

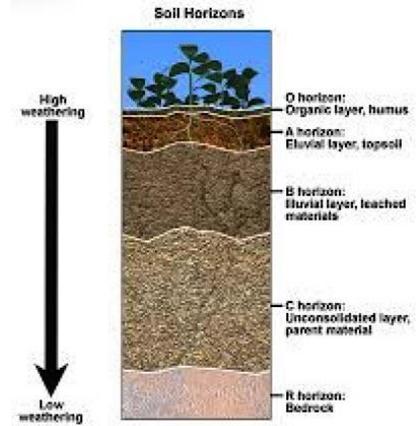
Essential Question: Why is soil important to all living things?

Activity 7: How does soil & the soil layers form?

Purpose: To describe how soil and soil layers are formed.

Overview:

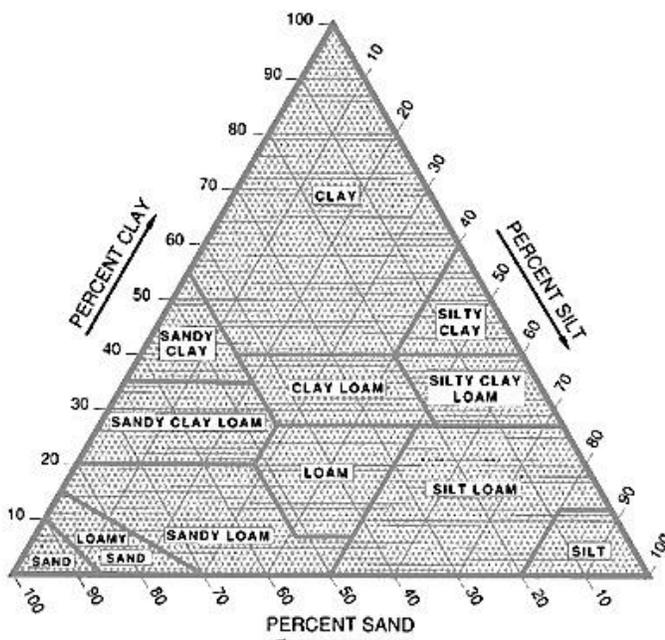
- Soil formation is a lengthy process. Natural processes can take more than 500 years to form only 2 centimeters (less than an inch) of topsoil.
- The process of forming soil and fully formed soil layers happens in four phases.
- The formation of Humus in soil is crucial for all plant life.
- This evolution, or change, continues to occur once soil layers are formed until the end of time!
- There are many different types of soil layers depending on where the soil is formed.



Background: 10 - 15,000 years ago the Puget Sound bedrock was carved by 2-3,000 ft. deep glaciers. As these glaciers retreated each left layers of sand, silt and clay soil. Ever since then water, wind & ice has moved these soils in different quantities around the Sound. This formed the “parent” materials for all Puget Sound soils.

Forming parent material is the **first phase** in making soil layers and healthy soil. The parent material for all soil comes from bedrock. Bedrock disintegrates over a very long period of time into rocks due to weathering. Many of these rocks eventually breakdown into smaller particles called sand. Other rocks break into even smaller particles called silt. The rest of the rock is chemically changed and becomes clay. These soil particles are then moved by water, wind and ice to form the parent material for soil.

See the diagram below for the different types of parent materials. Each parent material has a different texture.



A. Use the Soil Texture diagram to complete the missing information.

Data Table 1 – Soil Textures			
Name	% Sand	% Silt	% Clay
Sandy Clay Loam			
	10	30	60
Silty Clay Loam			
	40	40	20
Loamy Sand			

Chemical weathering can be more destructive in warm environments with a lot of rain.

2. Second phase: The parent material breaks down more in this step. Organic material is added to the parent soil. Rain, floods and wind bring in dead and decaying plants and animals. Animals visit and leave wastes too. Life begins to show up as lichens, bacteria, protozoa and mosses show up. The organic material accumulates over time, breaks down into compost and then to humus.

Humus is mysterious stuff! Humus comes from decayed (composted) organic material. It is very complex and even scientists have trouble defining exactly what it is. Humus is one of the most beneficial additives to any soil. This is due to high levels of nutrients and beneficial microbes humus contains. Humus is a dark, often sticky substance, which also improves the fertility and water retention of the soil.

B. Draw a small stereomicroscope sample of compost & soil containing humus below.	
Compost	Soil containing Humus

3. In the **third phase** water percolates through the parent material and dissolves the soil so minerals are released. More nutrients are released from the organic material. The soil changes into layers. The A and C horizons form. Pockets of soil are created. Larger plants begin to grow and more humus is formed. The parent material breaks down more, releasing mineral fragments.

4. In the **fourth phase** the parent material breaks down even more. Humus and other organic material collects and bigger plants grow. A well-developed B layer forms. O, A, B & C horizons become deeper & thicker.

C. Use the reading above to help you fill in the blanks. When done go to "Soil Notes" & check your work.

1 Bedrock	2 Bedrock	3 Bedrock	4 Bedrock

Write down three questions that you think could show up on a test about this activity:

Level 1 Easy

Level 2 Harder

Level 3 Difficult, but doable