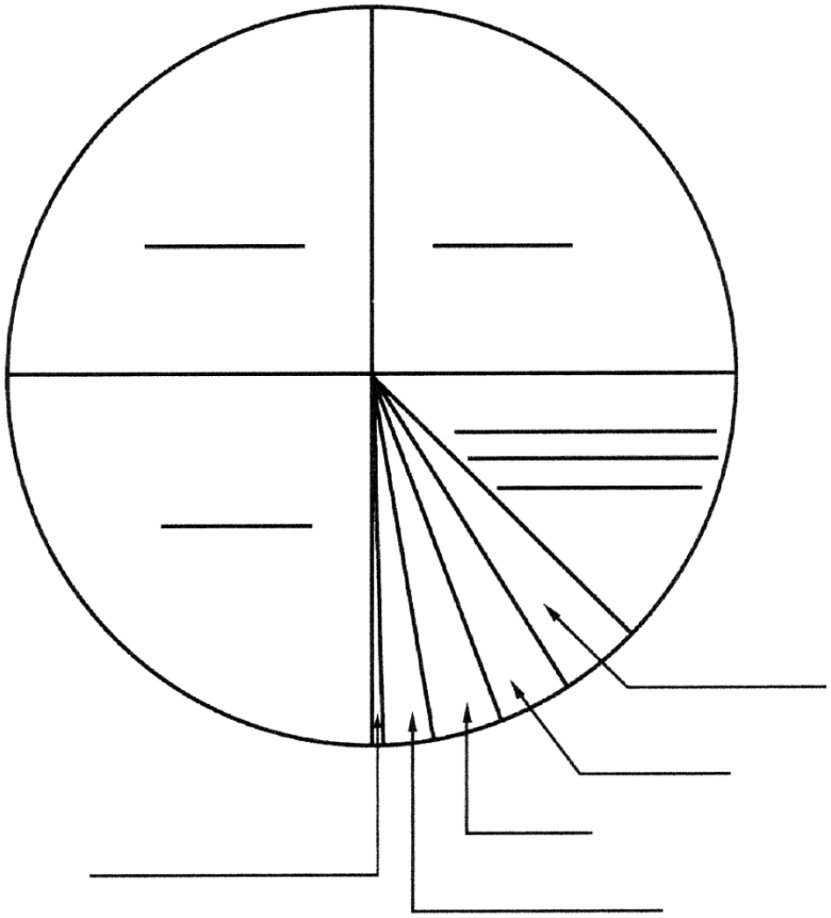
Related lesson on CD
- Farming the Great Land

Adapted from Utah and Oklahoma AITC materials

Earth's valuable soil

Directions

Label the following
3/4 of the Earth covered with water
1/8 of the Earth that is desert, swamp, mountains or polar regions
1/32 of the Earth that is too rocky for growing crops
1/32 of the Earth that is too hot to grow crops
1/32 of the Earth that is too wet to grow crops
1/32 of the Earth where crops can be grown
Tiny fraction that represents soil of that cropland



This project presented by Alaska Agriculture in the Classroom through funding from the Alaska Division of Agriculture and the Alaska Farm Bureau. For more information, visit www.agclassroom.org/ak