

Teacher Notes

Key Concepts

Earth materials such as soils have properties that make them interact with the environment in many ways. Soils have different properties such as color, texture, and the ability to hold moisture.

National Science Education Content Standards (1996)

Unifying Concepts and Processes

- Evidence, models, and explanation
- Systems, order, and organization
- Constancy, change, and measurement

Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Earth Science

- Properties of earth materials

Process Skill Objectives

Collecting data, communicating, experimenting, formulating hypotheses, inferring, interpreting data, observing, predicting

Family Science Packet Summary

In this activity, students will compare two soil samples, one sent from school and the other collected at home. Students will observe the samples closely with a magnifying lens to examine their color and particle size and test their ability to hold/retain water.

Note: If your population of students does not have ready access or permission to collect soil samples from home, please consider providing samples from your own home as a solution.

Activity Duration

Allow 1–2 days to complete this activity.

Materials Needed

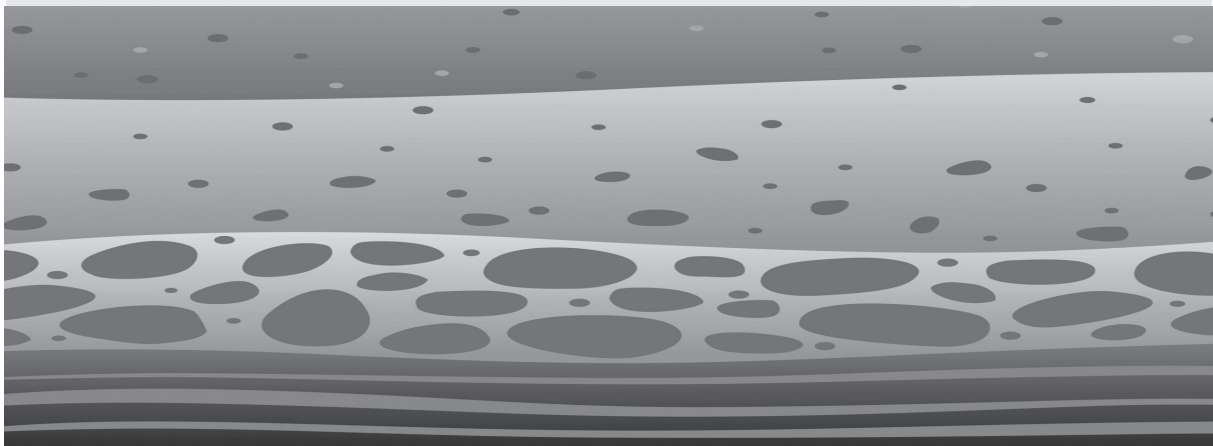
From School:

Per student — 1 cup of planting mix in small plastic bag, 2 paper plates, 2 plastic cups, 1 magnifying lens, 1-gallon plastic bag, plastic spoon, 1 Observation Record

Note: Pre-label the plates and cups for ease of use.

From Home:

Soil sample, water, pen/marker



Background Information

- Soil is made up of both organic and nonorganic components, which together create many types of soils that are located in different environments and used for different purposes.
- Soil is a mixture of rotting plants and animals and rocks and minerals that may support life. The living components of soil and the microorganisms responsible for their decomposition are considered the *organic material*; the nonorganic components are the *mineral material*.
- The particles of soil (e.g., sand, silt, and clay) each have a different size and texture which affects how well the soil drains water, how many nutrients it can hold, and thus, the types of plants best suited for the soil.

Pre-Activities

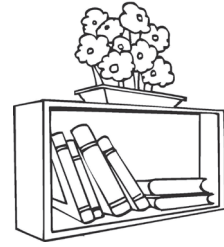
- Introduce this activity by discussing the following questions, “Where do things grow on earth? What do you think soil is made of? What things are in soil?” Review the basic steps of this activity including observing and collecting data.
- Create initial experiences where students can explore soil and other earth materials (rocks, etc.). Have soils and other earth materials available for student observation and exploration. Structure activities to involve recording and analyzing observations in a variety of ways.
- Collect and analyze soil samples from the schoolyard. Compare and contrast the soils. Observe the color, texture, size of particles, amount of mineral and organic substances, and other characteristics of the soil.
- Make a soil museum with the different soil types and their descriptions collected in different locations. Add the soil samples from home to this museum after the Family Packet activity is completed.
- Provide opportunities for students to research specific interests, curiosities, and basic information about soil and earth materials. Provide and encourage the use of multiple sources of information. Have students share their learning in a variety of ways.
- Integrate literacy with science learning. Books to explore include: *Life in a Bucket of Soil* (Silverstein & Silverstein, 2000); *Flower Garden* (Bunting, 1993); *The Sun, the Wind, and the Rain* (Peters, 1988); and *The Magic School Bus Inside the Earth* (Cole & Degen, 1987).

U-STAR~PLUS Science & Literature Connections

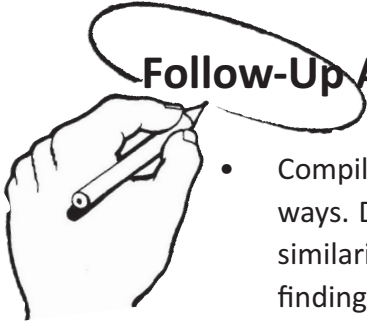
Bringing the Rain to Kapiti Plain – Verna Aardema

Rocks in My Pockets – Marc Harshman and Bonnie Collins

Milo and the Magical Stones – Marcus Pfister



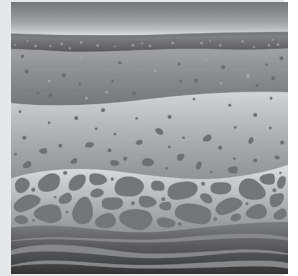
Follow-Up Activities



- Compile, analyze, synthesize, and share the data returned from home in a variety of ways. Discuss and interpret student hypotheses and data. Look at differences and similarities with soil samples and results. Generalize the data to determine student findings and discoveries. Ask related questions to understand and expand students' thinking about soil and properties. Provide opportunities to investigate further questions and related topics.
- Classify the types of soil collected in different locations. On a local map, label where each type of soil was found. Determine generalizations about the locations of certain types of soil.
- Because this activity only uses soil from a shallow depth, provide opportunities for students to collect and examine soil at different depths. Look at similarities and differences between the different depth soils.
- Discuss and begin connecting soil types with the plants that live in certain areas. While looking around the schoolyard, note which plants are growing in which soil. Plan and complete an experiment on growing plants in the various soils you have collected.
- Create and manage a worm compost bin to use with school/classroom gardens (*vermiculture*). Compost is often used to enrich soils to help plants grow.
- Research and discuss the importance of soil to our daily lives. From buildings to food, soil plays a critical role in our lives.
- Develop stories, songs, and skits from the perspective of soil. Consider the role of soil on earth, its composition, and location in the development of the project.

Soil Surprises

Family Science Activity



Due Date: _____

This activity helps you learn about...

Earth Materials

- soil and its properties

This activity involves...

Collecting data, communicating, experimenting, formulating hypotheses, inferring, interpreting data, observing, predicting

Packet duration

Allow 1–2 days to complete this activity.

What do we need?

From School: 1 cup of planting mix or local soil, 2 paper plates, 2 plastic cups, 1 magnifying lens, 1 spoon, 1-gallon plastic bag, 1 Observation Record


From Home: Soil sample, water, pen/marker

What are we doing?

Soil is all around us—at home, at school, in our neighborhood. What makes soil so special and important? In this activity, your scientist is going to learn more about soil and its unique properties.

How are we going to do this?

In this activity, you will collect a soil sample from home to compare to the soil sample sent from school. You will look at them closely with a magnifying lens to examine the samples' colors and particle size and test their ability to hold water.

Days 1–2 

1. Find a place outside of your home to collect a soil sample. Dig up 40 spoonfuls of soil (approx. 1 cup) and put in a cup. Label this cup “Home.” Add 20 spoonfuls of soil (approx. 1/2 cup) to one of your plates and label the plate “Home.”
2. Pour one half of your soil sample from school on the other plate and label that plate “School.”
3. Use your own eyes and then the magnifying lens to observe both soils closely.
4. Describe what you see on your Observation Record. Note the soil’s properties such as color, particle size, the smell, and how it sounds (rub it on your plate).
5. Test the dryness of the soils. Use your finger to feel the soils. Record your findings on the Observation Record.
6. Add the rest of the school sample to the other cup. Label the cup “School.” Break up the soils as you add them to the cups.
7. Using your finger, make a small hole (depression) in the center of the soil of both cups. Do not let the hole reach the bottom of the cup. Predict which soil will absorb (drink) the water fastest. Record your prediction on the Observation Record.
8. In each cup, pour three spoonfuls of water into the holes. Use the same spoon with both cups. Observe both cups carefully to see which soil absorbs all of the water first.
9. Finish your Observation Record and discuss the Family Time questions that follow.
10. Return your Observation Record, packet, and both dry soil samples to school by the date due.

Family Time Questions

1. What did your home soil sample look like? What did it feel like? Was it different than you expected? Why?
2. Are there any things that were the same about your two soil samples? Describe the similarities.
3. Which soil sample was able to absorb the water more quickly? Was it the one you first thought? Why do you think so?
4. Why do you think the soils were able to absorb the water?
5. Why do you think it matters if one type of soil absorbs water faster? What things in our world could be affected by this?

Family Notes

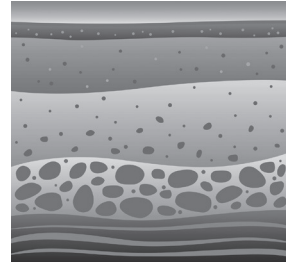
- Your scientist may need help in collecting the soil samples. Have your scientist examine the location from where the soil came. Make sure you have permission to dig, if needed.
- Your scientist may need your help in labeling the soil cup and adding water.
- On the Observation Record, all responses are acceptable; no answer is right or wrong. For the “I discovered” section, any thoughts are welcome.
- Encourage your scientist to record what she or he observes and thinks about the activity. Words or drawings may be used to record the observations.
- Your scientist may need help to complete the activity and fill out the Observation Record. Please partner with your child on this activity.

Family Science Observation Record

Soil Surprises

Name: _____

Date: _____



Complete the charts below based on your observations. Use words or drawings.

Home Soil Sample

Location	What it looks like, feels like	Description: Dry? Moist?	Other Interesting Notes

School Soil Sample

Location	What it looks like, feels like	Description: Dry? Moist?	Other Interesting Notes

Hypothesis (*Circle your prediction.*)

I predict the _____ soil will absorb the water the fastest.

Home sample or School sample

Why?

Conclusion (*Circle your prediction.*)

Which soil absorbed the water the fastest?

Home sample or School sample

Why?

I discovered...
