

# Sensational Soils

## Objectives:

- Students will be able to describe the differences in different soils.
- Students will be able to list the components that make up soil.
- Students will be able to identify two animals that live in the soil.

**Vocabulary:** soil, humus, decomposition, sand, silt, clay, soil horizon, agronomist

**Grade Level:** Grade 2-4

**Time Allotted:** 30 min

## Standards Addressed:

### Connections to Next Generation Science Standards:

Science & Engineering Practices: Planning & Carrying out Investigations, Analyzing & Interpreting Data

Disciplinary Core Ideas: ESS2.A, ESS3.B, ETS1.B, ETS1.C, PS3.A, PS3.B

Crosscutting Concepts: Cause and Effect, Patterns, Energy and Matter

### Connections to GSEs

ESS1 (K-2) 1a, 1b, 1c, LS1 (K-2) 1b, 1c,

LS1 (3-4) 1a, 1b, 1c, 1d,

ESS1 (3-4) 1a, 1b, 1c, 1d, 2a, PS1 (3-4) 3a

**Cross-curricular Connections:** Language Arts, Art, Math

**Materials Needed:** soil corer and/or gardening hand trowel, soil thermometer(s)  
paper plates  
metal spoons/ gardening hand rake  
bottle of water  
magnifying lenses & bug boxes  
field guides for insects, spiders, forests, bugs & slugs

## Procedures:

1. Review with students the four basic materials that make up the Earth: soil, rocks, water and air. Let's focus on one component today: soil.
2. Ask students if anyone has ever played in a sand box or made something out of clay or even made mud pies. All of these activities allowed you to get up close and personal with different types of soil! Ask the students if all of these different types of soil felt the same. Different soils have different textures.

3. Ask students if they had to make a recipe for soil what they would put into it. Write this on the board. Another option is to have students write or draw the ingredients of this recipe in their science journals, then share with the class.
4. Ask students two more questions to get them to evaluate their recipes: Is soil a living thing or a non-living thing? Are any living things found in the soil?
5. Tell the students that next we are going to test our recipe and see if it matches the soil we find outside.
6. Take students outside to the schoolyard or to the school garden. They will visit 2 or 3 different spots to compare the soil. Possible sites to compare would be *a grassy open spot vs. a spot in the school garden OR a spot in a school courtyard vs. a spot along the edge of the school.*
7. Bring all the field equipment like the soil corer, the paper plates, spoons, and water.
8. At your first site, use the soil corer/trowel to pull up some soil. Show all the students what it looks like. Ask them to describe the color and texture. Encourage them to look for areas where the soil gets lighter or darker or the texture changes. The layers of soil are called **soil horizons**, and those are used by scientists to classify soils. Soil scientists are called **agronomists**.
9. The students will then work in small groups to examine the soil. They should use their spoons or hand rakes, magnifying lenses, their field guides and their hands to look through the soil. They can spread out and find places to dig that are not right next to the other groups. If they would like to put a scoop of soil on a paper plate to be able to see it better, have plates available.
10. Encourage students to take the temperature of the soil in the different spots they are exploring. Why are different sites different temperatures? What factors will make the soil in one place warmer or cooler than the other?
11. If the students find any animals as they are digging, they can gently place these in bug boxes to help them see the animals better. They can use the field guides to try to identify the animals. Encourage students to try to determine whether the animals they found are vertebrates or invertebrates .
12. After 5-10 minutes of digging and exploring, ask students to each get one handful of soil (just enough to cover the palm of their hands). They will do a test on this soil called a "ribbon test". This helps scientists figure out the type of soil.
13. Go around and drop 2-5 drops of water into each student's hand onto the soil. Then the students rub the soil together and see if they can form a ball or a little log with it. Students can describe what they feel and maybe even what they smell when they do this test.
14. Explain that there are 3 basic types of soil: SAND, SILT and CLAY.
15. Explain to the students that they want to figure out their soil type using this guideline:

- \* If the soil feels gritty, like there are tiny little hard pieces in it, it has a lot of SAND in it.
- \* If the soil feels slippery and smooth, it has a lot of SILT in it.
- \* If the soil feels sticky and it forms a ball, it has a lot of CLAY in it.

16. There are a lot of different combinations, so they may feel more than one thing in their soil.
17. After everyone has “tested” their soil for the texture, they can share what they found with the class.
18. Then everyone needs to gently place the soil back into the hole they dug and try to cover it over.  
Take a moment to let students share if they found any animals and what they think the animals were. Ask them to explain their reasoning for whether the animals were vertebrates or invertebrates.
19. Next everyone releases the animals back into the soil where they were found. Ask the students why they think we put the soil and the animals back.
20. After finishing your discussion, repeat this process at another site or two more sites if time permits.
21. Wrap-up the lesson by gathering all tools and heading back inside. Once inside, students can re-examine the recipes for soil they made earlier. Do they need to modify the recipes? Did they find evidence of the 4 non-living components of the earth: soil, rocks, air, and water?

### **Extensions:**

#### 1. Arts Extension

Students can draw any animal they found and try to label what they think it is and if it has easily identifiable parts, like eyes, antennae, legs, etc.

#### 2. Language Arts Extensions

- a. Students write a short essay on what it would be like to live in the soil.
- b. Students write as many adjectives as they can think of to describe the soil they tested.

#### 3. Science/Math Extension

Students can bring back a sample of each soil they tested in a measuring cup or beaker.

They should make sure each soil is the same volume.

When they return to the classroom, they can make predictions about which soil sample they think will be the heaviest.

Then they can weigh the sample, record the results and graph them.