As part of the **Everything is Connected** season in partnership with the Cultural Programme at the University of Oxford, The Story Museum is collaborating with authors and artists to imagine a brighter future.

In this video and resource, academics from the University of Oxford invite you to explore the natural world on your doorstep to discover how 'everything is connected'.

From Worms to Flowers

Part 1: Starter

Introduce the film to the students, perhaps using the following text:

From plants to pollinators to the roots beneath your feet, everything is connected. What do we mean by 'Everything is Connected'? Everything in nature has a relationship with something else in nature. As we build more houses, shops, offices and roads, there is less room for nature to grow. Just like humans need to eat lots of different things to be healthy, the natural world needs to be full of different plants and animals to be healthy.

Students watch the film:

'Everything is Connected'
'Everything is Connected' *- film with subtitles*

Part 2: Introduction

Students discuss the following questions in pairs

- What in the film was familiar to you?
- What in the film surprised you?
- Do you spend time outside, in parks, gardens or playgrounds? What do you normally do in them?
- What plants or flowers have you noticed?
- What minibeasts have you seen?
- What do you think the presenter meant when he said 'the soil is alive'?!

Pairs feedback to the whole class and reflect: could we know more about nature if we looked a bit harder? That's exactly what we are going to do in this lesson!

Part 3: Main development

Go outside to the school field or a nearby park. Divide the class into 4 groups. Each group has a mission. One group will study plants, (Resource A), one group will study pollinators (Resource B), one group will study earthworms (Resource C) and the fourth will study soil (Resource D).

Part 4: Plenary

Students comes back together as a class. Each class shares their findings.

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LEVERHULME TRUST

Leverhulme Centre for Nature Recovery

Resource A

Group 1: Plants

Read this aloud as a group:

Plants in gardens and green spaces are important for the planet and living things. Plants absorb carbon dioxide and release oxygen from their leaves, which humans and other animals need to breathe.

The more plants and animals you have above the ground, the more nutrients in the soil. The animals' faeces (poo) will feed into the soil and improve the soil biodiversity and soil structure.

The roots of plants also encourage microbes and earthworms to thrive which create tunnels and pockets in the soil that fill with water. And it's in these pockets that nutrients dissolve and mix with the water ready for the roots to take up.

The more variety of plants the better. Native plants, plants that grow naturally and are not taken from another place or country, are better This is because they already have an established relationship with pollinators and pests which allows them to thrive in the garden.

Plant count:

Your group is going to do a plant count. Use one of the apps below. Keep a list of what you have found, to share with the rest of the class at this end of this session.

Plant identification Apps

https://www.inaturalist.org/pages/seek_app

https://www.inaturalist.org/

https://lens.google/

Resource B

Group 2: Pollinators

Read this aloud as a group:

Pollinators are animals that swap pollen between flowers to help grow more plants. You may instantly think of bees as a pollinator, but pollinators are so much more than just bees! They include flies, wasps, beetles, even spiders if they walk from flower to flower.

Pollinators are incredibly important – not only do they allow food crops to grow but they are also vital for the survival of other wild plants and support much of our wildlife. In the UK there are 1500 pollinators!

Search for Pollinators

Your group is going to search for pollinators, using the ideas below. Keep a list of what you have found, to share with the rest of the class at this end of this session.

You can follow the UK Pollinator Monitoring Scheme to count pollinators.

https://ukpoms.org.uk/fit-counts
https://ukpoms.org.uk/sites/default/files/pdf/FIT%20Count%20survey%20guidance%20v6.pdf

1. Choose a patch of flowers.
2. Put down a homemade quadrat which is 50cm x 50cm.
3. Then set a timer for 10 minutes.
4. Using the form or the app, record the number of pollinators that visit the flowers over the course of the 10 minutes.
5. Try to get some shots of pollinators, preferably more than just bees.

Tip: If there are no pollinators in your patch, it's could be due to 2 factors:

- There many be too few flowers to attract them. – Choosing a patch with flowering plants will encourage pollinators to come.
- Pollinators are sensitive to the weather, and it might just be that it's too cold, rainy or windy. Choose a brighter day! (In England? Good luck!)

Resource C

Group 3: Earthworms

Read this aloud as a group:

Earthworms are a common creature that live in the soil, below the ground. Earthworms like to eat soil and old leaves and roots. These underground animals are incredibly important to soil health and to plants growing because they mix dead plant materials (nutrients) into the ground and their tunnels allow more water and air to enter the soil which helps keep it healthy. In the UK the Anecic worm can grow up to 40cm long!

Search for Earthworms

Your group is going to search for earthworms, using the ideas below. Keep a list of what you have found, to share with the rest of the class at this end of this session.

A handy Earthworm field identification guide is available here:
https://www.fas.scot/downloads/key-to-common-british-earthworms-of-amenity-grasslands-2/

Resource D

Group 4: Soil

Read this aloud as a group:

The soil in the ground is alive and home to many animals of all different sizes. Soil is incredibly important because it allows plants to grow and animals to thrive. A few simple tests can assess the health of your soil and understand how well the animals and their homes are doing. These tests help us understand how well water and air can move through the soil – this in turn will help animals and organisms living in the soil.

Find out how healthy the soil is

Your group is going to test how healthy the soil is, using the ideas below. Keep a record of what you have found, to share with the rest of the class at this end of this session.

Slake test

A Slake test is a very simple way to look at soil structure and assess how well water can move through the soil.

What you need:

- A glass
- Water
- Some form of net to hold the soil (I used some from a bag of tangerines/onions)
- A rubber band

Instructions:

1. Cut out a square piece of netting that is slightly larger than the diameter of the glass
2. Place the rubber band around the top rim of the glass. Tuck each corner of the netting under the rubber band. Push the centre of the net Into the glass.
3. Fill the glass up to the top with water.
4. Take a clump of soil you would like to test and place it into the net in the top of the glass.
5. Watch to see how the soil responds. Does it hold its shape? Does it fall apart?

The soil should hold its shape when put into water. Water moves through the soil when it contains tunnels rather than breaking it apart. If your soil quickly breaks apart in the water with lots of fragments sinking to the bottom, this is 'bad' and the soil could be targeted for improvement.

Water Infiltration test

This water infiltration test is a simple way to measure the ability of the soil to take in water.

What you need:

- A glass
- A piece of card or plastic you can tip the glass on to

Instructions:

1. Fill up your glass of water to the top.
2. Place the cardboard/ plastic over the glass of water and tip it upside down.
3. Next to the soil you would like to test, quickly but carefully slide the cardboard/plastic out from under the glass so that the rim of the glass makes contact with the soil.
4. Time how long it takes for the water to soak away.

If the soil is healthy and contains a lot of tunnels, the water will quickly be absorbed by the soil. So, the faster the soil infiltration, the healthier the soil. This is the case as long as it has not been disturbed as disturbance creates large pockets and diminishes flora and fauna productivity.

In addition, if the water just sits in the glass on the soil and doesn't soak away, this tells you your soil is compacted. Soils need these tunnels to allow for air and water to penetrate to sustain soil life, as well as these spaces acting as their habitats - so this is also 'bad' and could be targeted for improvement. This can be done by reducing foot/compression traffic over an area, and can also be improved with the methods suggested above.

Tips on how to improve soil

If you want to have healthier soils, there's a few very effective and simple approaches that can help you achieve this. Like most parts of life, diversity brings huge benefits, and this is also true for soils! Having a diversity in the animals that live in and on your soil, as well as planting lots of different native plants can help improve soil health and function. To get the most benefits for your soil, try to reduce how much you dig into it and add some compost over the top, all that soil life will thank you!

Glossary

Biodiversity: Diversity of plant and animal life, especially. as represented by the number of species.

Carbon Dioxide: A colourless, odourless gas absorbed by plants.

Ecology: The branch of biology that deals with the relationships between living organisms and their environment.

Eco system: A system composed of all the organisms found in a particular environment, interacting with it and with each other.

Microbes: An extremely small living organism, such as bacteria

Morphology: The branch of biology that deals with the form of living organisms and their parts, and the relationships between their structures.

Nutrients: Supplying nourishment

Organisms: An individual animal, plant, or single-celled life form.

Oxygen: A colourless, odourless gas absorbed by humans

Pollinator: An insect or other agent that pollinates a plant.

Quadrat: A square plate to measure a distance

Species: A group or class of animals or plants having certain characteristics in common.