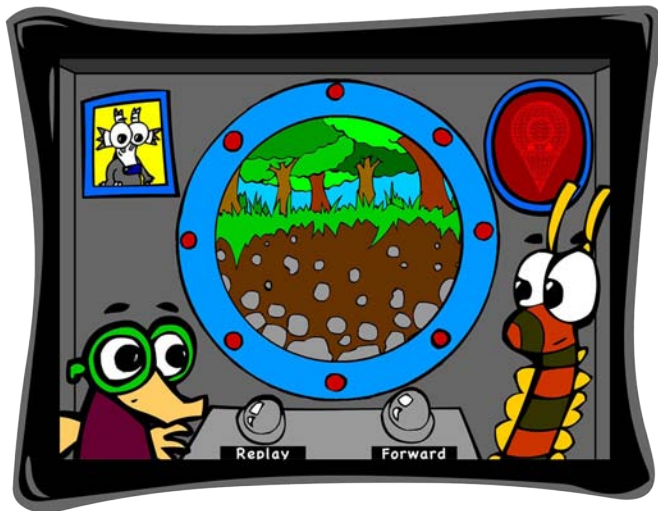




Topic 3: How Do Soils Form?

Introduction Soils form an almost complete skin over the earth, broken only by oceans and other water bodies and by mountains that have yet to develop a soil cover. When you walk in your garden or through the fields and woods there is always this magical carpet, the soil, beneath your feet.

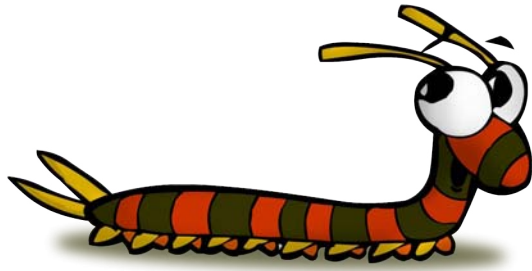


Soil Parent Material Just as we all have parents, so soils also have 'parents', or rather parent materials, from which they form. For most soils the parent material is either solid rock or sediments. The last Ice Age (more than 10,000 years ago) left sediments in many parts of the world from which many soils have formed. Parent material is the main factor responsible for the texture of the soil (i.e. whether the soil is sandy, silty or clayey) and is also important in determining whether the soil is acid or basic, and whether it is rich in nutrients. When you are out and about look out for the different types of rock and imagine what types of soil will form from them.

Climate Climate is a very important soil forming factor. As climate changes across the world so does the soil type. Temperature, rainfall, snow and ice all influence the way the parent rocks and sediments are converted into soils. They play a large part in breaking down the rocks to form soil. They affect the rate at which chemical, physical and biological processes combine to develop soil in a particular place. Rainfall influences the distribution and amounts of nutrients in the soil, and hence their availability to plants.

When you go on your holidays to a different climate look at the soils there and see how they are different to the ones back home.





Landscape The way that the landscape is developed has a strong influence on the thickness of soils and how well they are developed. On steep slopes, such as hillsides, the soils are often very thin because the soil tends to be washed down the slopes by the rain. In flat positions, such as plains and valley floors, the soils tend to be thicker. Here, they do not tend to be washed away like the hillslope soils but instead tend to receive sediments washed downslope from above them.



When next you are in the hills look at the steep slopes and imagine how the soil can be washed down the slopes. Also when you are on flat land realise that the soils beneath your feet are probably quite deep.

Organisms, including Vegetation and Fauna

Vegetation and soil animals are important in several aspects of soil formation including organic matter production, release of nutrients to support plant life, and in the development of soil structure. Soils under grassland tend to develop fairly thick top organic rich horizons whereas in those under forest the organic matter layer is usually thinner. Plant cover acts to stabilise soils during their development and helps to prevent erosion of the soil.



Remember there is a very close relationship between the soil and the vegetation that grows on it. The two work together very well to produce our native flora.

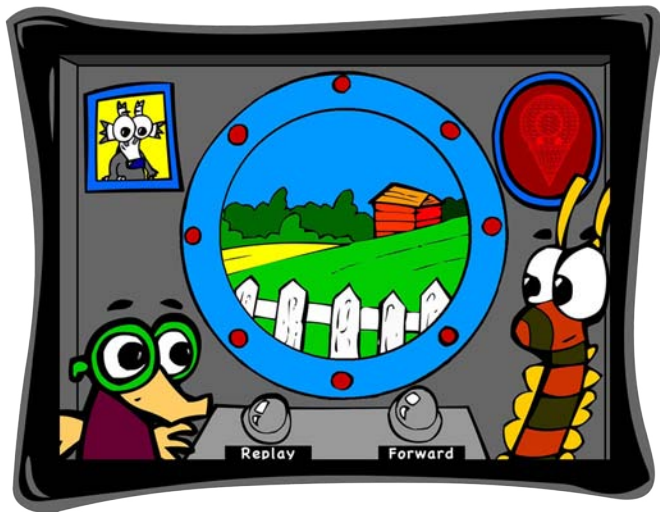


Time Soils need a lot of time to develop. It takes hundreds of years for just a centimetre of soil to form from hard solid rock but perhaps only a few decades to develop a few centimetres of soil in soft sediments. Soil formation first began many millions of years ago and there are some world soils that are over a million years old. We need to look after our soils well because they are very precious and new ones can take along time to form.



When you are out in the countryside and come across boulders and other pieces of rock, you can say to them 'one day soils may come and form from you'.





The Influence of Human Beings on Soils

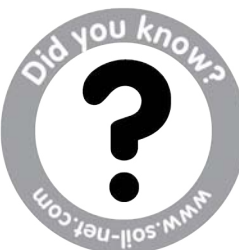
Soils Farming soils to produce crops has had a big influence on soils. The upper parts of the soil, in particular, will have been disturbed by cultivation and organic remains mixed in with the mineral soil. Humans have also increased the fertility levels of many soils by adding fertiliser. In some parts of the world, soils have been farmed badly and soil erosion has resulted, decreasing the potential of the soils.



Soil formation is a complex process brought about by the interaction of these various soil forming processes.

There are several thousand different types of soil in the world as a result of the different interactions of the soil forming processes across the world.

In the last 100 years human beings have had a bigger and bigger effect on soils and in many parts of the world have modified soils greatly.



People who use the soil should do so carefully and ensure that they maintain the soils for use by future generations.

