

K-12 IYS Activity



Summary

Students will learn how limited productive soil is as a natural resource on Earth. The students will visually see how very little soil there is available for growing all of the food, fiber, and lumber for the ever growing world population.

Learning Objectives/Outcomes

1. Identify the limited quantity of soil that is available to grow all the food, fiber, and lumber for the world population.
2. Learn why so much of the world is not able to grow the food, fiber, and lumber required to support civilization.
3. Learn about how thin and fragile the soils are that are required to grow the world's food, fiber, and lumber

Materials (per student, group etc.)

- Apple
- Knife
- Paper towels (to keep area clean)
- Hand wipes (or access to sink for washing hands)

Apple as the Earth's Soil

Ages of Audience

1. Elementary
2. Middle School
3. High School

Recommended group size?

Less than 25

Where could you offer this?

1. Local school
2. Community garden
3. Boy/Girl Scouts
4. 4H/FFA

What type of room do you need?

1. Classroom seating
2. Lab/work benches
3. Outdoor standing laboratory

The more interactive the students are during the process the better they will understand the scope of the demonstration. As you cut the apple into section use this opportunity to teach older students fractions.

Type of Lesson

1. Hands-on (participants touch the stuff)
2. Outdoor or Indoor
3. Small group exercise/discussion critical thinking

Time Needed

1. Participant/class time: varies depending on the extent of incorporation of discussion points during the conversation.
2. Finish up by having the students determine how many items they can identify that they touch/eat during the day that comes from the soil.

Methods/Procedures

1. **WATER:** Take an apple and ask the classroom to think about the apple as the world, and then ask them how much of the world is covered by water (3/4).
 - Remove $\frac{3}{4}$ of the apple and discard.
 - Ask how much of the world remains.
2. **POLAR ICECAPS, HIGH MOUNTAINS:** With the remaining $\frac{1}{4}$ of the apple in your hand inform the class that about $\frac{1}{2}$ of the "dry" earth surface is not able to produce food, fiber, or lumber because it is either under polar icecaps or high mountain ranges.
 - Discard $\frac{1}{2}$ of the remainder of the apple.
 - You should have about $\frac{1}{8}$ of the original apple in your hand.
3. **TOO HOT, TOO COLD, TOO WET, TOO DRY, TOO SHALLOW:** With the remaining $\frac{1}{8}$ of the apple in your hand inform the class that about $\frac{3}{4}$ of the remaining earth surface is too hot, too dry, too wet too cold, too shallow to raise food, fiber, or lumber.
 - Discard $\frac{3}{4}$ of the remainder of the apple.
 - You should have $\frac{1}{32}$ of the original apple left in your hand
 - Remind the class that this is the portion of the Earth that is available to produce all the food, fiber, lumber that the world population uses every day.
4. **SKIN OF THE EARTH:** With the $\frac{1}{32}$ of the apple in your hand remove the skin of the apple. The skin of the apple represents the soil that is available to raise all the food, fiber, and lumber on the face of the earth.

continued...

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Apple as the Earth's Soil

Discussion Questions

The observations and discussions regarding the apple as the skin of the Earth can be complimented with the Soils Support Civilization PowerPoint presentation (also downloadable from March's soils.org/iys tab). Discuss how modern day treatment of soil resources is better/worse than that of the ancient civilizations? Key questions to prompt further discussions:

1. What would happen if we damaged our very limited fragile soil resources?
2. How would the following effect world food, fiber, and lumber production?
 - a. Droughts
 - b. Floods
 - c. Sea Elevation
 - d. Urban Sprawl
 - e. Soil Erosion
 - f. Soil Salinization
3. Name things that you have used today that needed soil to be produced:
 - a. Desk - Lumber
 - b. Sweater - Fiber
 - c. Cereal - Food
4. Name things that you have thrown away today that needed soil to be produced:
 - a. Paper towel - Lumber
 - b. Cotton Ball - Fiber
 - c. Milk - Food
 - d. Dust - Soil
5. Discuss how we can improve the use of our soil within the classroom?



Fig. 1. This is a “soil pit”. Soil scientists dig these to learn more about soils in different areas. Notice that the color of the soil changes from dark brown near the surface (where the grass’s roots get their nutrients) to a lighter color below.

Additional Resources

<https://www.youtube.com/watch?v=mA78nPn41F4> - Dr. Dirt

<http://www.worldometers.info/world-population/> - World Population

<http://en.wikipedia.org/wiki/Earth> - General Earth Facts