

SOIL

Where is it?

It's right under our feet that supports life.

What is it?

It can be defined in many ways. Soil is a mixture of minerals, dead and living organisms, air and water. These four ingredients of soil react with one another in amazing ways and making the soil one of our planet's most dynamic and important resources.



The upper most layer of Earth's crust in which plants grow is the soil.

Soil is a naturally occurring mineral particles, organic or inorganic in character, lying over the bed rock formed by weathering of rocks.

Soil is a dark brown solid material which is a mixture of rock particles of various sizes and decayed plant and animal material called humus. So soil is formed by different particles such as gravel, rock, sand, silt, clay, loam and humus.

Soils are limited natural resources. They are renewable because they are forming constantly but one inch of topsoil can take several hundred years to develop.



Activity:

- ✚ **Soil:** Hello there! I am soil. Who are you my little one?
- ✚ **Seed:** I am a seed. I am struggling here to survive in search of resources. Can you help me out?
- ✚ **Soil:** Of course! I am like a mother to all the living things. I never say No to anyone.
- ✚ **Seed:** Can I get my support now?
- ✚ **Soil:** Yes, everything you need for your survival are here in me. I give you nutrients, water and expose you to sun light. You can utilize all of them and grow happily.
- ✚ **Seed:** Thank you soil. You are priceless.

What makes soil so important?

Soils give us everything. What not! They give us food, energy and nutrients. They help meet our societal needs.

They are amazing! Life as we know it would not exist without them, as they provide countless services that benefit all humans. Clean air and water, the clothes on our backs, habitat and food for plants and animals are just a few things we can thank soils for. These are all few goods and services provided by soils.

Soil is home to living things: organisms in soil maintain food systems and mitigate climate change. For example plants and animals depend on soils

for food, shelter and more. Soil is also home to fungi, algae and many organisms that are invisible to our naked eye such as bacteria and protozoa. As they move through the soil, microorganisms help improve drainage and soil structure, making soil more fertile and productive.

Soil – a friend to farmers: Generally farmers rely on soils to make food production possible, feeding people and livestock.

Soil – as a purifier: When surface water travels through the ground to replenish aquifers, soil filters out toxins and impurities, making it drinkable.

Soil – key to carbon cycle: Carbon cycle is the continuous process by which carbon atoms travel between the atmosphere and Earth. In the process of breaking down organic matter in the soil, microorganisms release carbon dioxide into the atmosphere and create nutrients and minerals that feed plants and crops. Soil also naturally absorbs carbon from the atmosphere. Healthier soil absorbs more carbon, reducing the effects of greenhouse gases.

Soil also provides raw materials for infrastructure. For example soil is an important element in making bricks for buildings.

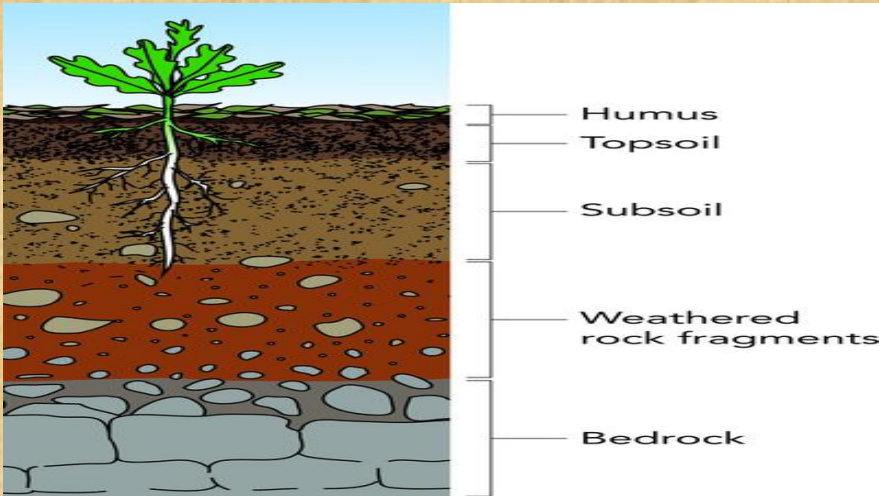
How do soils form?

Soil is formed from the rocks by the process of weathering. In weathering, rocks are broken down into the tiny particles because of sun's heat, rain, wind, flowing water etc. These tiny particles mix up with the humus to form fertile soil. So the nature of the soil depends on the rocks from which it has been made and the type of vegetation that grows on it.

Soil profile:

Now if you look down at the soil under your feet, can you tell very much about that soil? But if you dig down deep into any soil, you'll see that it is made of layers or horizons. A vertical section of the soil that ranges from

surface to the underlying rock, referred to as soil profile. Each layer of a soil profile is horizon. So putting the horizons together form a soil profile. Like a biography, each profile tells a story about the life of a soil.



O layer: The horizon that sits on the surface is the O layer. The two layers below the O layer are A and B horizons.

Horizon A: It is the upper layer, closest to the surface. We can think of this horizon as the topsoil. Top soil is dark in color because it is rich in minerals and humus. The plant roots grow in the top soil and is also the place for a lot of decayed plants and animal elements. This humus makes the topsoil fertile. It can hold more water and rich in minerals which useful for plant growth.

Horizon B: As we move deeper into the layers of the soil profile, we have horizons B and C, giving us three main horizons. A and B horizons are known as true soil and contain most of the chemical and biological activity that helps plants grow. The B horizon is also known as sub soil. It is lighter in color than the top soil and made up of slightly bigger rock particles than the top soil. The sub soil layer contains very little living organisms and roots of fewer plants are able to reach this layer.

Horizon C: The layer of soil below the horizon B is the horizon C and is also called as sub stratum. It is made up of small lumps of broken rocks formed by the partial weathering of bed rock.

Below the C horizon there is a un-weathered solid rock called bed rock or parent rock. From this the soil has been producing over a long period of time.

The soil provides plants with the vital nutrients, water and air that they require for healthy growth and development. But, each plot of ground has its own blend of minerals, organic and inorganic matter which largely determines what crops, shrubs or trees can be grown successfully.

Soil profile is like a soil's fingerprint. One soil differs from other soils based on factors like color, texture, structure, thickness and its chemical composition.

What makes soil, soil?

Texture – The particles that make up soil are categorized into three groups by size: sand, silt and clay. Sand particles are the largest and clay particles the smallest. Although a soil could be all sand, all clay or all silt. Instead, more soils are a combination of three. So, the relative percentages of sand, silt and clay are what give soil its texture. A loamy texture soil, for example has nearly equal parts of sand, silt and clay.

Structure: Soil structure is the arrangement of soil particles into small clumps, called "peds". Like the ingredients in cake batter bind together to form a cake, soil particles (sand, silt, clay and organic matter) bind together to form peds.

Peds shapes roughly resemble balls, blocks, columns and plates. Between the peds are spaces or pores in which air, water and organisms move. The sizes of the pores and their shapes vary from soil to soil structures.

A soil's texture and structure tells us a lot about about how a soil will behave. Granular soils with loamy texture make the best farmland, for example, they hold water and nutrients well. Few grained soils with a sandy texture don't make good farmland because water drains out too fast.