

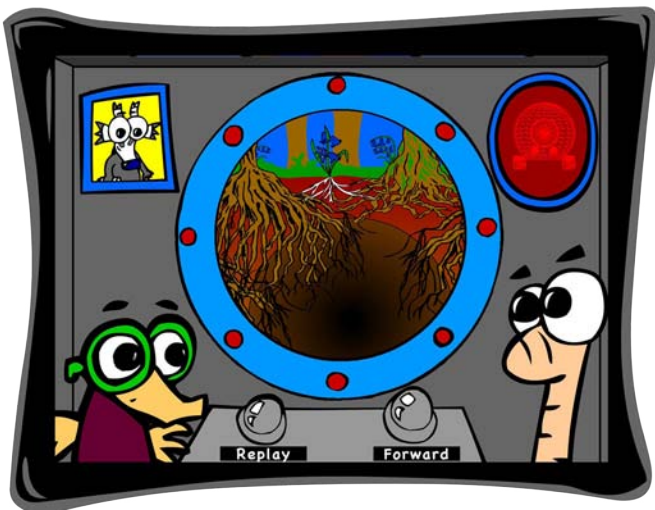


Topic 9: Soil, Plants and Food Production



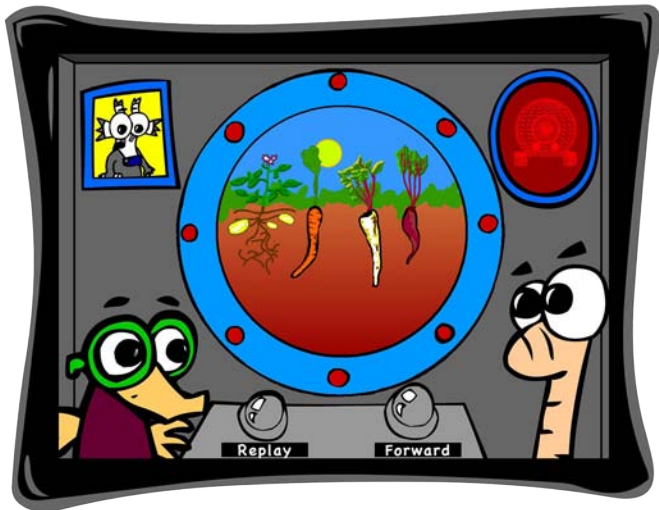
Introduction Virtually all plants need soils in which to grow. Soils do three major things which enable a plant to grow. They provide support for the plant roots which in turn supports the above ground growth of the plant and generally stops the plants from blowing over in the wind. They provide the water for plants which enters the plant system through the roots within the soil. Finally they supply most of the nutrients needed by plants to grow.

Just imagine a large oak tree, for example, that has grown to over 15 metres height and has a very large trunk. The soil has provided the nutrients and water to enable it to reach this size and holds onto the roots to stop the tree blowing over. What a very important part the soil plays in supporting and maintaining our wide range of plants and ultimately our food supply.



Soils and the Woodland In the woodlands, soil supports several layers of plant life, from the tallest trees to the flowers, ferns and mosses that make up the undergrowth. It may come as a surprise to learn the root systems for a particular plant below ground can cover a larger area than the plant above ground, even if the plant is a large tree. The roots of some plants, known as taproots, can go deep down into the soil, even to many metres. Some other plants keep their roots near the surface but have many branches through which they prospect the soil. When next you are in a woodland see if you can find some of the roots of plants, or see the roots of trees that may have fallen over.





Soils and the Garden Growing vegetables and flowers year after year in the garden depends on the soil being maintained in good condition. Good gardeners look after their soil and ensure that there are enough nutrients and water in it and that it has a good structure to allow plant roots to move through it. Because vegetables are grown year after year in the same soil, it is necessary to add fertiliser to make sure the soil has enough nutrients to allow good quality vegetables to be grown.



Why not ask your parents, or someone who likes gardening, to take you to look at garden soils and let them tell you about the wonderful things soils can do.

Soils and the Farm Like the gardener, the farmer has to look after the farm soils very carefully and ensure that they are well supplied with water and nutrients for the crops to grow year after year. Soils contain some eighteen essential nutrients that will be needed by the crops that are being grown. Farmers use fertilisers and farmyard manure to maintain the right levels of nutrients in the soil. To ensure good yields of crops there needs to be enough water in the soil. In countries where there is plenty of rainfall this is not a problem but in drier climates it is necessary to top up the soil water by irrigation.

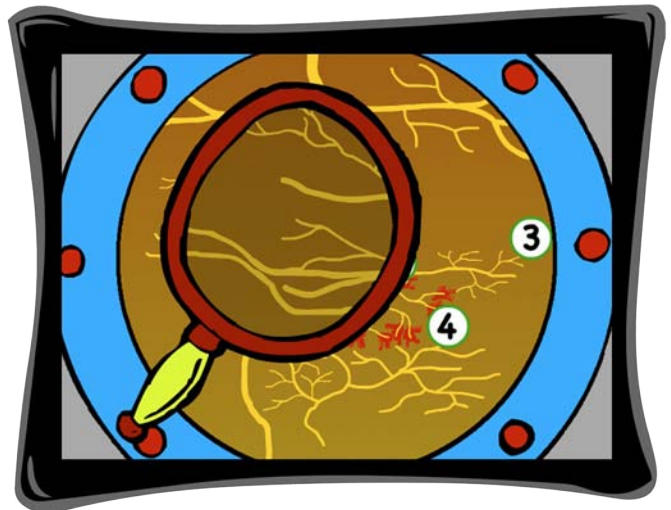


When next you have a farm visit be sure to ask the farmer to tell you about the farm soils and what they can grow.



Plants Under the Microscope

The rooting structure of plants is extremely important in ensuring the health of plants. In some soils the total length of roots below a plant can run to several kilometres as they prospect the soil for water and nutrients. Most plants have not only their roots but the roots themselves have many root hairs. It is the important responsibility of these root hairs to prospect for food and water for the plant. Mycorrhiza is an important fungus that occurs in soils. It plays an important part in the transfer of nutrients from the soil to the plant via the roots.



Wherever possible have a look at soil under the microscope or with a magnifying glass and examine plant roots.



Most plant roots occur in the upper half metre of the soil. This is where most of the nutrients are held. The organic matter, which comes from the decay of plant material and soil organisms in the top layer of the soil, is the source

of many nutrients which are cycled time and time again to maintain the fertility of the soil. Other nutrients are inherited from the rocks and sediments on which the soil forms. These are then prospected for by the deeper roots of the plants. Some nutrients, termed macronutrients, are needed in very large quantities while others, the micronutrients, are need in much smaller quantities. All are important in creating a fertile soil. It is part of the magic of soils that even in natural and semi-natural situations, e.g. woodland, soils can continue to support plant life year after year.

Soils are cultivated worldwide to produce food for the fast growing world population. There is an important responsibility to look after our soils so that they can continue to do this for future generations.

