



This document is one of a suite of Factsheets that are part of the support offered to schools and teachers. The Factsheets provide guidance, ideas and link to resources to support your Citizen Science activities. They also contain suggestions for extended learning relating to problem solving, numeracy, geography and social studies. We hope they will provide all the guidance you need to develop lessons to fit with your own curriculum plans. For general enquiries contact – Amanda Malcolm, Citizen Science Coordinator, citizenscience-scotland@tcv.org.uk, 0141 552 5294.

Soils Factsheet

Introduction

Soils are a mixture of ground rock (sand, silt and clay) and decayed organic materials (humus). This humus contains the nutrient that allows new plants to grow each year. As winter approaches, trees lose their leaves and most plants die back. These are broken down over winter by the action of bacteria in the soil and the actions of earthworms. Earthworms draw leaves and other vegetation from the surface of the soil down into the soil. The tunnels earthworms make also allow air and water to penetrate deep into the ground, benefiting plant roots and draining away rainwater.

Suggested Activity - Earthworms are extremely important and play a vital role in recycling plant nutrients and aerating the soil. By taking part in the OPAL survey you'll help improve pupil's knowledge of earthworms and the soils they live in - something we know surprisingly little about.

<http://www.opalexplornature.org/soilsurvey>

By the conclusion of the Citizen Science Project it is anticipated that learners will be able to:

- Understand the importance of worms in recycling leaves into the soil
- Understand the earthworm's ability to help with land drainage
- Appreciate the need for accuracy and the careful following of instructions to collect scientific information

Plants, animals, fungi, bacteria and humans affect soil formation. Animals mix soils as they form burrows and pores, allowing moisture and gases to move about. In the same way, plant roots open channels in soils. Plants with deep taproots can penetrate many metres through the different soil layers to bring up nutrients from deeper in the soil.

Suggested Activity – View a map of the soil parent material (the underlying geological material) in your local area, retrieve descriptions about the soil depth, texture, pH and organic matter content, and explore vegetation habitat data across Britain.

<http://www.bgs.ac.uk/research/climatechange/sustainableSoils/parentmaterialmap.html>

Some soils may contain up to one million species of microbes per gram (most of those species being unknown), making soil the most abundant [ecosystem](#) on Earth. Dead plants and fallen leaves and stems begin their decomposition on the surface. There, organisms such as worms feed on them and mix the organic material with the upper soil layers; their added organic compounds become part of the soil formation process.

The type of soil that is at the surface around where you live is determined by the underlying rocks. These vary widely across Scotland which has a rich tapestry of rock types. Igneous rocks were formed by volcanic activity; they appear

Suggested Activity – you can view the underlying geology of rock structure where you are
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

plates were exerted on existing rocks, cooking and bending them into new forms of rock such as slate and marble. The different rocks break down over time mixing with organic matter from plants and form soils.

All across Scotland, new plants and animals are being introduced from all over the world. Some plants and the soil they are transported with can sometimes carry organisms from their country of origin with them. These Invasive Non Native Species (INNS) can escape into the wild and multiply in number, causing serious problems for native species through predation and competition for space.

as plugs of volcanoes such as Edinburgh Castle or domes of granites such as Ailsa Craig Island. Sedimentary rocks were formed by deposition of sands and silt in rivers, seas and lakes and include coal, oil shale and limestone rocks which were formed when plant and animal material was laid down and formed rock layers. Metamorphic rocks were formed when the pressure and heat of the earth's tectonic

Suggested Activity – Whilst doing an earthworm survey or simply doing gardening, keep an eye out for unusual species such as New Zealand Flatworms
<https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=348>

These INNS eat native earthworms and can lead to local worm extinction. If you find any, report them here <http://www.opalexplornature.org/nzflatworm>

Outcome statement	Curriculum area
I have used a range of ways to collect information and can sort it in a logical, organised and imaginative way using my own and others' criteria. MNU 1-20b * Responsibility of all	Numeracy > Information handling > Data and analysis
I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way. MNU 2-20b * Responsibility of all	Numeracy > Information handling > Data and analysis
I can explore examples of food chains and show an appreciation of how animals and plants depend on each other for food. SCN 1-02a	Sciences > Planet Earth > Biodiversity and interdependence
Having taken part in practical activities to compare the properties of acids and bases, I have demonstrated ways of measuring and adjusting pH and can describe the significance of pH in everyday life. SCN 3-18a	Sciences > Materials > Chemical changes
I understand how animal and plant species depend on each other and how living things are adapted for survival. I can predict the impact of population growth and natural hazards on biodiversity. SCN 4-01a	Sciences > Planet Earth > Biodiversity and interdependence