

Science Concept:

Soil is composed of broken and weathered rocks that mix with organic materials. (NOTE: Students should be familiar with the rock cycle.)

Objectives:

The student will:

- Identify and label soil particles from a soil sample;
- compare and contrast two soil samples; and
- make inferences about soil samples (i.e., where they come from/how they could be used).

GLEs Addressed:

Science

- [5] SD1.1 The student demonstrates an understanding of geochemical cycles by observing a model of the rock cycle showing that smaller rocks come from the breaking and weathering of larger rocks and that smaller rocks (e.g., sediments and sands) may combine with plant materials to form soils.
- [5] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating.

Writing

- [5] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing.)

Vocabulary:

clay – the finest particle of rock or mineral

decay – to become decomposed; rot

organic – characteristic of, pertaining to, or derived from living organisms

particle – a very small piece or part; a tiny portion or speck

sand – a particle of rock or mineral material, finer than gravel but coarser than silt

silt – a particle of rock or mineral material, finer than sand but coarser than clay

soil – complex mixture of inorganic minerals (i.e., mostly clay, silt, and sand), decaying organic matter, water, air, and living organisms; all loose, unconsolidated earth and organic materials above bedrock that support plant growth

Materials:

- Note cards (two per student)
- Various soils, including driveway dirt, potting soil, clay-like soil, etc.
- Containers (one per soil type per group)
- Peat moss
- Sand
- Clay
- Silt
- Dead leaves or other dried, dead vegetable matter
- Buckets or tubs

- Sifting screens with various screen hole sizes
- Clear plastic cups
- Magnifiers
- Tweezers
- White paper or paper plates
- Cups
- Chart paper
- Science journal

Activity Preparation:

1. Divide soil into containers so that each group has one container of each soil type.
2. Place sand, clay, silt, peat moss, and dead leaves in separate cups and label contents.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear up

Process Skills: observing, communicating, and inferring

1. Distribute two note cards and a magnifier to each student. Take a walk around the schoolyard and ask students to look for soil. Instruct them to use one note card for each type of soil that they find and list everything that they know, observe, or infer about each soil type on the cards. If available, use digital cameras to photograph the soil they describe. Have students share ideas about the types of soil they discovered. (NOTE: If weather does not permit this activity, use photographs showing soil from various places and ask students to use the note cards to write about the photos.)

Explore

Process Skills: Skills: observing, predicting, and communicating

2. Briefly review the rock cycle and then elicit a definition of "sediments." Show students the types of sediments in the labeled cups and let them know that they can touch them to recall the types.
3. Divide students into groups and distribute containers of soil to each group. Allow students to use sifting screens, magnifiers, tweezers, and cups to explore the soil. Students may spread the soil on white paper or paper plates.
4. Ask groups to work together to describe and/or identify the soils and explain where they think the soils may have come from. Instruct students to use all their senses except taste. Instruct students to create a data table in their science journals and record all observations and findings in their table.
5. Encourage the use of many descriptive words about the color, texture, size, etc. Students may draw pictures as well as write words in their science journal about each particle type. Encourage them to think about the proportions of particle sizes in each sample (e.g., mostly sand-sized particle with some gravel, or mostly organic matter with some sand-sized particles or mineral matter).

Generalize

Process Skills: communicating, making generalizations, and inferring

6. Ask students the following questions and record responses and any new words on chart paper:
 - a. What did you find in your first sample? Second sample?
 - b. How were the samples the same? Different?
 - c. How did the feel of one soil compare to another?
 - d. What was the most common particle size in the soil samples?
 - e. Where do you think each sediment may have come from?
 - f. What makes you think the sediments came from a particular place or parent material?
 - g. What type of creature or plant do you think could live in each soil, if any?
 - h. If you found organic material, how do you know it is organic?
 - i. How do you know that some particles are not organic?
 - j. Where have you seen soil like the samples you chose?

Apply

Process Skills: describing and communicating

7. Ask students to determine which soil might be best for planting a garden. Students should answer the questions and explain their reasoning in their science journal.

GRITTY TRUTH ABOUT SOIL

RUBRIC

Assessment Task:

Choose one soil type to examine and identify and label at least three of the particles as to whether they are sand, silt, clay, gravel, or organic material. Using your background knowledge, try to infer where the sample may have come from and what it could be used for. Find a partner who chose a different soil type and compare and contrast the soil that you chose with the soil that your partner chose. Write at least two sentences that compare and two that contrast the two soil samples.

Rubric

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student will identify soil particles, labeling them as sand, silt, clay, gravel, or organic matter.	[5] SD1.1	The student identifies two or fewer particles from a soil sample and may omit labels or label as sand, silt, clay, gravel, or organic matter.	The student identifies at least three particles in each soil sample and labels them as sand, silt, clay, gravel or organic matter.	The student identifies four or more particles in each soil sample and labels them as sand, silt, clay, gravel, or organic matter.
The student will make inferences about soil samples.	[5] SA1.1	The student may infer where the soil sample came from or what it could be used for.	The student makes an inference about where the soil sample came from and what it could be used for.	The student makes two or more inferences about where the soil sample came from and what it could be used for.
The student will compare and contrast two soil samples.	[5] W2.2.2	The student writes less than two comparing statements and less than two contrasting statements about the two soil samples.	The student writes two sentences that compare and two sentences that contrast the two soil samples.	The student writes three sentences that compare and three or more sentences that contrast the two soil samples.