

## Part 1: Introduction to Soil

### Objective

Introduce the topic of soil and its importance, and learn what students already know about soil.

### Materials

1 jar filled with soil from the garden  
2 pages of chart paper  
Markers  
Drawing paper  
Colored pencils or crayons

### Preparation

Label chart paper with the titles “Our Ideas About Soil” and “Questions We Have About Soil.”

### Class Discussion

Elicit students’ ideas about soil by holding up the jar full of soil.

*What is the stuff in this jar? What is soil? How important is soil? Do you think all soils are alike? Why or why not?*

Record all student ideas about soil under “Our Ideas About Soil.” You could have students write their ideas on a sticky note and place on the chart paper.

### Lesson

Ask students to think quietly about a favorite outdoor spot, such as a soccer field or a park swing or by a campfire. Ask students to pretend they are very tiny and sink down into the soil. Students will spend about 10 minutes drawing everything they might see in the soil, and the soil itself. *What does it look like close up? What might they encounter on their trip into the soil?*

**Grade Level:** 3

**Subject Area:** Science / Reading (see Extension, Part 2)

**Objective:**

Explain how the basic properties (texture and capacity to hold water) and components (sand, clay, humus) of soil determine the ability of soil to support the growth and survival of many plants.

**Materials:**

1 jar filled with soil from the garden  
2 pages of chart paper  
Markers  
Drawing paper  
Colored pencils or crayons

**Resources:**

<http://www.soils4kids.org>

**Standards:**

3.L.2.4  
RL 3.5  
W.K.5

**Collaborators:**

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\*One lesson may potentially take multiple days to complete.

## Conclusion

Hang the student drawings next to the “Our Ideas About Soil” list. Give the students time to discuss how the drawings are alike and different. Add more student comments to the list and record any questions they have on the “Questions We Have About Soil” page.

## Extension

Distribute a ziplock bag to each child and ask students to bring a small soil sample from home to class. When samples have come in, allow students time to examine them and add comments and questions to the lists.

## Part 2: Texture & Components of Soil

### Objective

To compare a variety of soil with the senses. Students use most of their senses to discover soil.

### Teacher Background

People often mask many of their sensory experiences, focusing only on the visual. In this activity, students are challenged to discover different types of soil using most of their senses, and describe it using words related to these senses.

### Materials

Four containers with different types of soil (clay, compost, silt, sand)  
Scrap paper or sticky notes  
Four lunch-size paper bags  
Four large pieces of construction paper  
Markers

## Preparation

Set out four containers of soil. Set paper scraps/sticky notes, empty paper bags and pens next to the containers. Have the Conclusion questions posted on the smartboard.

## Class Discussion

Ask the students, "I wonder, what is the best texture of soils?" Have students turn and talk. Discuss with the class that they will be scientists and conduct an experiment to discover the best texture for soil.

1. Divide your class into four groups of students.
2. Tell the students you will be exploring four different types of mystery soil and using words to describe them. Explain that they will be using all of their senses except for one...taste!
3. Give each group one container of soil, one bag, a marker and a pile of sticky notes or pieces of scrap paper.
4. Ask your students to keep a lid on their containers and have them shake the containers and listen.
5. Now have them open the containers slowly and allow them to touch the soil with their fingers, exploring the soil texture.
6. Invite the students to hold the containers up to their noses to smell the soil.
7. Ask them to take a close look at the soil. They can also rub a bit on some paper and look at the color it leaves.
8. Now have each student share one word about their soil, based on one of their senses. Have them record their word on a sticky note or piece of scrap paper and place their word into the bag at their station.
9. Once all students are finished writing a word about their soil, have them leave all the materials at the station and rotate to the next container of soil. Repeat until all students have rotated through the four stations.

## Conclusion

Have students come back to the carpet, with their writing journals. Post the below questions using the Smartboard. Have them write their responses in their journals. Which soil had the strongest smell? Which felt smooth and slippery? Which felt gritty and coarse? Which made the loudest sound? Which two were most alike? What did you learn about soils from this activity?

## Extension

1. After the students have experienced all four soils, explain that the groups will now use all of the words in the bag to create a poem about their type of soil.
2. Have each group open their bag and take out all the words inside. They can spread these words over a large piece of chart paper and move them around until their poem has a pleasing sound. They must use every word, no matter how often it appears. Ask them to give the poem a title.
3. Once each group has prepared a poem, have them practice reading it. When they are ready, have each group present their poem to the class. The class can then try to guess which soil the group is describing.

## Part 3: Capacity to Hold Water

### Objective

Observe and understand that soil holds water differently depending on its structure.

### Teacher Background

Soil requires both water and oxygen to support plant growth. As water fills the spaces between the soil particles, it drives out air. Too much water and not enough air, can cause roots to rot, and the plant may die. A good soil must be able to retain some water for the plant to take up through the roots, but drain excess water so that the space between soil

particles can provide air around the roots. An ideal garden soil is a combination of the different soil types and varies based on the crop. If a garden soil does not allow adequate drainage or water holding capacity, it can be amended to improve the soil structure.

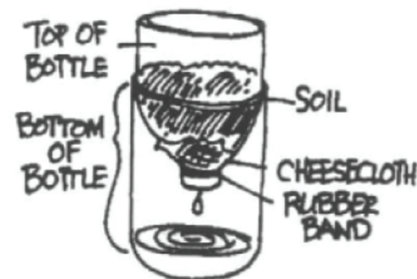
<https://www.youtube.com/watch?v=dsfJRwZXaVk>

## Materials

4 plastic bottles cut in half  
 4 moistened samples of different soils: sand, clay, silt, compost  
 Screen (cheesecloth, pantyhose, or disposable foot socks)  
 Strong tape  
 4 measuring cups  
 Water

## Preparation

Place the screen around the bottle top (the spout) and rubberband it to stay. Invert the bottle top so that it nest in the bottom half of the bottle. Tape around the seam of the two bottles, so that the spout is not touching the bottom of the base. Label each bottle with a soil type. Using the measuring cup, add equal amounts of the appropriate soil to the top bottle.



## Class Discussion

How can soils be different from each other? How can some of these differences affect how quickly water drains through the soil? Do you think most plants like to sit with water around their stems? How can we find out which of these soils drains the fastest?

## Lesson

1. Gather the students around the bottles. Have them predict which of the four soils will drain the fastest and slowest. Record their predictions.
2. Designate 4 students to be the pourers.

3. Designate any other students to be timekeepers and recorders.
4. Have one of the timekeepers give the signal to begin pouring and the timing begins.
5. At the signal, each of the pourers should pour 250 ml of water into the soil.
6. Timers are stopped when the water begins to drip out the spout. Note which soil dripped first, second, third and fourth.
7. After the water has mostly run through the soils, compare (across soil types) the amount of water that is in the base of each bottle. Where is the water that is not in the jar? How much is left behind in the soil?

## Conclusion

Which of the soils would you plant a seed in? Why? Which sample would you not plant a seed in? Could one of the soils possibly drown your plant? Which soil would be bad during a drought? How are soils different in their ability to hold water?

## Part 4: Growth and Survival

### Objective

Explain and determine the ability for soil to support the growth and survival of plants.

### Materials

*Different Kinds of Soil* by Molly Aloian

*Exploring Soils: A Hidden World Underground* by Samantha Grover

*The Curious Garden* by Peter Brown

*Compost* by Linda Glaser

## Lesson

Review the experiment, explaining which soil is best for plant growth. Then read one of the books listed and ask related questions. Give students time to talk about the story.

## Conclusion

How are soils different in their ability to hold water? How does water affect a plant's growth and survival? What does a plant need to survive and thrive? Which soil is best for the growth and survival of a plant?

## Extension

Plant a seed in each soil type as well as a mix of sand, silt, and clay. Observe the plant growth. Water each as needed. Record each time a plant is watered and compare.

## Your Notes & Ideas