

8

Soil



What

you will learn

An advantage to live in the soil

Soil type

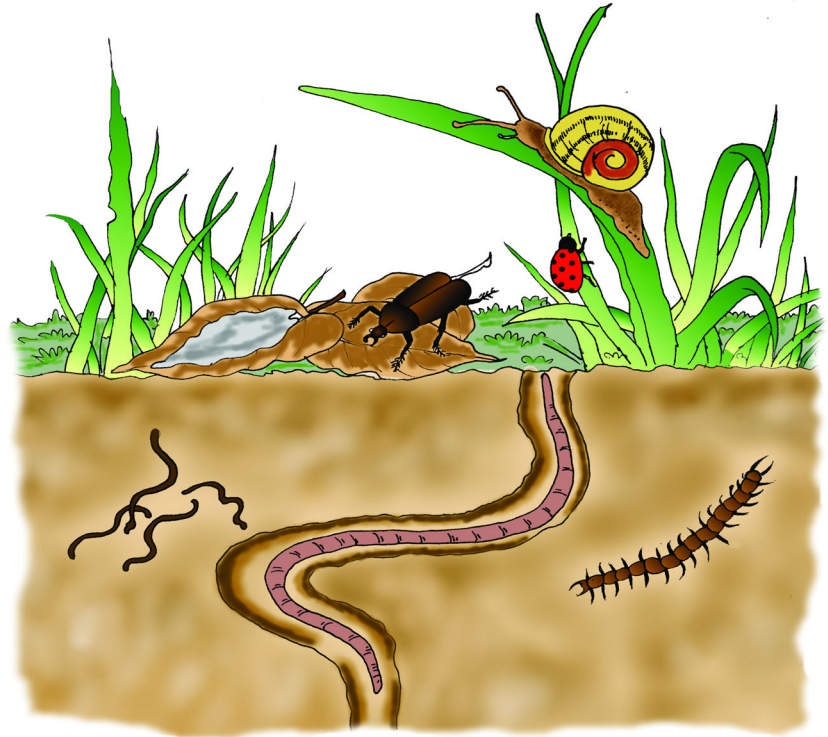
Soil fertility

Soil erosion

An advantage to live in the soil

A little way below the surface, the soil temperature stays much the same all year round. Underground homes provide warmth, shelter and protection from bad weather. Without the soil there would be very little life on land.

Millions of small animals live in the soil: millipedes, centipedes, worms, beetles, ants and other insects.



Millipedes



Centipede



Worms

Could you name a few bigger animals which live in the soil?

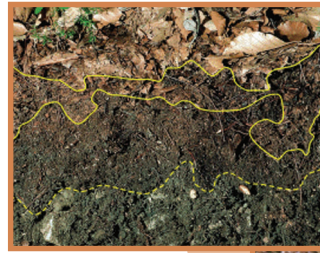
Do you Know?

The world's no. 1 food plant is wheat.

The soil

Once you step out onto a piece of ground, you step out onto something that is alive. Soil is not just a piece of dirt.

Soil is made up of living and non-living material spread as a very thin layer over the entire surface of the planet we call earth.



Humus is mostly made up of dead plant material which is slowly rotting.

Humus helps to keep the soil in good condition in different ways. For one thing, it breaks down to give chemicals which help plants to grow.



When freshly dug soil is left in a dry place, it slowly loses weight. The moisture in it slowly evaporates.

Soil moisture is important. Plants need a constant supply of water which they get through their roots.

When soil is covered with water, the water level slowly drops. The soil has air trapped in it, between the grains of sand and clay. The water slowly soaks into the soil and the air escapes.

This air in soil is important, too. Oxygen is needed by the roots of plants, and by soil animals.



- 1 What is humus? Why is it important?
- 2 Why is soil air important?
- 3 Why is soil moisture important?



Ideas

↔ Soil consists of air, moisture and humus.

↔ Soil contains several living organisms.

Soil types

People describe soil types in all kinds of ways such as heavy, light, sandy, clay, loam, poor or good. Soil scientists describe soil types by how much sand, silt and clay is present. This is called texture.

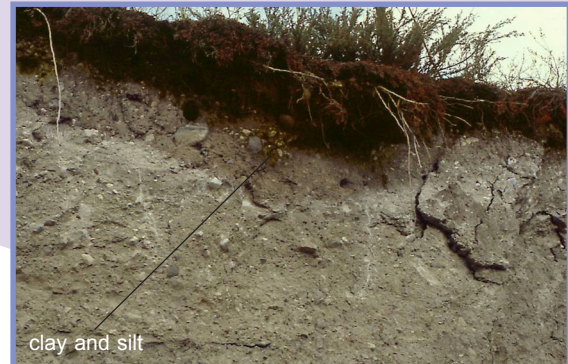
It is possible to change the texture by adding different things. Changing texture can help in providing the right conditions needed for plant growth.



Sand is the largest particle in the soil. When you rub it, it feels rough. This is because it has sharp edges. Sand doesn't hold many nutrients.

Clay is the smallest of particles. Clay is smooth when dry and sticky when wet. Soils high in clay content are called heavy soils. Clay also can hold a lot of nutrients, but doesn't let air and water run through it well.

Silt is a soil particle whose size is between sand and clay. Silt feels smooth and powdery. When wet it feels smooth but not sticky.



✦ Sand and soil in Maldives

Sand and soil found in other countries does not come from coral like our sand. It is made from rocks that form the outer layer of the earth – the crust. In Maldives we talk about black soil – *kalhufas*, dust and sand – *alhifas*, and white beach sand- *hudhufas*.

Alhifas and *hudhufas* are examples of sand, they are not soil. *Kalhufas* is soil, but it contains a lot of sand so we call it **sandy soil**. Soils rich in humus are often brown or black in colour. You may have observed that plants grow well in black soil (*kalhufas*).

Do you Know?

Corn is the crop that is used to sweeten most of the non-diet soft drinks in the US.

• Sand from animals

Sand in the Maldives is formed from the skeletons of sea animals and plants especially corals. You may have seen stones of different sizes on the islands or near the beach. These stones are different kinds of corals. Coral stones and sea shells break down to form sand.



• Sand from plants

A lot of sand in the Maldives comes from special types of sea plants called coralline algae. Coralline algae are plants which form skeletons of a compound called limestone. When the plant dies the skeletons break down to make sand.



Halimeda (Mashi) is a coralline algae which forms small flakes of sand. A large proportion of coarse sand (kashiveli), found on our beaches is from *halimeda*.



Ideas

- Soil types can be determined by how much sand, silt and clay is present.
- Sand in Maldives is formed from the skeletons of sea animals and plants.
- A lot of sand in Maldives comes from special types of sea plants called coralline algae.



- 1 How can you determine the soil type of a given sample of soil?
- 2 How would you find out which types of soil are best to grow plants?

Soil fertility

A fertile soil is one where a lot of strong, healthy plants can grow. Plants need water and minerals from the soil for healthy growth. A fertile soil will provide enough minerals, water and air spaces for plants to grow.

When plants die they decay and eventually turn into humus. The minerals which the plant took from the soil now go back into it. In this way the soil stays fertile.



This is a desert. Very few plants grow here.
Can you explain why?

Do you Know?

A common estimate on the length of time needed to naturally produce an inch of the topsoil is a century.

✦ Improving our soil

In Maldives we have very sandy soil which does not hold water well. Also our soil may not contain much humus because few plants and animals have died and left their remains in it. These problems can prevent us growing as much food as we could. We need to find ways of improving our soil.



✦ Composting

This is a method we can use to improve our soil. Compost is a natural fertiliser. This is made by piling up layers of sand, soil and plant and animal remains. The remains include things like dry leaves, green leaves, wood chips, ash, vegetable and fruit peels, fish waste, egg shells, strips of paper and cardboard and coconut husks.

There are very small living things inside the pile of compost. These could either be bacteria or fungi. They feed on the plant and animal remains, breaking them down and releasing the minerals into the soil.

Soil can be improved by adding artificial fertilisers. These are made in factories and contain minerals which plants need for growth.



Compost



Artificial fertilisers



- 1 Make a table showing what components fertile soil must have and the reasons why.
- 2 Discuss the advantages and disadvantages of composting.
- 3 Discuss the advantages and disadvantages of using artificial fertilisers.



Ideas

- In Maldives we have very sandy soil
- Composting is a natural method of fertilising the soil
- Soil can also be improved by adding artificial fertiliser

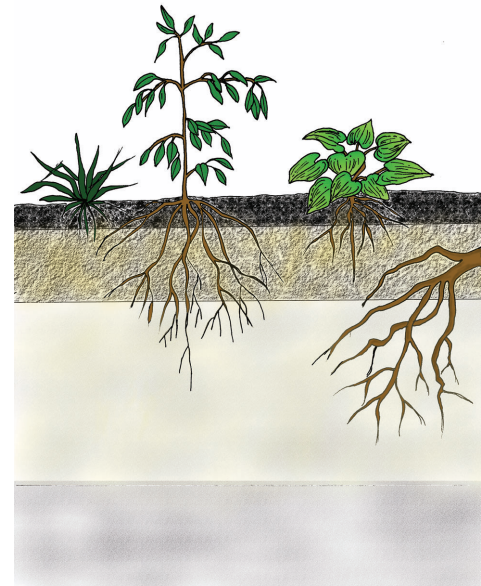
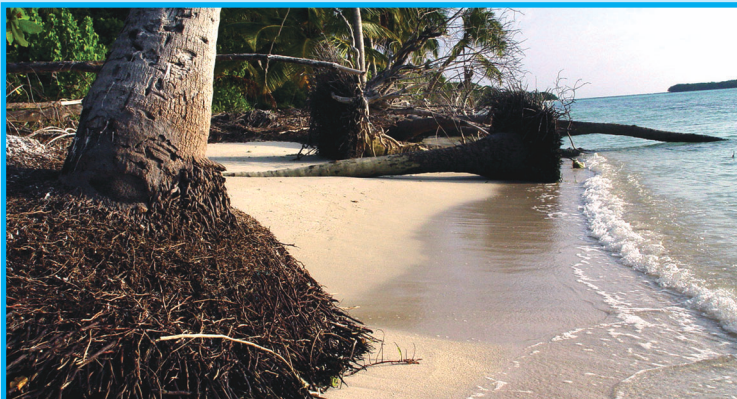
Soil Erosion

The upper layer of the soil is very important. This topsoil is where plants grow. It has taken thousands of years for this layer of topsoil to form. However, it takes much less time to have this soil blown away or washed away by the action of wind and water. The process that causes sand and soil particles and even rocks to be carried away by wind and rain is known as erosion.

Causes of erosion

Wind, water and waves are causes of erosion. They help carry sand and soil from place to place.

Wind	wind removes sand and soil in areas where there are few trees and the soil is loose and light.
Water	water washes away the loose sand and soil from bare areas of land.
Waves	strong waves lash against the shore, loosening the sand and soil. These are then carried away by the current.
Humans	Humans clears land for various reasons. This allows wind, water and waves to erode the land.



Do you Know?

The largest sand desert in the world is the Sahara Desert, located in North Africa.

✦ Saving our soil

Soil can get washed away if we do not care for it properly. People remove coral rocks from the reef to build houses. They cut down forests and clear land for farming. These activities are sometimes necessary. However, we are also helping wind and water to remove fertile soil. If we keep cutting down trees and destroying the reefs, our islands can get washed away. The fertile soil will be eroded and plants will not grow well. It is important for us to stop and think of ways to save or **conserve** our soil.



- 1 Make table showing the causes of soil erosion and the action that can be taken to prevent it.
- 2 Discuss what possible ways you could conserve soil.



Ideas

- ☞ *It takes thousands of years for a layer of top soil to form and it is where plants grow.*
- ☞ *We need to take preventive measures to conserve our soil.*
- ☞ *Wind, water and waves are causes of erosion.*



El Zahrawi is believed to have been born in the city of El-Zahra, six miles northwest of Cordoba, sometime between 936 and 940.

He was known as El Zahrawi, though in European languages his name is written in over a dozen different ways: Abulcases, Albucasis, Bulcasis, Bulcasim, Bulcari, Alzahawi, Ezzahrawi, Zahravius, Alcarani, Alsarani, Aicaravi, Alcaravius, Alsahrawi etc.

It is clear from El Zahrawi's life history and from his writings that he devoted his entire life and genius to the advancement of medicine as a whole and surgery in particular. El Zahrawi wrote a medical encyclopaedia spanning 30 volumes which included sections on surgery, medicine, orthopaedics, ophthalmology, pharmacology, nutrition etc. This book was known as *At-Tasrif* and contained data that El Zahrawi had accumulated during a career that spanned almost 50 years of training, teaching and practice. He apparently travelled very little but had wide experience in treating accident victims and war casualties.

The variety of operations covered is amazing.

In fact 'Kocher's method' for reducing a dislocated shoulder was described in *At-Tasrif* long before Kocher was born! So this means that he was not the first person to invent the method.

Once *At-Tasrif* was translated into Latin in the 12th century, El Zahrawi had a tremendous influence on surgery in the West. The French surgeon Guy de Chauliac in his 'Great Surgery', completed in about 1363, quoted *At-Tasrif* over 200 times. El Zahrawi was described by Pietro Argallata (died 1423) as "*without doubt the chief of all surgeons*". Jaques Delechamps (1513-1588), another French surgeon, made extensive use of *At-Tasrif* in his elaborate commentary, confirming the great prestige of El Zahrawi throughout the Middle Ages and up to the Renaissance.