



**3-5 Earth Science**

**3-5 Nature of Science**

**3-5 Physical Science**

## **Southern Nevada Regional Professional Development Program**

### **Soil Mini-Unit**

**Note: Check with your school district safety manual concerning the use of soil before beginning this mini-unit.**

### **INTRODUCTION**

Go outside where there is grass, trees, flowers, or even weeds. Look at the ground in which they are growing. What do you see? Soil. Is all soil the same? Does all soil contain the same things?

### **WHERE'S THE SCIENCE?**

**Soil**, a natural resource, is a mixture of weathered rocks, air, water, and organic material (**humus** - decayed dead plant and animal matter). Soil comes in many colors such as brown, yellow, and even red. Soil types can be described by the amount of sand, silt, or clay they contain. Sandy soil has a high content of sand particles. **Sand** is the largest rock particle in soil. It has a rough texture. Some soil contains a high content of silt. **Silt** has medium –sized particles. It feels smooth and powdery when dry and has a smooth texture when wet. Another type of soil contains high contents of clay. **Clay** particles are the smallest. They feel smooth when dry and sticky when wet.

## MATERIALS

Group students in fours

- Safety goggles
- Soil samples for lesson 1\* (Do not use potting soil)
- Soil samples with high content levels of sand, silt, and clay for lesson 2\*
- Hand lenses
- Paper plates
- Screens
- Droppers
- Plastic sealable baggies
- Black marking pens
- Plastic spoons
- Science notebooks
- Class *Question Board* with sentence strips or sticky notes
- Digital camera(s) (optional)

\*Check science warehouse companies for purchasing soil samples

## PROCEDURES

### Lesson 1: *What is soil?*

1. Pose the questions, “What is soil?” and “Is all soil the same?”  
Have students record their thoughts in their science notebooks. Share whole group and chart responses.
2. Have students cover desk tops with newspaper. Have one student from each group get safety goggles, two paper plates and a soil sample. **NOTE: Be sure safety goggles are on before students begin handling the samples.** Have students divide the soil sample so that each pair has their own sample to observe.
3. Have students observe soil and record its **properties** in their notebooks. Encourage students to also record any questions that they may have during their observations. After groups

are finished observing and recording, have them use hand lenses to get a closer look at the sample.

4. After students have observed their soil samples bring them back together as a whole group. Share what they observed and chart their responses. Discuss that **soil is a mixture of weathered rock, air, water, and organic matter (humus - decayed dead plant and animal matter).**

### ***Lesson 2: Soil Types (Part 1)***

1. Give each student a sentence strip or sticky note. Have them select one burning question that they recorded in their notebooks about soil and write it on the sentence strip or sticky note. Have students share their questions and put them on the class ***Question Board***.
2. Tell students that scientists who study soil describe it by the size of the rock particles present in it. Have one student from each group get safety goggles and newspapers to cover desk tops. Have a second student get sandy soil samples, hand lenses, and paper plates. Let the observations begin. Be sure to encourage students to record any questions that they may as well as their observations. A digital camera comes in handy as well so students can document the soil types through photos which can be pasted into their notebooks.
3. Repeat procedure #2 for silty soil and clayey soil.
4. After students have completed their observations of all three soil types, have them share their findings. This presents a good opportunity to have them compare and contrast the different samples.

### ***Soil Types (Part 2)***

1. Revisit the ***Question Board*** to see if any questions have been answered. If so, record findings with the questions. Have students review the different soil types. Explain that today they will again be working with the sand, silt, and clay soil samples that they had observed in ***Part 1***. Introduce the droppers and screens at this time if students are not familiar with them.

2. Have one student from each team gather the samples and screens. Have students work with the materials. (Digital cameras for documentation can be used here as well as in #3.) Have them share their findings.
3. Have students use the droppers and water with fresh samples. Have students share their findings. Again both #2 and #3 procedures are great opportunities for compare/contrast discussions.

### **Lesson 3: *Is soil the same from place to place?***

**Note:** *If you have a yearlong plot study have your students use their plots for this part; if not, then plan on having them visit different areas of the playground and/or the courtyard (with administrator's prior approval) to gather soil samples.*

*It is a good idea for the teacher to preview the areas where the students will be gathering their samples.*

1. Revisit **Question Board**. Add findings and new questions. Explain to students that today they will be collecting soil samples from a variety of locations around the school. Show them the baggies, plastic spoons, and black markers that they will be using to gather their samples. Model for students how to collect the samples with the spoons and accurately label their baggies as to the location of where they collect their samples.
2. **Note:** *If time is an issue then Step #2 can be started on the next day and spanned over a few days to include step #3.* Once students are back in the classroom have them observe their samples and look for evidence of what the samples contain. Have hand lenses, droppers, and screens available for students to use during their observations as well as samples of sand, silt, and clay.
3. Students can refer to informational texts to gain more information about their samples and to support what they have already observed. Have students share their findings.

They can do this through posters, visuals, photos, or other ways that they may choose.

4. Revisit initial questions – *What is soil?* and *Is all soil the same?*

### **Extensions**

- Students can plant seeds in each type of soil and observe in which type soil they grow the best.
- Display a map of the United States. Divide the map into equal parts (depending on the number of students in your class; for example if you have twenty five students divide the map into fifths). Have small groups of students research the types of soil that can be found in each area and the types of plants and animals that live in their areas. Have groups share their findings. Discuss differences and commonalities of each section researched.

### **Vocabulary**

**Clay** – smallest rock particles in soil

**Humus** - part of soil that comes from dead plants and animals

**Natural Resource** – material on Earth that people need or use; such as soil, water, and air

**Property** – how something looks, feels, tastes, smells, or sounds

**Sand** – largest rock particles in soil

**Silt** – rock particles in soil between sand and clay in size

**Soil** – mixture of weathered rocks, humus, air, and water on Earth's surface

### **Additional Resources**

*Dig In! Hands-on Soil Investigations*, NSTA Press, ISBN 0-87355-189-3

*Natural Resources Conservation Service*, [www.nrcs.usda.gov](http://www.nrcs.usda.gov)

*Soil*, Stewart, Melissa, Heinemann Publishing, ISBN 140340096-2

*Soil Science*, DeltaScienceReaders, ISBN 1-59242-376-0  
U.S. Department of Agriculture, [www.agintheclassroom.org](http://www.agintheclassroom.org)  
<http://www.butlerswcd.org/Education/Kid/home.htm>  
<http://www.urbanext.uiuc.edu/gpe/case2/c2facts2.html>

### **Nevada State Science Standards**

**E5C5** Students know soil varies from place to place and has both biological and mineral components. E/S

**P5A3** Students know materials can be classified by their observable physical and chemical properties (e.g. magnetism, conductivity, density, and solubility). E/S

**N5A1** Students know scientific progress is made by conducting careful investigations, recording data, and communicating the results in an accurate method. E/S

**N5A2** Students know how to compare the results of their experiments to what scientists already know about the world. I/L

**N5B3** Students know the benefits of working with a team and sharing findings. E/L

### **Safety Reminders**

- Have students wear safety goggles while working with the different soils.
- Refer to school district safety manual to see procedures for using soil in the classroom.
- Have students gather samples with plastic spoons from outside (with administrator's approval) as well as use them to move the soil around on paper plates
- Wash hands both before and after handling samples

