



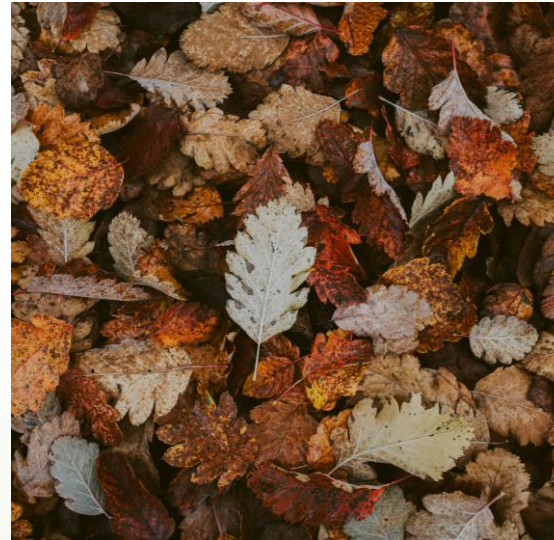
Soil

Let's dig in...



What is Soil?

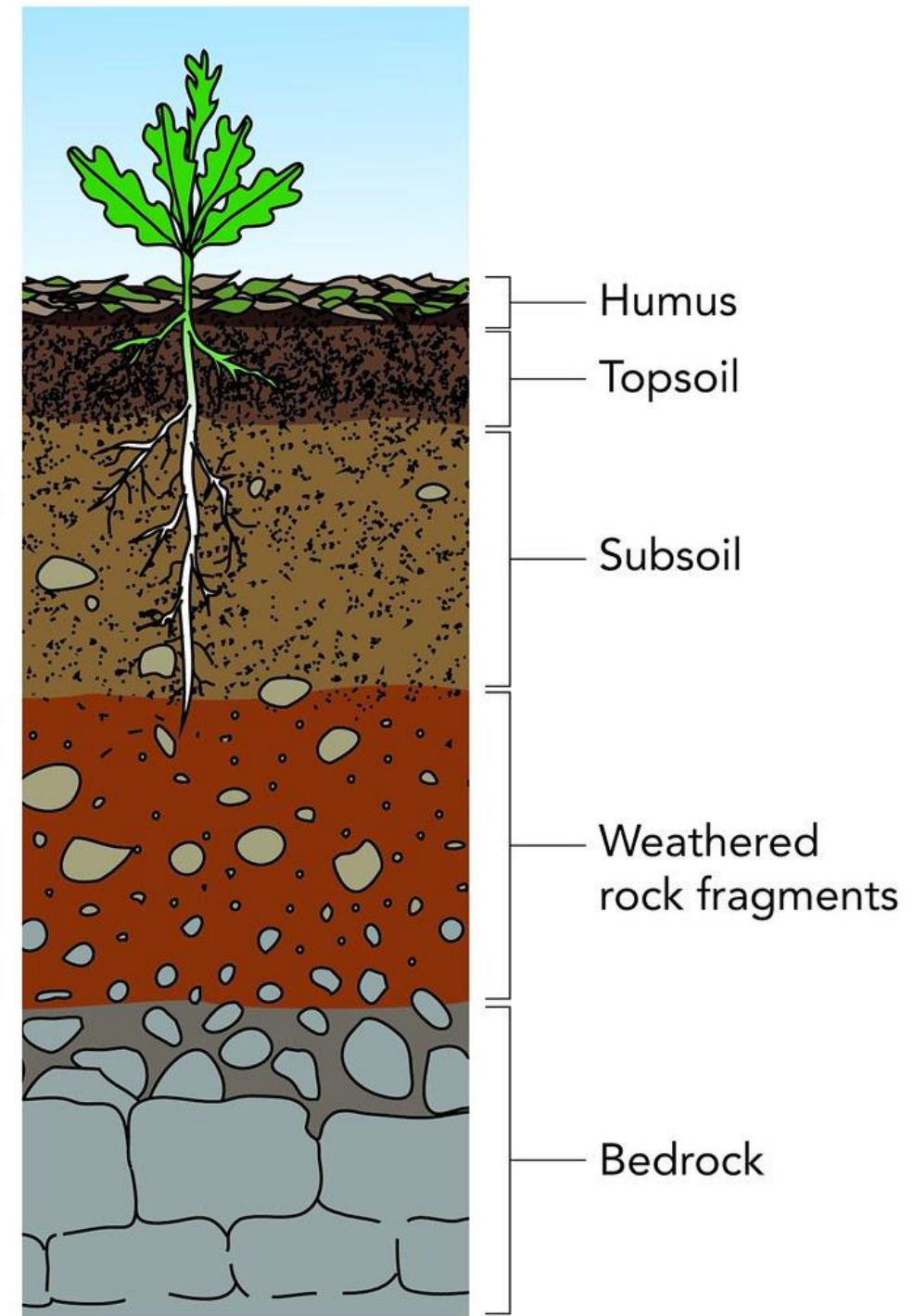
- Soil is a mixture of four main ingredients:
- Stones, water, air and “organic matter” (anything alive or was alive, for example dead leaves, logs, insects etc.)
- Soil takes a long time to form. 1cm of soil can take 1000s of years to form!



Soil Layers

There are five main layers of soil:

- Humus is made up of just organic matter. It includes leaves, branches, animal droppings and living creatures.
- The Topsoil is made up of a large amount of humus, which provides nutrients to the soil. Healthy topsoil will have lots of worms, insects and bacteria.
- The Humus and Topsoil are the most important layers for plants. Seeds grow and develop roots in the topsoil.
- The subsoil is harder than the topsoil with less humus. It does contain different minerals to the Topsoil which can be important.
- The lower layers are mostly rock. As you move up the layers the stones have broken down and become smaller and smaller.



Soil Types

- The mix of ingredients, age of the soil and environmental conditions will determine the soil type.
- The main soil types are Sandy, Clay, Silt, Peat and Loam
- Sandy soil feels gritty, clay feels wet and hard, peat is very dark in colour, silt is like smaller grains of sand. Loam is a mixture of each. Most food crops prefer to grow in Loamy soil.



Sandy soil



Clay



Loam

Why do we need soil?



Soil supports all life on land!



Plants which we rely on as food grow in soil.



Soil stores carbon, keeping it from being released into the atmosphere as CO₂.



It is a home to billions of animals, bacteria and fungi.



Threats to soil

There are lots of threats to our planet's soil:

- Pollution

- Soil can become damaged by litter and waste and when chemicals like pesticides, herbicides and fertilisers from farming are added.

- Deforestation

- When large numbers of trees are cut down this can cause the healthy topsoil to be lost.

- Desertification

- This means areas of land turning to dry deserts of sand. This happens mostly due to a lack of water and has increased due to climate change and some types of farming.

What do Plants Need from Soil



Different types of plants will grow well in particular soil types.



Most vegetables, herbs and fruits prefer loamy soil.



They need the right amount of water and air in the soil.



Plants require the right pH balance and mix of nutrients and minerals in the soil.

Moisture, Air and Light



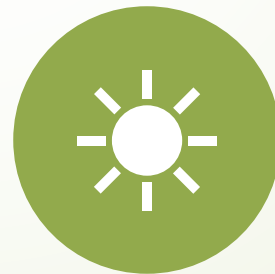
Plants need enough moisture, air and light to grow. The soil needs to have the perfect balance of these factors to support the plant.



Some soil types store water better than others. Too much water can wash away the healthy topsoil.



There must be enough air in the soil for plants to grow. Worms and other animals help create tunnels which allow air and water to move freely.



Soil can't control light! But certain areas of the soil will be in better position to receive light than others

Living creatures in the soil

- ▶ Did you know there is more life in a single teaspoon of healthy soil than there are people on the planet!
- ▶ Most of the living creatures in the soil are so tiny you would need a microscope to see them. These includes bacteria, fungi and other microbes.
- ▶ There are also larger creatures like worms, beetles and larva (baby insects) living under the soil.
- ▶ Worms are of great importance to the soil. As they move through soil, they create tunnels which allow air and water to get to the plant's roots.
- ▶ They along with other insects and bacteria also help to break down leaves and other rotting materials to release nutrients into the soil. Worms do this as they eat and food passes through their body and leaves behind "castings" which is like a fertiliser for the soil.
- ▶ The more worms and other life there is in the soil the healthier it will be!



Soil Nutrients and pH

- Just like us plants need a mixture of nutrients to stay healthy. While we get our nutrients from our food. Plants absorb them from the soil. They mostly need Nitrogen, Phosphorus and Potassium to keep them growing well.
- For plants to be able to take up these nutrients from the soil it must have the right pH.
- Soil pH measures how “acidic” or “alkaline” the soil is. Everything on the planet has a certain pH which can range from 1 to 14. Water has a pH of 7 and is considered neutral. Acidic items are below 7 for and alkaline items are above 7.
- Most vegetables will grow best between 6 and 7 on the pH scale.
- This is an optional part of the soil for us to investigate.



Soil Tests

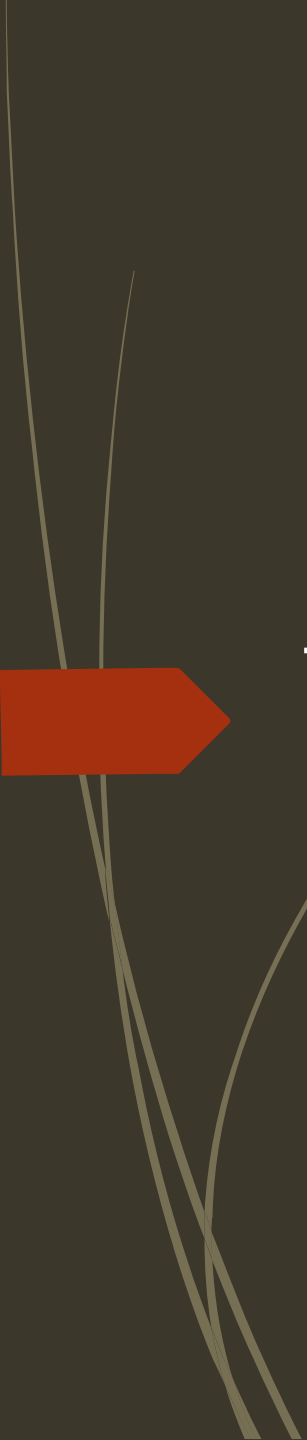
Lets investigate our soil and discover more about it. To try some of the below experiments you can follow the Soil Investigation Guide and record your answers on the Soil Testing Sheet:

- Light Check
- Soil Type
- What living things are in it?
- Worm count!
- Air in the soil
- Soil Drainage
- Soil pH test.



How can we improve the Soil?





Check out
these videos
to learn
more..

- What is soil made from?

<https://youtu.be/if29mjcd5bc>

- What are the layers of soil?

<https://youtu.be/bggqd0E2eAY>

- Learn about worms and how they help the soil

https://youtu.be/l-zc_1vjLnI