

Lesson 11:

Soil on Earth



Time Allotted

20 Minutes

Target Audience

Grades 5-8 🌱

Objectives

- Students will appraise the value of soil based on the amount of fertile soil available on Earth
- Students will predict how not having access to healthy soil affects the people who live nearby

Materials

- Apple
- Slicing knife (small)

Summary

Students will learn about the percentage of fertile soil on Earth and how this relates to agriculture and conservation.

Background

Growing healthy food begins with healthy soil. Soil is the foundation of human nourishment and of life, making it one of the most valuable natural resources the earth has to offer. Unfortunately, soil is not a limitless natural resource and is used at a much faster rate than the earth can create and replenish it. With water covering 75% of the Earth's surface, fertile, tillable soil only makes up slightly greater than 6%. Deserts, high altitude mountain ranges, barren land, and areas covered with ice make up the remaining 19% of Earth's surface. Human practices have a significant impact on the little available fertile soil, many of which can be detrimental to the quality and usability of the soil available for growing food. This lesson provides students with a powerful visual illustrating just how little soil is available for food production.

Method

1. Begin this lesson with a brief discussion about soil using the following questions as prompts:
 - What is the difference between soil and dirt? What is soil made of?
 - What are some examples of things that may make soil unsuitable for growing food?
 - What are some ways soil could be improved for food growth?
 - Why do some regions in the world have "better" soil than others? Does this make them more or less capable of growing food? How might this affect other regions in the world?
 - Why, if at all, is soil important?
2. Tell the students that in this lesson, they will discover how much soil on Earth is available on our planet to grow food. Instruct students to partner with another student and together answer the question: How much of Earth's surface is suitable for growing food? Each pair should make a prediction—encourage students to use fractions, percentages, and decimals to describe their estimates. After students have had three to five minutes to talk, ask the students to share their predictions, recording the results on the board for them to see.
3. Next, show the students the apple, and explain that the whole apple represents Earth. Follow the prompts below for the demonstration to illustrate how much of the Earth's surface is suitable for growing food:

- Cut the apple into four equal parts. One slice ($\frac{1}{4}$ or 25%) represents the land on Earth, and the remaining three slices ($\frac{3}{4}$ or 75%) represent the water present on Earth.
 - Next, cut the land section in half. One of these pieces ($\frac{1}{8}$ or 12.5%) represents mountains, deserts, or land covered with ice or soil in which we cannot grow food. The other piece represents land we can live on.
 - Cut the piece representing land we can live on into fourths. On Earth, three of these pieces are too rocky, wet, hot, infertile or are covered with cities and roads. There is now $\frac{1}{32}$ or ~3% of the apple left.
 - Slice the skin off the remaining piece. This sliver of skin represents the topsoil which is suitable for growing food, and which must produce enough food to feed everyone on Earth!
4. Engage the students in a discussion about what they have just learned.
- Why is it important to know how much soil is available for growing food on Earth?
- What does this help us understand about the value of soil?
- What are some measures we can take to conserve the little soil we have?

Extensions

- Have students create a pie chart representing fertile soil on earth based on information gathered from the activity.
- Create a world map, indicating different types of terrain and types of soil they typically have. What types of terrain typically have the most fertile or infertile soils?
- Have students research different regions/terrains and the types of food suitable for growing in those areas. Do the foods grown in certain regions always reflect the food predominantly consumed in those regions? Why/why not? How might this affect other regions supplying the foods consumed?
- Explore the soil types around your planning site, neighborhood, city, state, etc. How do you think soil type affects the crops grown in different areas/regions, if at all? What are some ways someone might change the composition of the soil? Why might they choose to do this?

Younger Audience Adaptation

Use the above method, with the following change to step 2: have students make their predictions on a circle by coloring in portions of the circle—have them imagine how one divides a pizza or pie to help illustrate.