

Soil Profile

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Grade/Age Level: 4th Grade

Subject: Content/Science

Utah State Standard 3: Students will understand the basic properties of rocks, the processes involved in the formation of soils, and the needs of plants provided by soil.

Objective 3: Observe the basic components of soil and relate the components to plant growth.

Content Objective: Students will identify the three layers of soil (topsoil, subsoil, and bedrock) and explain the particles contained in those layers.

Language Objective: The students will be divided into three groups, one group for each layer of soil. Each group will:

- Read information about their assigned layer
- Discuss what kinds of particles are in that layer and how well plants would grow there
- Present their information to the class
- Individually create a soil profile in a jar
- Fill out the attached diagram, writing the name of each layer, as well as qualities and attributes of each layer

Instructional Features:

Materials Needed:

- Information on the three layers of soil
- Small jar
- Gravel (bedrock)
- Soil sample from the bottom of a deep hole (subsoil)
- Soil sample from a garden (topsoil)
- Soil Profile Worksheet (<http://www.uen.org/Lessonplan/preview?LPid=9876>)

*Background for Teachers:

A normal soil profile consists of three layers: topsoil, subsoil, and bedrock. Topsoil is the top layer. It is generally looser than the lower layers. It is made up of the smallest grains of rocks and minerals. The topsoil layer is usually darker in color because it contains the most dead and decayed organisms. These provide nutrients that plants need for growth. This is where plants can absorb water, nutrients and air. Subsoil is the layer below the topsoil. It is usually lighter in color because it has less living and once-living organisms. It is denser and grittier than the topsoil. It sometimes has larger rocks or pebbles mixed with small particles. Minerals in this layer are not easy for plants to use. Plants grow poorly in subsoil. Bedrock is the lowest layer or the solid rock that lies underneath the soil. It is the parent material from which much of the soil originally formed. Bedrock can be within a few inches of the surface or many feet below the surface.

Procedure:

Show students a picture of a road cut or a construction site (one with a deep hole, showing a profile of soil). Ask them what they notice about the soil. Ask them if they have ever looked down in a deep hole. Does the soil on the sides and down at the bottom look the same as the soil on the top? Why do you think they might be different? This is what we are going to explore today.

1. Split the class into three groups and give each group some information on one type of soil. They will individually read the information given to them, then as a group discuss the different materials that make up their kind of soil (minerals, rocks, air, water, living and dead organisms), and what qualities this gives the soil. They then need to create a 3-5 minute presentation to share with the class what they have learned. The presentation needs to include type of soil, materials found in the soil, whether or not plants can grow there, and one fact they find interesting.
2. Starting the presentations with the bedrock group, have them present and then pass out the gravel to put in the bottom of their jars. Then do the subsoil group, followed by the topsoil group.
3. Students should now fill out their worksheet naming each of the layers and describing characteristics and materials found in each of them.

Adaptations for ELLs at different stages of English Language Acquisition:

Pre-Production/ Early Production	<ul style="list-style-type: none">▪ Provide some information/text in L1▪ Use a variety of texts- including pictures, word walls, books, diagrams, etc.▪ Use heterogeneous grouping, but allow ELLs to discuss in L1▪ Have other students present the information▪ Adapt worksheet, allowing ELLs to fill in what they know (only require a 1-2 word explanation)
Speech Emergent	<ul style="list-style-type: none">▪ Use a variety of texts- word wall and pictures particularly important▪ Worksheet modifications (4-7 word explanation)
Intermediate/ Fluent	<ul style="list-style-type: none">▪ Provide more challenging text for them to read through▪ Ask them to present the information to the class▪ Require more in-depth explanations from them on worksheet

Grouping: Heterogeneous grouping will work the best for this activity, because it allows students of all levels of English skill to work efficiently together. All students can participate in the group discussions, but more advanced English speakers should be doing the presentations.

Metacognitive Strategies: Students will engage in Organizational Planning by determining how they, as a group, will accomplish the task. They will also monitor and clarify the information they have found by discussing their findings as a group.

Cognitive Strategies: Students will use Resourcing through the use of reference materials when gathering information about their topic. They will also be required to use Note Taking while listening to their peers' presentations in order to fill out their chart.

Herrell & Jordan Strategies:

- 24: Collaborative Reading- By gathering a range of books on the topic, using heterogeneous grouping, creating a data chart, and presenting the information, ELLs can work collaboratively. This allows them to give meaningful contributions to the project while bettering their comprehension skills.
- 31: Word Walls- Through the posting of important vocabulary words pertinent to this activity, ELLs will have a much easier time reading and comprehending what is going on in this lesson. The word wall will serve as a great resource for them to refer to throughout the duration of the lesson and the unit.

Assessment:

Formative:

Review: We will review the words on the Word Wall to start the lesson. This will help ELLs to remember the key words that will pertain to the lesson.

Orally Explain: Students will be required to share the information they find in their groups. ELLs in stages 1 and 2 can do this in their native language.

Check for Understanding: This should be done throughout the duration of the lesson after instructions are given, particularly checking on ELLs, making sure they understand what they are to do.

Summative:

Presentation: Students in stages 3, 4, and 5 will be required to say something in their group presentation. Students in stages 1 and 2 can hold visual aides or say 1-2 words, as they feel comfortable, but it will not be required.

Worksheet: Stage 1 and 2 students need to have 2-3 word descriptions for each of the three layers of soil. Their descriptions need to say what kinds of materials are found there. Stage 3 students are required to have a 4-7 word description. Students in stages 4-5 should have longer descriptions, written in complete sentences.