

Our Living Landscape



Soil Topic



Notes to Accompany Introductory Video

Soil is living and without it our planet would be a lifeless slab of rock.

What is soil? There are four main ingredients in healthy soil. The biggest part is the **mineral content** which comes from the rocks in the area and smaller particles like sand, silt and clay. The size of the rock pieces and type of rock will affect the soil enormously. Some soils have bigger particles creating looser soils and some have tiny particles which stick together creating heavy soils that water cannot easily drain through.

Most soils can benefit from the addition of **organic matter** to make them better for growing crops. Organic matter is made from **decomposing** (breaking down) dead animals and plants. It helps to prevent soil from drying out and provides nutrients to whatever is growing in the soil.

Two other important ingredients in soil are **water** and **air**. Air in the soil allows spaces for water and roots to move. Water helps to give the soil its structure and also enables to transport vital nutrients to plants.

Why do plants need soil? Plants make their own food by turning sunlight into energy through **photosynthesis**, but soil provides moisture and nutrients which the plant also needs. Soil anchors the plant, enabling it to produce a good root system to take in water and hold it firm as the plant grows taller.

What lives in soil? Soil is home to **invertebrates**, **fungi** and billions of **microscopic organisms** – these are the decomposers which make organic matter: 50% of the planet's soil passes through the gut of **earthworms** each year; they also help keep the soil open and full of air. Other invertebrates that shred organic matter include woodlice, slugs, beetles and millipedes. Fungi also break down organic matter and bacteria is vital in taking nitrogen from the atmosphere and fixing it into compounds that can be used by plants to grow. There are more soil microscopic organisms in a handful of healthy soil than there are people on the earth!

If soils have little organic matter, they will struggle to retain water and provide a habitat for invertebrates and micro-organisms. If soils are not managed well they can become **compacted**. This is where the air gaps are squashed out meaning water and worms cannot travel through the layers easily and the soil is heavier to work. If soil is compacted it is not healthy.

Compacted soils are at risk from flooding because the water cannot penetrate into the ground and in heavy rain the topsoil can be washed away onto roads or into rivers. Farmers try not to compact the soil which is one reason tractors have big bouncy tyres to spread the weight and avoid

squashing the air out. It is also one of the reasons gardeners don't like us treading on the flower borders or vegetable beds! Some farmers are exploring methods of cultivation which minimise driving over the soil such as **drilling** crops straight into ground without **ploughing** it first.

Plants are good at absorbing CO₂ (carbon dioxide). It is activity by soil microbes that determines whether the carbon is stored underground or released back into the atmosphere where it contributes to climate change. If all farms in the UK could increase the organic matter in their soils then that would go a long way to clearing greenhouse gases from the environment. More than three times the carbon is stored in soil than in the atmosphere.

Farmers must look after this precious resource. Without microbes, wonderful worms and healthy soil in the future, we won't be able grow food crops, deliver clean water and lock up harmful greenhouse gases.

Useful Websites

- <https://soils.org.uk/education/downloads/>
- <https://www.countrysideclassroom.org.uk>
- <https://www.soilassociation.org/causes-campaigns/save-our-soil/10-soil-facts/>