Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_

**Objectives:**

* The students will construct a soil profile.
* The students will be able to identify and describe the 6 layers of the soil profile.

**Background Information:**

Soil is composed of inorganic and organic components: minerals, air, water, and plant and animal material. About 50% of the volume of soil is mineral elements and organic particles. The rest of the volume is space. These small spaces, or capillaries, transfer and hold water in the soil. Oxygen and other gases also move through these spaces. This combination allows small animals, such as insects or worms, and plant roots to move through soil to collect the water and nutrients.

There are five soil forming factors which shape the quality of soil — climate, living organisms, parent material (bedrock), topography (lay of the land) and time. Soils are classified according to their texture. Soil texture is determined by the amount of sand, silt or clay in the soil. These components vary in size with sand particles being the largest and clay particles the smallest. All soil needs some clay to hold in moisture. Sand helps keep soil from being too compact or solid. Soils with a medium texture and a relatively equal ratio of all particle sizes are ideal for plant growth.

If you were to slice through soil, you could see that it has three layers: bedrock, subsoil and topsoil. Each layer can be various depths and plays an important role in growing plants. Bedrock, also called parent material, is the deepest layer of soil. In some parts of the world, the bedrock layer is exposed, such as in mountains or other rocky areas. The roots of plants cannot penetrate this layer, although air and water do. They create a weathering effect on the bedrock and break it down into smaller pieces. Over a long period of time this mineral-based, solid layer breaks down to form subsoil. Subsoil is the layer of soil directly above bedrock. Deep-rooted plants and trees can grow deep into the subsoil to retrieve moisture and nutrients. The amount of organic matter in the subsoil layer is less than that in the topsoil. Fertile topsoil contains organic matter and nutrients and supports many forms of life, from bacteria to worms. Topsoil is the layer that farmers till and plant their crops in. Plants with branching root systemsdepend on this layer for moisture and nutrients. Scientists estimate that it takes 300 to 500 years to form one inch of topsoil!

**Materials:**

* Spoon
* Plastic cup
* Graham crackers
* Coco Krispies
* Coco Krispie Treats
* Crushed oreos
* Chocolate pudding
* Gummy worms
* Chocolate chips

**Instructions:**

1. Read the background information before beginning your lab.
2. Observe the soil profile ingredients provided. Label the soil horizon that each ingredient represents next to the ingredient in the materials list above. Have your teacher check for accuracy **before** beginning step 2.
3. Accurately layer the ingredients provided in your clear plastic cup to model a soil profile.
4. Once you have finished making your soil profile, use a permanent marker to label each horizon on the side of the cup. Have your teacher check your soil profile **before** beginning step 4.
5. Once your teacher has approved your soil profile, you may eat your “soil” while answering the following questions. Turn the questions in when you are finished.

**Analysis Questions:**

1. What percentage of soil consists of minerals and organic particles?
2. List the five factors that determine the quality of soil.
3. In an actual soil profile, the E Horizon is made up mostly of what?
4. Which Horizon, in an actual soil profile, is made up of unweathered rock? Would this horizon ever be visible? Explain.
5. Would your edible soil profile be considered well-developed soil? Explain.