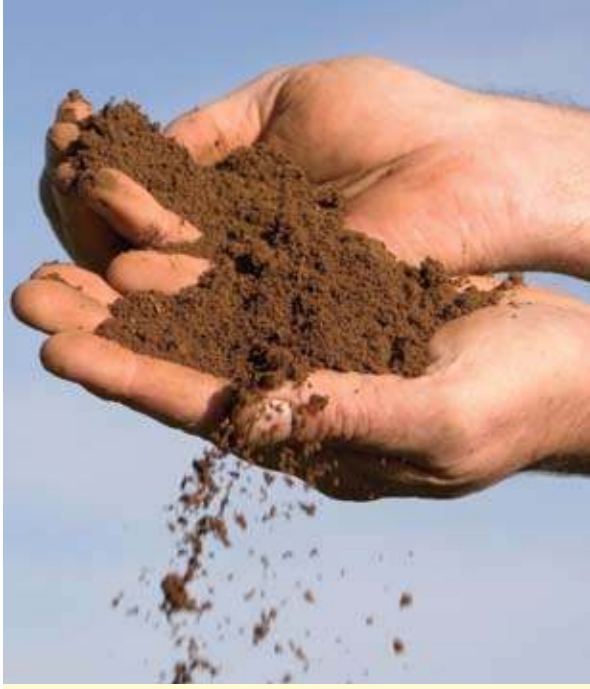
Activity: Soil Sort

Grades K-3



Overview

Young students become soil surgeons, dissecting soil and sorting its components and begin to discover its unique properties.

Background

See *It All Begins With Soil* activity on page 23.

Groundwork

Objective: To understand that soil is comprised of many living and non-living components.

1. Students imagine they are part of a medical practice called Soil Sort, Inc. These surgeons have a very special patient — soil! Give students one-to-two cups of soil. Have the surgeons use their senses to examine their patients. Then have them perform surgery to figure out what's inside their patients.
2. Challenge the surgeons to dissect their patients by separating the soil into rough piles of as many different types of soil components as possible. Suggest they sort the soil into categories — size, shape, color, materials. Have students use the Soil Sort worksheet (page 89) to record their findings.
3. As they attempt to separate the different components, encourage students to try to figure out what different parts make up the whole. In potting soil: grains of sand originally came from large rocks, and brown, light material came from tree bark or decomposed plants. (Peat moss is decomposed moss, found in peat bogs, collected and bagged for garden use.) White, round objects in potting soil is a material called vermiculite, which helps keep the soil airy and moist.
4. Have pairs of surgeons give a 'second opinion' by teaming up with another pair. Ask the new teams to report to the class: "What type of piles did you have in common? Why do you think you did not all have the same category?"

Exploration 1

Objective: To explore the drainage abilities of different soils.

1. Have pairs of students run a test called Dirty Drains to find out how quickly their soil drains water compared to other soils. Each station uses two measuring cups and one paper cup. Poke four holes in the paper cup and fill with sample soil to an inch below the top of the rim. Place paper cup over one to be used for measuring, and fill the other to the one cup mark. Pour over soil mixture, and record how much water is left in the second cup. Record which soil drains the most water in two minutes.

Time:

Groundwork: 45 minutes
Exploration: Two 45-minute sessions
Making connections: Ongoing

Materials:

- **1 to 2 cups soil from the sensory garden**
- **1 to 2 cups of potting soil**
- **Butcher/freezer paper with shiny surface**
- **Toothpicks or plastic spoons**
- **Hand lens or magnifier**
- **Clear liter (or quart) jars**
- **Water**
- **Paper cups**
- **2 clear measuring cups**
- **Rubber surgeon's gloves or masks**
- **Soil Sort Worksheet**

Standards At-A-Glance

Next Generation Sunshine Standards Met:

SC.K.N.1.2, SC.K.N.1.3, SC.K.P.8.1, MA.K.G.2.1, MA.1.G.5.2, SC.1.E.6.1, SC.1.L.14.1, SC.1.L.14.3, SC.1.N.1.2, SC.1.N.1.3, SC.1.P.8.1, SC.2.E.6.2, SC.2.E.6.3, SC.3.N.1.6, SC.3.N.1.7, SC.3.P.8.2, SC.3.P.8.3, SC.3.N.1.3, SC.4.E.6.3, SC.4.P.8.1, SC.5.P.8.3

Standard Reinforced or Skill Utilized:

SC.3.L.14.1, LA.K.1.6.1, LA.1.1.6.1, LA.2.1.6.5, LA.2.4.2.2

2. Ask: "Think about what you observed when you touched and dissected your soil. Why do you think some soils drain better than others? What other materials can you think of that drain well? How are these other materials like soil?"
3. Let the water drain completely and tell surgeons to use the same soil as they conduct the next test: Settle Down, Please!, to help them figure out why the soils drained differently.

Exploration 2

Objective: To understand that soils are made up of different sized particles and that the proportion of these particles affects how water drains through different soils.

1. Have surgeons fill a clear liter or quart jar two-thirds full of water and add their soil until their jar is full. Making sure the lid is screwed tightly, have students vigorously shake each jar, then place it upright and let it settle. Ask: "What do you think will happen to the soil in the jar? Why?"
2. Surgeons should continue to observe their patients in the jar when possible throughout the day. In 24 hours, have students observe, measure and sketch the layers that settled out. Ask: "Why are there different layers in the jar? How are these different layers made?" Florida sand will settle to the bottom, and any organics on top of that. Silt, or very fine soil particles, will remain suspended in the liquid. If there is any clay in the soil, it will stay at the top of the layer of water or settle on top of the sand. Each layer corresponds with the size of the soil particles – smallest will be on top, and largest on the bottom.

Enrichment

1. Make a medical journal highlighting the findings about the soil.
2. Ask: "How did these soil particles get here?"
3. Ask: "How long did it take to make this soil?" Depending on the materials, it takes between 100 and 20,000 years to make one inch of topsoil.

Extensions for Middle and High School

1. Utilize the previous soil lesson titled "***It All Begins with Soil.***"
2. Identify living microorganisms in the soil, using a microscope, and sketch what is found.
3. Design a "treatment plan" for a gardener who wants to grow blueberries and has soil with pH 6.5. What should be done to this soil?
4. Micorrhizae is a relatively new soil amendment. Research this practice; what is involved in it, and has it produced beneficial effects?
5. Research the effects of synthetic fertilizers on soil composition.
6. Interview a local farmer to discuss strategies for keeping soil healthy.

Soil Sort

Medical Chart

Name _____ Date _____

Pile #	Description

Dirty Drains **Setup:** **Results:**	**Settle Down, Please!** **Setup:** **Results:**

(Record other observations on back.)

Soil Sort

Sample Pre-Post Assessment

1. Soil is:

2. The process for creating soil takes:
   a. At least 10 years
   b. At least 100 years
   c. A few days, depending on the microorganisms and moisture content
   d. None of these

3. Pot A and Pot B have two different types of soil in them. If 3 cups of water were poured in each pot, and 2 ½ cups of water were collected under Pot A and 2 ¾ cups of water was collected under Pot B, which soil would you recommend for a water-loving plant?

4. List one component in soil that helps hold water:

5. Soil contains living organisms. True False