

How To Make Soil Profile

Make your own soil profiles.

- Models of soils help us to observe soil properties and explain how soil they form. They are also valuable teaching tools when it is difficult to look at soils in the field. Soil monoliths are a kind of soil model that professional soil scientists use. A soil monolith is a vertical section that is removed from a soil profile in the field that is prepared for mounting. Other types of models of soil can also be made that would help capture its profile properties.
- Each soil profile is different because soils differ greatly from each other and from one place to another, due to interactions between the five soil-forming factors. Each section of soil on a landscape has its own unique characteristics. The face of a soil, or the way it looks if you cut a section of it out of the ground, is called a soil profile, like the profile of a person's face.
- Every soil profile is made up of layers called soil horizons. Soil horizons can be as thin as a few millimeters or thicker than a meter. Soil profiles and their horizons change as you move across a landscape, and also change as you move downward deeper into the soil at one location. In fact, soil samples taken at the surface may have entirely different characteristics and appearances from soil dug deeper in the soil profile.
- One common reason soil horizons are different as you dig deeper is because of mixing of organic material in the upper horizons and weathering and leaching in the lower horizons. Erosion, deposition, and other forms of disturbance might also affect the way a soil profile looks at a particular location.
- How many soil types are there? The United States Department of Agriculture (USDA) and other agencies map and collect soil data at many different scales. According to the USDA, there are over 50,000 different varieties of soil in the United States alone! Since parent material, topography, climate, organisms, and the amount of time it takes for these to all interact varies worldwide, so soil profiles also vary worldwide.

Materials

- A jar (such as a pickle or mayonnaise jar)
 - Sample of soil from different layers of a big hole (perhaps at a construction site)
- Your samples should resemble each of the major layers of soil in a typical soil profile.

Major Horizons

There are **6 major horizons** in the soil profile. Not all soil profiles contain all 6 horizons; and so, soil profiles differ from one location to another. The 6 master horizons are represented by the letters: O, A, E, B, C and Bedrock.

O: The O horizon is a surface horizon that is comprised of organic material at various stages of decomposition. It is most prominent in forested areas where there is the accumulation of debris fallen from trees.

A: The A horizon is a surface horizon that largely consists of minerals (sand, silt, and clay) and with appreciable amounts of organic matter. This horizon is predominantly the surface layer of many soils in grasslands and agricultural lands.

E: The E horizon is a subsurface horizon that has been heavily leached. Leaching is the process in which soluble nutrients are lost from the soil due to precipitation or irrigation. The horizon is typically light in color. It is generally found beneath the O horizon.

B: The B horizon is a subsurface horizon that has accumulated from the layer(s) above. It is a site of deposition of certain minerals that have leached from the layer(s) above.

C: The C horizon is a subsurface horizon. It is the least weathered horizon. Also known as the saprolite, it is unconsolidated, loose parent material.

R: Original solid rock. Unweathered parent material



For you to be awarded any extra credit you must bring in your jar on or before _____ as well as a brief explanation of the layers in your soil profile (what does each layer represent?). If you chose to use food items to represent each soil layer, try to use items that are not perishable (will not rot). One option for an edible soil profile can be seen below. No water/milk is added to the pudding.

Edible Soil

Bedrock – Oreo cookie in the bottom of the cup.

Bedrock is solid rock. Parent material is formed from the bedrock after a long weathering process. There are two basic ways that weathering can happen – physical and chemical. Physical weathering includes things like wind or water erosion, glacial activity, freezing and thawing, and biotic activity (plant roots, animals, micro-organisms). Chemical weathering includes leaching, oxidation, carbonation, and hydration.

Parent Material – Crumbled cookies as the next layer.

This is the C horizon in a soil profile. It is called the parent material because it is the weathered rock and partly weathered soil from which the soil layers above are formed. What influences does the parent material have on the other horizons? (Size of the particles would determine the texture of the soil.)

Subsoil – Vanilla pudding as the next layer.

This is the B horizon from the soil profile. Why is it lighter in color than the A or O horizons? It is lighter in color because it has less top soil and organic matter.

Topsoil – Chocolate pudding as the next layer. Add a gummy worm to the pudding.

This is the top layer of soil. Nutrients, bacteria, fungi, and small animals are abundant. Plants thrive in it because of the nutrients in it.

Litter – Sprinkles on the top.

The sprinkles represent the organic matter. This layer is usually less than an inch thick. Litter decomposes into nutrients that enrich the soil. In areas where the temperature is lower, the composition of organic matter is slower.

