

BASIS Lesson Plan

Lesson Name: Soils are Diverse!

Grade Level Connection(s)

NGSS Standards: Grade 2, Earth Science

FOSS CA Edition: Grade 2, Soil Explorations; Pebbles, Sand, and Silt

**Note to teachers: Detailed standards connections can be found at the end of this lesson plan.*

Teaser/Overview

Soils are the building blocks of our planet. Every part of the world has its own type of soil that makes its environment unique. We will excite students about the different kinds of soils and the characteristics that set them apart from one another. We will use our senses to explore the types of soils and to make connections with the environments where we commonly encounter them.

Lesson Objectives

- Students will use their senses to explore three types of soils commonly found in environments around the bay area
- Students will learn the terms to distinguish the three types of soils
- Students will discover the materials in the soil (organic and inorganic) and how they are different from each other
- Students will understand how different soils support different life forms

Vocabulary Words

Soil: Soils cover the upper most layer of the Earth's land surface and are composed of four main things: inorganic material, organic material, air, and water. The amount of each of these four pieces determines the properties of the soil and the type of life that it can support.

Organic material: Living things like earthworms, insects, and microbes; and things that used to be living like sticks, dead bugs, and leaves. Just because something is no longer living doesn't mean it's not organic.

Inorganic material: Things that are not alive right now, and were never alive. In the soil, this is the solid portion that isn't organic stuff, like rocks.

Texture: Texture is one way soil scientists tell the difference between soil types. The types of soil textures are soft, wet, dry, grainy, rough, or sticky.

Materials

Scientist Volunteers will bring:

- Soil samples from three different sites
- Ziploc bags (with small amount of soil sample in each)
- Plastic tubs (3; one for each station)
- Large totes
- Pictures of each site that soil was collected from (one picture of each site for each station)
- Worksheets (one for each student at each station)

Materials teachers should provide:

- Pencils & eraser
- Colored pencils

Classroom Set-Up

We will begin our topic introduction as a large group on the classroom rug. Students then will be split evenly into three groups. Each group will visit one of the three soil stations for approximately 10 minutes and rotate through the other 2 stations for the same amount of time. We will then have the class reconvene at the carpet area for a wrap-up discussion.

Classroom Visit

1. Introduction (15 minutes)

Role Model Introductions:

Being a role model for students is an important part of being a BASIS volunteer. Begin your lesson by introducing yourselves! Every team member should take a moment to explain who they are and what they study/do as a scientist. A bonus will be to tell your "story," as if giving an elevator pitch to 8-year-olds: Why did you become a scientist? What made you interested in your topic? Why should

students relate to you, or be interested in you? Feel free to draft a script of what you will say, here. And remember, you can also weave your story throughout your lesson through examples from your own life, and/or return to it with Q&A at the end.

Topic Introduction:

Does anyone know what a soil is? Where do we find soils? Why do we need soils? What are they made of? Are all soils the same?

(Here, students will come up with an initial definition for soil and words to describe soil. They will also look at pictures of the different environments that the soil samples came from.)

Then, go over answers & vocabulary.

Finally, we will examine 3 different soils that we have collected from different parts of the Bay Area. Using our senses we will describe how they are different from each other and try to determine which environment they are from! Our choices are a forest, a meadow, and a beach -- pass around pictures.

2. Learning Experience (30 minutes)

Students will work in 3 groups to describe different soil samples using four of their five senses. With individual bags of soil they can see the components, hear the sounds it makes, and feel the texture. The instructors will have an open cup of soil that the students can smell. They will rotate to 3 stations that have different soil types and they will use a worksheet to guide the activity. Each of us will be located in one station and help students fill out the worksheet. Students will spend approximately 10 min in each station and then try to connect each soil sample with the pictures of the different environments.

3. Wrap Up: Review and Discuss the Learning Experience (10 minutes)

Who can tell me where they think the first soil is from? What about the second and third?

Look at the pictures from each place. Which place do you think gets more sunlight? Which might stay wet the longest after a rainfall?

Go over the correct answer with reasoning.

The types of plants that are growing in different soils are very different! In the sand there are only a few bushes and shrubs, but in the forest there are lots of tall trees and a wide variety of other plants. Also, each environment is home to different animals. Deer, bears, rabbits live in forests, while hares, mice, and snakes live in the sand near our beaches.

4. Connections & Close (5 minutes)

Connections to the real world around students:

Next time you're outside playing games or hiking with your family, look at the soil and think about what it's made of and how it is able to support the plants and trees that grow in it. Think how would the environment be different (plants & animals), if the soil was a different type.

Close:

Wrap up as a role model by leaving a few minutes for students to ask questions about science, about being a scientist, and about becoming a scientist. Then, thanks and goodbye!

Follow Up: After the Presentation

Teachers who wish to extend the impact of this lesson may find the following CRS web pages useful:

- <http://www.crscience.org/educators/helpfulreports>
- <http://www.crscience.org/educators/treasuretrove>
- Soil (True Books: Natural Resources) by Christin Ditchfield
- A Handful of Dirt by Raymond Bial
- Dirt: The Scoop on Soil by Natalie M. Rosinsky
- Soil Science Society of America
 - Resources for kids: <http://www.soils4kids.org/home>
 - Resources for teachers: <http://www.soils4teachers.org/home>

Standards Connections

NGSS:

- Connections by topic
 - Earth & Space Science: 2. Earth's Systems: Processes that shape the Earth
- Connections by disciplinary core ideas:
 - Earth & Space Science: 2-ESS2 Earth's Systems
 - Physical Science: 2-PS1 Structure and Properties of Matter
- Connections by scientific & engineering principles
 - 6. Constructing explanations and designing solutions
 - 7. Engaging in Argument from Evidence
 - 8. Obtaining, Evaluating, and Communicating Information
- Connections by crosscutting concepts
 - 6. Structure and function
 - 7. Stability and Change of Systems
- Connections by Performance Expectations
 - 2-ESS2-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly



CRS

WWW.CRSCIENCE.ORG

COMMUNITY RESOURCES FOR SCIENCE

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats