UNIT 3 | HOW MANY IS ENOUGH?

EARTH: THE APPLE OF OUR EYE

COUNTING ON PEOPLE
K-5 Activities for Global Citizenship

METHOD

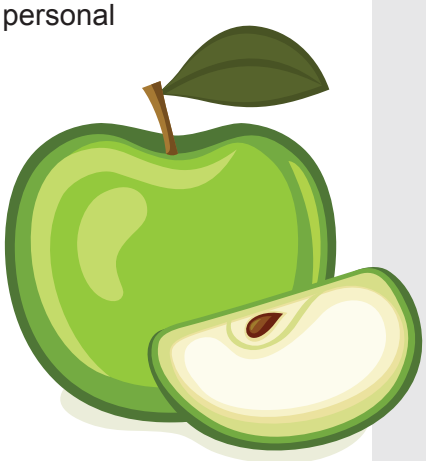
A visual demonstration (for grades 3-5) that illustrates the limits on farmland, making the importance of conservation clear.

MATERIALS

- Apple
- Knife
- Paper towels

INTRODUCTION

Only about 3 percent of the earth's surface is capable of growing food. Over time, better farming has made it possible to feed more and more of the world's people. But, with a limited amount of land and a growing number of people to feed from that land, each person's share of the land becomes smaller and smaller. Healthy soil is required in order for land to be fertile. Soil can be damaged if it is overused, polluted, or built upon. With our global family now over seven billion people, it is important to appreciate the limits of our farmland and to consider the personal actions that can be taken to protect it.



PROCEDURE

Slice the apple according to the instructions, narrating as you go. Use a globe or a map of the world to point out the regions that are discussed during the demonstration.

Note: To tie in more mathematics, have your students create pie charts of the described areas as the demonstration progresses.

CONCEPT

Farmland is an essentially nonrenewable resource that we depend on for our food.

GRADE LEVEL

Upper elementary

SUBJECTS

Science, Social Studies, Math

OBJECTIVES

Students will be able to:

- Describe earth's geography in terms of relative amounts of water, mountains, deserts, ice, developed land, and land available for farming.
- Identify two reasons why protecting farmland and maintaining healthy soil is important for food production.
- Name at least two ways people can help to preserve farmland.

SKILLS

Dividing, using fractions, observing, deductive reasoning, problem solving, understanding cause and effect

Apple	Narrative
Whole Apple	Hold the apple out so that the class can see it. “This apple represents our planet.”
3/4	Cut the apple into quarters. Hold out 3/4 in one hand. Ask the students, “What do you think these pieces represent?” They may want to look at the globe for help. “These pieces represent all of the water in the world.”
1/4	Set the three “water” sections aside and hold out the remaining quarter. Ask the class, “What fraction of the apple remains?” *(1/4)* “So, this 1/4 represents all of the land on our planet.”
1/8	Slice the land (the remaining 1/4) in half, lengthwise. Hold out one of the pieces. Ask the class, “What fraction of the apple is this?” (*1/8*) “This 1/8 represents the areas where people can’t live, and we also can’t grow food.” Ask students what types of land might fall into this category. (*Polar areas, deserts, swamps, very high or rocky mountains*) Say, “We call this land **inhospitable**.”
1/8	Hold up the other 1/8. Explain that this land where people can live, but not all of the soil is good or available to grow food.
3/32	Slice the 1/8 piece crosswise into 4 equal sections. Ask the class, “What fraction of the apple does each of these sections represent?” (*1/32*) Hold three of the sections in one hand. “These 3/32 represent land on which people can live, but we can’t grow food. Some of this land is either too wet, dry, rocky, steep, or has soil too poor to grow food. Other parts of this land are protected parks and nature areas that will never be developed or used to grow food. The rest of this land is developed for people to use: cities, suburbs, highways, shopping centers, schools parks, factories, parking lots, and other places where people live, work, or use in other ways.”
1/32	Set the 3/32 aside and hold out the 1/32. “This 1/32 represents the portion of the earth that can be used to grow food to feed all the people living on our planet.”

Apple	Narrative
1/32 Peel	Carefully peel the 1/32 slice of earth. Hold out the peel. "This tiny bit of peel represents top soil, the very thin layer of the earth's crust in which people grow food. It is less than five feet deep and it takes 100 years for one inch of topsoil to form. It is very important that this tiny bit of soil be taken care of so that we can grow food for all the earth's people."

Some Threats to Farmland:

Soil erosion, the removal of soil from the earth's surface by wind and water, is the most serious cause of soil loss and degradation. Although it is a natural process, erosion is accelerated greatly by things like construction, deforestation, unsustainable farming practices, and animal grazing.

Farmland is also lost to **urban sprawl**, or the expansion of an urban area into areas of countryside that surround it. Farmland can be threatened by the demand to build more housing developments, roads, and shopping centers.

After the demonstration, it is important to talk with your students about ways people can help keep soil clean and healthy. Use the Discussion Questions below as a guide for class discussion.

DISCUSSION QUESTIONS

1. What are some foods you eat everyday that come from the soil?

Answers will vary but may include: grains (like rice, wheat for bread, and corn for cereal), apples and other fruits that grow on trees, carrots and other vegetables, spinach and other green leafy plants.

2. What things can cause erosion?

*The roots and fallen leaves and branches of plants help to keep soil in place. When trees are cut down through **deforestation**, the soil is no longer protected and it easily washes away in the wind and rain. Planting trees can help prevent soil erosion. Another example is overgrazing. When cattle eat grass, they pull it out of the ground by the roots, taking some soil with it. Each bite leaves a patch of ground uncovered, exposed to the wind and the rain. Also, these animals have sharp hooves that tear up the surface a little with each step.*

3. What is overfarming? Invite students to brainstorm what "overfarming" might be, just by the sound of the word.

*Oerfarming occurs when we ask too much of the land. We used to practice **crop rotation**, which means we divided farmland into sections, and grew a different crop in each section. Each year, the kind of crop grown in each section would be changed, and one section would be left unplanted, to let it rest for a year. Now,*

*many farms plant only one kind of crop. This practice, known as **monoculture**, is widely used today because these crops are easier to maintain, faster to grow, and less expensive to farm. However, each kind of crop takes different nutrients from the soil, so if the same crop is grown in the same place for too many years in a row, the soil has no chance to renew itself. Eventually, all of that particular nutrient will be gone and that soil will be unable to grow anything.*

4. What are some ways we could help preserve farmland?

Answers will vary but may include: choosing not to build anything on land that could be used to grow food, keeping the soil and water clear of pollution by disposing of chemicals properly, planting trees in areas that might be prone to erosion, conserving energy to help reduce pollution that becomes acid rain and pollutes the soil, buying food from farmers who practice crop rotation (most small local farms rotate their crops), teaching others about the importance of protecting our soil.

5. Where else does food come from beside farmland?

Waterways including oceans, rivers, lakes, and streams. Remind students, though, that overpopulation also leads to overfishing and the dumping of pollutants into the waterways.

MEASURING LEARNING

Ask students to imagine that they are citizens of a town that is rapidly growing. The city council wants to build houses and other buildings on nearby farmland. Have each student write a letter to the local newspaper of their fictitious town explaining why it is important to preserve the farmland. They should include two reasons why healthy soil is important for food production.

FOLLOW-UP ACTIVITIES

1. Arrange a class field trip to a local farm. At the farm, explore foods that come from the farm, discuss with the farmer how the farm may have changed over the years, and investigate how the farmer keeps the soil healthy.

2. Try the activity, *Scraps Into Soil*, in the People and Waste unit of this curriculum in order to further explore soil and introduce students to the concept of composting. You can use the soil from the activity to start a class or school garden.

Adapted from an activity that first appeared in KUITATK, a Native American Science Education Association Issue Publication.