



Edible Soil

Description: Students will create a soil profile using edible ingredients.

Purpose: Learners expand their knowledge of the soil profile by making 'dirt pudding'.

Grade Level: K-8

Indiana Academic Standards:

Examples of select academic standards possibly met during this activity. Additional academic standards may be achieved with added enrichment activities.

Earth and Space Science: 1.2.1; 1.2.2; 1.2.3; 1.2.4; 1.3.3; 1.3.4; 4.2.2; 7.2.6; 8.2.6;

Life Science: 6.3.3

Time: 45 minutes, plus set-up.

Materials: (per student)

Clear plastic cup

Spoon

1/8 cup (2 tbsp.) Candy-coated chocolate (ex. M&Ms or Reese's Pieces)

½ cup Chocolate pudding to represent subsoil.

1/8 cup (2 tbsp.) Crushed chocolate sandwich cookies (ex. Oreos) 1 tsp.

Colored sprinkles = organisms
1 tbsp. Coconut

2 Gummy worms to represent earthworms

Yellow, brown or green food coloring.

Labels/Paper:

Parent materials

Subsoil

Topsoil

Organisms

Residue or leaf-litter

Earthworms

Objectives: Learners will identify the layers of a soil profile.

Background Information:

Soil takes many years to form from a starting point of bedrock or parent material, a layer of rock upon which soil accumulates. As years pass, good quality soil will develop four or more distinct layers. At the surface is the O-horizon, a layer of organic material that is usually composed to partly decomposed, also called residue, or leaf litter. Next is the A-horizon, also called topsoil. Most plant roots grow in this layer and it holds most of the soil's nutrients. The B-horizon (subsoil) contains sand and silt, and perhaps some nutrients that have dripped through (leached) from the layers above. The C-horizon is partially broken down bedrock. The last layer, the R-horizon is bedrock.

Some classifications schemes are more complex and add other layers. The deeper the O and A-horizons are, the more nutrient dense (richer) the soil is. "Rich", well-drained soil is very desirable to farmers because it usually indicates that the crops will yield more. Soil profiles vary greatly, even in the same field, in the same township, county and state. Good Indiana farmland has an A-horizon that is 3-feet thick. An eroded soil may have little or not A-horizon. For simplicity in this activity we use the terms: parent material, subsoil, topsoil and residue or leaf-litter.

See Explanation of Soil Profile on page 3 for more detailed explanation.

Getting Started:

1. Prepare the pudding according to the directions on the package. (You may also choose to purchase pre-mixed pudding in a large can, often available at foodservice grocery stores such as GFS. The foodservice director of your school may be able to order for you as well).
2. Place chocolate sandwich (ex. Oreos) cookies into a sealed plastic bag and crush using a rolling pin. (You can also use a food processor).
3. Add a couple of drops of food coloring to the coconut in a plastic container or bag. Shake for 30-45 seconds. Pour coconut onto paper towels to drive (about 1 hour).

Activity Directions:

1. Review the layers of a soil profile from Lesson 1 of the soil module. Available at: http://gen.uga.edu/gen_soil.html Tell learners that they will be making their own edible soil profile.
2. Discuss each layer of soil and what each ingredient represents. Demonstrate how to construct the edible soil profile.
3. Place each soil layer ingredient by its appropriate layer.
 - Candy coated chocolate (ex. M&Ms or Reese's Pieces) = Parent materials
 - Chocolate pudding = subsoil
 - Crushed chocolate sandwich cookies (ex. Oreos) = topsoil
 - Colored sprinkles = organisms
 - Coconut = residue
 - Gummy worms = earthworms
4. Place the appropriate measuring utensil with each of the soil horizon ingredients.
5. Demonstrate making the soil horizons of your edible soil.
6. Follow the recipe below.
 - Place 1/8 cup (2 tbsp.) Candy coated chocolate (ex. M&Ms or Reese's Pieces) in the bottom of an individual cup.
 - Add 1/2 cup Chocolate pudding to represent subsoil.
 - Next add 1/8 cup (2 tbsp.) Crushed chocolate sandwich cookies (ex. Oreos) for the profile's topsoil.
 - Sprinkle with 1 tsp. Colored sprinkles = organisms
 - Next add 1 tbsp. Coconut = residue
 - Finally add 2 Gummy worms to represent earthworms

Discussion Questions:

1. What are the layers of soil?
2. What types of organisms live in soil and aid in soil production?
3. Why are "rich" soils desirable by farmers?

Explanation of Soil Profile

All soil starts with a **parent material** such as weathered bedrock (e.g. limestone, sandstone, gneiss, schist, etc.) or boulders transported by glaciers. The type of parent material determines the type of texture (amount of sand, silt and clay) a soil will have, and thus whether the soil is a silt loam, silty clay, sand, etc.

Subsoil takes hundreds or thousands of years to build. Agents such as rain and growing plants slowly break the **parent material** down into smaller and smaller pieces until it eventually becomes subsoil.

Topsoil is at the surface of the soil and is necessary for plant growth. As **subsoil** continues to be exposed to the elements of weather such as freeze-thaw cycles and rain, it begins to develop horizons or visible layers. As plants and animals in the uppermost layer die, their remains become organic matter and make a healthy dark brown or black topsoil.

Organisms such as fungi, bacteria, earthworms and plant roots live in **topsoil**. They decompose manure, plant residue and crop pests. Other organisms in the soil “fix” nitrogen from the air and make it available to help plants grow.

Residue is the stalks, stems, leaves of last year’s crop that is left on top of the soil. Conservation tillage is a system of farming where the soil is disturbed as little as possible (minimally tilled), allowing lots residue to cover and protect the soil surface.

Earthworms love **residue** because it provides food for them and moderates the temperature of the soil. The practice of conservation tillage not only protects the precious topsoil from erosion (where soil is washed into rivers making them dirty), but it encourages more earthworms - and the more earthworms, the better the topsoil!

Bacteria are microscopic, single-celled organisms. A teaspoon of soil generally contains over 100 million bacteria!

Fungi are usually multi-celled organisms that are neither plants nor animals. Fungal cells form long chains called hyphae and may form fruiting bodies such as mold or mushrooms to disperse spores.

Source: <http://ctic.paginteractive.com/CTIC%20HOME/ONLINE%20STORE/Free%20Download/>

Building Better Soil – Taste the Difference!

It has been said that the average person consumes over a bushel of dirt in their lifetime. Doesn't sound too appetizing, does it? Although it takes a long time to build real soil, you can make a fun visual representation of soil in a few minutes.

