

Topic: Soil

Overview

Students will use technology to discover how soil forms and what can be found in soil. Students will be allowed to collect soil samples to observe different particles or “ingredients” found in soil.

Grade 3

Time Allotment

Three 50–minute classes

Learning Objectives

On completion of this lesson students will be able to:

- explain how soil forms
- identify what can be found in soil

This lesson addresses Va. SOL Science 3.1, 3.7; English 3.10

Media Components

- **Geologist’s Notebook: How to Make Mud Pie.** Produced by Maslowski Wildlife Productions, 2003. United Learning: Evanston, IL, 2003.
<http://wvpt.unitedstreaming.com/index.cfm>
- Computers
- LCD projector
- Microsoft Word software
- Internet

Materials and Student Handouts

- soil
- small baggies (1 per pair)
- several small shovels or trowels
- newspapers or paper towels (1 per pair)
- paper and pencil
- large chart paper
- magnifying glasses (1 per pair)
- What is Soil? handout
- Video Research handout
- Advertisement rubric

Teacher Preparations

- Download, preview, and cue video
- Copy handouts
- Sign up for the computer lab
- Check out LCD projector

- Bookmark free clip art sites and save all of them together in a folder called “Clip Art” under Favorites
- Gather trowels/shovels, baggies, magnifying glasses, and large chart paper

Introductory Activity

Focus: Say: “Today we will pair up with a partner to go outside and collect a small sample of soil from the school yard. I want to remind you to be good scientist and try not to destroy the area that you are digging from. Please leave the area as close as you can to the way it was before you started digging.” Before they collect their soil, review the scientific process steps. Distribute the handout, “What is Soil?” and go over the requirements. Students are to hypothesize what they think soil is made of and what they think they will find in their soil before going outside.

Activity: Go on a walking tour of the school property to collect soil samples. Each pair of students will need a small shovel or trowel and a baggy to hold their soil sample. When the students return to the classroom, they will need to dump their soil onto a newspaper or paper towel. Students will need to use a magnifying glass and explore the soil sample. Using the What is Soil? handout, students are to follow the procedures steps and record what they find in their soil. After the students have recorded what they have found in their soil, stop and record on the chart paper the various things that were found in everyone’s soil samples.

Follow-up: Say: “I would like for you to take a minute or two to study the many things that we have found in our soil samples. From this list, we will come up with a good definition for soil. See if you can see any connections between the various things we found in the soil.” Give them a minute or two to look at the list and make connections. Ask students, “What is Soil?” Let a few students generate and share their ideas about what soil is to them. Tell them as a class, they will need to come up with a good definition for soil. Start reading off what was recorded on the chart paper. Read through the list of things that were found in the soil. Guide them and prompt them on creating a definition. *Soil is a mixture of many things* (based on the list). Ask them to list things that were connected or alike. *It is tiny pieces of broken rocks* (from the nonliving things found). *Tiny living things are in soil* (if any live plants, roots, or critters are found – you can mention if you had a special microscope, you would see small microbes in the soil). *Soil is also made of dead plants and animals* (from dead roots, plants, or any insects, etc. found). Students may not list water or air as being found in soil. Ask students if their paper towel was wet or if the soil was damp. Review what state of matter takes up space between the loose dirt. You might have to guide students to include this based on a previous unit about plants and what they need to live. *Water and air are in soil*. Record the italicized parts as a definition for soil. After completing the definition of soil together, let students finish the conclusion section of the “What is Soil?” handout.

Learning Activities

This activity is to reinforce the introductory activity. Use the downloaded video clip on the computer and LCD projector to view the video. Pass out the Video Research handout.

1. **Focus:** Say: “We have discussed things that we found in the soil. I would like for you to listen closely to the following video to see if you can identify the two main ingredients that are found in good soil and what are these ingredients. Please record your answers on the handout I have given you. You will see the questions I would like for you to find in the first box.”

Play: Using a computer and projector, show the download clip: **Geologist’s Notebook: How to Make Mud Pie.** Start the video at the beginning. Be sure to keep the lights on for the entire video.

Pause/Stop: Pause the video at 1:03 minutes. You should end where the gentleman says, “Good soil has a balance of organic and inorganic ingredients.” You will see a person’s hands holding a rock and turning it around.

Follow-up: Ask students what are the two main ingredients that make good soil (*organic and inorganic*). What are organic ingredients? (*Organic ingredients come from things that are or were alive or once part of a living thing.*) What are inorganic ingredients? (*Comes from things that were never alive.*). Make sure you give students time to record their answers on the handout.

2. **Focus:** Say: “Soil is mainly made from what inorganic ingredient? This inorganic ingredient has something in it that makes the soil nutritious. What does this inorganic ingredient contain that is so good for the soil? How does this inorganic ingredient get broken down to become soil? Give me the main word that breaks down this ingredient. You may record your answers in the second box on the handout.”

Play/Resume: Resume the video at 1:04. You will see the words inorganic ingredients on the screen and here, “Let’s make our first ingredient organic.”

Pause/Stop: Pause the video at 4:24 minutes. You will hear, “With these materials, we can now start to make our mud pie.” You will see small pictures going across the screen and the words displayed, “Weathering = sand, silt, clay and dissolved minerals.”

Follow-up: Ask the students what the main inorganic ingredient is used to make soil? (*Rock*). Rocks have something in them that makes the soil nutritious. What does rocks contain that is so good for the soil? (*Minerals*). How do rocks become soil? (*They are broken down by weathering*). Again, make sure students have recorded their answers.

3. **Focus:** Say: “There are many organic ingredients found in soil. What are the three main groups of organic ingredients? Please record your answers.”

Play/Resume: Resume the video at 4:25 minutes. The screen will be black and the words organic ingredients will appear. You will hear, “But if we used just these weathered inorganic materials from rocks, our mud pie would be very hard and not particularly good to grow plants in.”

Pause/Stop: Stop at the video at 7:43 minutes. You will see a ground squirrel digging in the ground. You will hear, “Many other animals, including ground squirrels, help in this final mixing.”

Follow-up: Ask the students what are the three main groups of organic ingredients found in soil? (*Dead things, microbes, and larger organisms*). Give students time to record their information.

4. Focus: Say: “We will watch this clip again. I would like for you to focus on why these three groups are so important for the soil. Why are dead things important for the soil? How do microbes help the soil? Why are larger organisms important to have in soil? You make write your answers in the last box of your handout.”

Replay: Replay the video at 4:25 minutes. The screen will be black and the words organic ingredients will appear. You will hear, “But if we used just these weathered inorganic materials from rocks, our mud pie would be very hard and not particularly good to grow plants in.”

Pause/Stop: Stop at the video at 7:43 minutes. You will see a ground squirrel digging in the ground. You will hear, “Many other animals, including ground squirrels, help in this final mixing.”

Follow-up: Ask: Why are dead things important for the soil? (*They keep the soil loose, moist, and recycle nutrients*). How do microbes help the soil? (*They get rid of dead things and recycle nutrients*). Why are larger organisms important to have in soil? (*They can get rid of dead things and recycle nutrients. They dig tunnels which allow air and water to get in the soil. They mix up the soil.*). Allow students time to record their answers.

Culminating Activities

Focus: Say: “We will be going to the computer lab to create an advertisement in Microsoft Word. Look at this nice one page advertisement that I found. You and your digging partner are to produce a similar creative advertisement that will explain why your Homegrown Soil is the best to buy. You will need to list what ingredients you used to make your soil and why these ingredients are important or make your soil great. You are allowed to take your video research handout as a resource for ingredients and importance. I will give you a rubric of what is expected to be on your one page advertisement. You are allowed to go on the Internet to find free clip art pictures to insert. I have book marked these free sites and you will see a clip art folder under favorites. You may use any of the sites you find in this folder. Remember you want to convince me to buy your soil because it is the best!” Handout out the rubric for the advertisement and go over what is expected and answer any questions. Inform the students that you will leave the advertisement at the front of the room for students to use as a model if needed.

Start: Students will go to the computer lab to construct their advertisement.

Pause/Stop: While students are working on the computer, walk around to monitor or provide assistance.

Follow-up: Remind students to save their work. Students are to print off a copy of their advertisement to hand in for a grade.

Assessment

- Use the rubric created for advertisement to assess students’ work - attached.

Community Connections

- Invite a Soil and Water Conservationist to come into the classroom to talk about soil

Cross-Curricular Extensions

Reading

- *Soil* by Alice K. Flanagan. Compass Point: Minneapolis, 2001.
- *Dirt: The Scoop on Soil* by Natalie M. Rosinsky. Picture Window Books: Minneapolis, 2003.

Writing

- Students could write a story based on the life of a rock: “I am Just a Broken Rock” or the life of an earthworm: “I am a Munching Earthworm.” This could lead to edit and revising a paper for grammar, punctuation, spelling, and capitalization.

Math

- Different types of soil samples (loam, clay, sand, silt) could be brought into the classroom. At different stations, students could weigh, measure, and compare how much soil it takes to equal two pounds. Students could graph their findings.

Science

- Earthworms could be brought into the classroom. Students could do a mini-study on earthworms. Using magnifying glasses, students could identify different parts of the earthworm: the rings, head, tail, light-colored band around the worm, topside, and the bottom side – bristles. The worms could be placed into a glass container filled with soil. Students could observe this worm farm.
- Students could learn how to compost. As a classroom, you could set up a composting site outside or have a small container in your classroom to compost a few items.

Research

- Students could visit Discoveryschool.com’s web site, “The Dirt on Soil: What is Really Going on Under the Ground at: <http://school.discovery.com/schooladventures/soil/index.html>. This site will allow them to take a journey underground, explore the many layers of soil, and explore live creatures that live underground.

About the Author

Kim McInturff is a third grade teacher at Nathanael Greene Elementary School in Greene County, Virginia.

This lesson was written as part of the Spring 2004 WVPT NTTI for the Virginia Enhancing Education Through Technology Ed Tech Grant awarded to the Shenandoah Valley Technology Consortium (SVTC).

What is Soil?

Name _____

Hypothesis:

What is the soil in my school yard made of? What do you think you will find in the soil? _____

Materials: small baggy, small shovel/trowel, newspaper/paper towel, pencil, magnifying glass, soil

Procedure:

1. Collect some soil from outside.
2. Spread your soil on the newspaper or paper towel.
3. Use the magnifying glass to observe the soil.
4. Record what you find in your soil.

Observations: This is what I found in the soil:

Conclusions:

What was the soil made of? _____

Were you surprised at what you found? _____

What did you learn? _____



Video Research

Name _____

What are the two main ingredients found in soil?

What are these ingredients?

_____ - _____

_____ - _____

Soil is mainly made from what inorganic ingredient? _____

This inorganic ingredient has something in it that makes the soil nutritious.
What does this inorganic ingredient contain that is so good for the soil?

How does this inorganic ingredient get broken down to become soil? Give me
the main word that breaks down this ingredient. _____



Down & Dirty
Kim McInturff
Greene County Public Schools



There are many organic ingredients found in soil. What are the three main groups of organic ingredients?

Why are dead things important for the soil? _____

How do microbes help the soil? ? _____

Why are larger organisms important to have in soil? ? _____

Advertisement Rubric Name _____

1 point each:

_____ I have the name of my product that I am selling.

_____ I have included the cost.

_____ I have the amount that can be purchased with the price (ex. 10 pounds for \$5.00 or 1 bag for \$50).

_____ I have a number, email address, or mailing address of how to contact me.

Why to buy? I have the ingredients that were used!

_____ I have the inorganic ingredient listed - rocks. Briefly mention how the rocks became soil.

_____ I have why rocks are important.

_____ I have dead things mentioned.

_____ I have why dead things are important.

_____ I have microbes mentioned.

_____ I listed why microbes was important.

_____ I mentioned larger organisms.

_____ I mentioned why larger organisms are important.

My advertisement is:

_____ Appealing and attractive

_____ Correct spelling

_____ I included a picture(s).

Grade:	
A+	15
A	12 - 14
B	9 - 11
C	6 - 8
D	3 - 5
F	0 - 2