

NATIONAL TRUST FOR SCOTLAND'S
THREAVE LANDSCAPE RESTORATION PROJECT

BALANCE IN NATURE



Contents



Learning at Threave Nature Reserve - An Introduction

The National Trust for Scotland's Threave Nature Reserve is on the outskirts of Castle Douglas, in Dumfries and Galloway, SW Scotland. A former small dairy farm, it borders the River Dee and is home to Threave Castle.

In 2019, NTS began the Threave Landscape Restoration Project, an innovative and ambitious 100-year project designed to enable the land to recover from years of traditional agricultural management, restore key habitats and protect biodiversity on this special site. The project takes a sensitive and holistic approach to caring for the land, using new technology alongside developing a deeper, more responsive understanding of the ecology of the land and how it responds and adapts to the changing climate.

The five films by eco filmmaker John Wallace were created over the course of a year, beautifully documenting some of the work done in the early stages of the project and the wildlife on the reserve. They explore each of the three key habitats – water, grassland and woodland, people's relation to and impact on the landscape, and finally the importance of biodiversity.

The Learning Resources create five interdisciplinary packages of learning materials linked to and inspired by the five films that explore the innovative approach to landscape restoration at Threave. These are :

- **Trees**
- **Grasslands**
- **Water**
- **People**
- **Biodiversity**

The learning materials are designed to be delivered in schools across Scotland and are linked to the national curriculum. They can be delivered in the class as an IDL project or within the various curriculum areas as stand-alone lessons. They offer the opportunity to deliver Outdoor Learning and Learning for Sustainability which is connected to a "real life" landscape restoration project.

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THREAVE NATURE RESERVE is free and open all year. NTS Rangers are available to deliver outdoor and rural skills education opportunities to schools and community groups at the Reserve, and to talk about all aspects of the Landscape Restoration Project. They can be contacted at ThreaveNature@nts.org.uk. Threave Landscape Restoration Project is funded by National Trust for Scotland, Galloway Glens Scheme and HSBC UK with Connicks as lead consultants and project managers.

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TREES

All lessons are linked to the film trees



To view



Subtitled

Learning for trees

Overarching Learning Intentions

The aim of this package of lessons linked to *Trees* is to help young people understand how trees work and how much they do for our natural environment. The lessons will give young people an empathy and wonder about the magic and beauty of trees and also their role in supporting biodiversity, combatting climate change and contributing to their health and wellbeing.

INTRODUCTION

'Trees' shows how the Threave Landscape Restoration Project is supporting the recovery of native woodland habitats on Threave Nature Reserve. This is achieved through planting a variety of native trees and removing densely planted commercial forestry, to allow a variety of trees and plants to regenerate.

Mixed mainly native woodland is vital to biodiversity and reducing climate change and its effects. There is just a tiny fraction of native woodland remaining in Scotland compared to several hundred years ago. Native woodland has been depleted by felling for wood and clearing land for livestock farming and commercial forestry – woodland regeneration is hampered by grazing, particularly by sheep and deer.

Planting and supporting the natural regeneration of varied, mainly native woodland is important because these woodland ecosystems have evolved

in Scotland over thousands of years. Large areas of single species or limited species woodland, such as conifers like Sitka spruce, cannot support a healthy ecosystem and are 'dead' in comparison to diverse woodlands. The planting at Threave is reconnecting smaller areas of woodland, ensuring connectivity.

Healthy woodlands include a variety of native trees, a good range of ages of trees and the ability for new trees to self-seed and mature. Dead and decaying wood is also necessary to feed the woodland floor and provide a home for other plants and animals. Even one tree can support hundreds of other life forms, and together they form a community that supports thousands more, including humans.

NB Commercial forestry is an important part of the Scottish economy – the practice of commercial forestry planting is changing to encompass requirements to include areas of native, mixed woodland. Finding the right balance is still a work in progress.

POINTERS FOR TEACHERS

This series of interdisciplinary lessons/learning activities cover 2nd and 3rd level curriculum areas of Science, Outdoor Learning and The Expressive Arts. They are best presented to the learners after they have watched the 'Trees' film (link above) and participated and researched the science of trees. The lessons are suggestions and should be interpreted by teachers creatively and in relation to their learners' knowledge and needs. The lessons can be taught as part of a Learning for Sustainability/IDL topic or independently by subject.

CURRICULUM LINKS

SCIENCE	SOCIAL STUDIES/RME	LITERACY	EXPRESSIVE ARTS/HWB
<p>SCN 2/3-01a - I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction.</p> <p>I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.</p>	<p>SOC2-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible.</p>	<p>LIT 2-04a - As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes.</p>	<p>EXA 2-03a - I can create and present work that shows developing skill in using the visual elements and concepts.</p>
<p>SCN2-02a - I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.</p>		<p>LIT 2-05a - As I listen or watch I can organise these notes under suitable headings and use them to understand ideas and information and create new texts, using my own words as appropriate.</p>	
<p>SCN 2-02b - Through carrying out practical activities and investigations, I can show how plants have benefited society.</p>	<p>RME 2-04c - I can show understanding of the beliefs of world religions and explore the similarities and differences between these and my developing beliefs.</p>	<p>LIT 2-06a - I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.</p>	<p>EXA 2-05a - Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through activities within art and design.</p>
<p>SOC 2-08b - I can consider the advantages and disadvantages of a proposed land use development and discuss the impact this may have on the community. RME 2-04c - I can show understanding of the beliefs of world religions and explore the similarities and differences between these and my developing beliefs.</p>	<p>RME 2-04c - I can show understanding of the beliefs of world religions and explore the similarities and differences between these and my developing beliefs.</p>	<p>LIT 2-07a - I can show my understanding of what I listen to or watch by responding to literal, inferential, evaluative and other types of questions, and by asking different kinds of questions of my own.</p>	<p>EXE 2-06a - I can develop and communicate my ideas, demonstrating imagination and presenting at least one possible solution to a design problem.</p>

CURRICULUM LINKS (CONTINUED)

SCIENCE	SOCIAL STUDIES/RME	LITERACY	EXPRESSIVE ARTS/HWB
<p>SCN 3-01a - I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.</p>	<p>RME 2-09d - I am developing my understanding of how my own and other people's beliefs and values affect their actions (in relation to nature/climate).</p>	<p>LIT 2-24a - I consider the impact that layout and presentation will have and can combine lettering, graphics and other features to engage my reader.</p>	<p>EXA 2-07a - I can respond to the work of artists and designers by discussing my thoughts and feelings. I can give and accept constructive comment on my own and others' work.</p>
<p>SCN 2-14a - By investigating the lifecycles of plants and animals, I can recognise the different stages of their development.</p>		<p>LIT 2-26a - By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.</p>	<p>HWB 2-26a - I am experiencing enjoyment and achievement on a daily basis by taking part in different kinds of energetic physical activities of my choosing, including sport and opportunities for outdoor learning, available at my place of learning and in the wider community.</p>
		<p>LIT 2-28a - I can convey information, describe events, explain processes or combine ideas in different ways.</p>	

Outdoor Learning

LEARNING INTENTION

Young people gain an experiential first hand understanding of how woodlands work through observation, exploration and investigation. They develop their connection with trees and woodlands and can identify actions which might support or improve woodland habitats.

Overview

The Outdoor Learning activities for 'Trees' are designed to give teachers and outdoor educators a starting point for successful learning in the outdoor environment. They can be adapted to suit the site you have available and the time of year, and also list useful equipment and resources to aid preparation. There is a link to a risk benefit assessment that covers the outdoor learning sessions which can be adapted if required. We hope all of these will be useful either directly or as inspiration and support for taking learners outdoors.

Relevant Topic/IDL links include

Woods, Trees, Living Things, Habitats, Minibeasts, Life Cycles, Ecosystems

Time of year

Any time - in winter, trees can be identified by twigs and bark, though this is a little more challenging. Visiting the same tree throughout the year is a great way to learn.

Site

An area of woodland, or if this is unavailable an area where there are some trees, or even a single tree. Even if access to trees is limited, focusing on one tree or a few trees, for example in the school grounds, and returning to visit over time can help learners to really get to know the tree, and to discover the kind of life it supports. Remember to get the landowner's permission and check any environmental or wildlife conservation restrictions first (see Risk Benefit Assessment, side panel).

WATCH TREES

All lessons are linked to the Trees Film



LINKS

Safety

Risk Benefit Assessment

Warm-up activity- settling into the outdoor environment

Journey stick Warm-up activity sheet

LEARNING ACTIVITY



Info

Trees and woodlands are ecosystems that support a huge variety of life. They also lock carbon dioxide into the soil, and clean and cool the air. Being among trees is great for our wellbeing – encourage learners to rest and relax among trees, as well as investigate and explore.

Aim

To get to know a tree or wider woodland and build up a picture of how healthy it is and the life it supports through making observations, recording findings and drawing conclusions.

Activity

Place the learners into groups. If you are in a woodland or have several trees, give each group a tree to focus on – alternatively, if you have limited trees, you can give each group a different task.

Task 1: Identify the tree or trees – use tree ID sheets to identify the type of tree – look closely at the bark, leaf shape and/or twigs and buds

Task 2: Estimate the approximate age of the tree or trees (see resources) – different trees grow at different rates, so it's not just about size but also how gnarled and twisted a tree is

Task 3: Estimate how healthy the tree is – you can score this on a scale of one to five, with five being very healthy. Look for dead branches, wounds in the trunk, epicormic growth (where young shoots grow from the base of the tree, a sign of stress), spindly growth – is it getting enough light, or is it shaded by other trees?

INVESTIGATING WOODLAND HEALTH: MAPPING THE WOODLAND COMMUNITY

Task 4: look around the tree – what is on the ground, for example leaf litter, grass, pavement – how far do its roots go, do you think?

The class can record the observations on a large piece of paper as a rough map of your woodland area, with the names, health score and other observations.

Alternatively, learners could make a ‘fact file’ for their tree, including drawing leaf shapes, taking bark rubbings, etc.

Questions to ask

- What do you think would improve the health of this tree/woodland?
- What would you change?
- How do you think this tree/woodland came to be here (planted by people, grown naturally bit of both) and why?

Plenary

Write a note of thanks or a wish for the tree with string made of natural materials you have been focusing on – this can be done on (ideally) recycled card and tied to the branches of the tree. Or just ask each participant to verbally thank their tree or find a word to describe their tree.

Extension

Tree planting at school or in the community; there are lots of local tree-planting initiatives across the country, and you may also find help to purchase trees through the Woodland Trust. You can research the best types and placements of trees using some of the knowledge the class have gained from investigating trees and woodlands. The best time of year for tree planting is October – March. Tree seeds such as acorns and ash keys can also be gathered and planted in pots in Autumn / Winter.

Track a tree through the seasons. follow through the seasons, for example by drawing, photographing or filming the tree.’

The ‘Tree Tools for Schools’ website (see resources) has lots of tree related films and activities.

Resources:

Woodland Trust Tree Tools for Schools – includes ID sheets
<https://www.treetoolsforschools.org.uk/menu/>

How to Estimate the Age of an Oak PDF – Woodland Trust

Measuring Trees (height and age) PDF – Newport.gov.uk

Equipment

- magnifying glasses
- ID sheets (see resources)
- Tape measure and/ or string and metre stick

LEARNING
ACTIVITY

2

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DEADWOOD SURVEY - MICRO
HABITS AND LIFE CYCLES
Info

The TCV Deadwood survey is a comprehensive survey you can use in full, or you can adapt it to suit your class, woodland area and timetable.

Deadwood - dead standing trees, fallen branches, logs and stumps - is an important part of the woodland environment. Deadwood is a micro habitat for invertebrates (minibeasts), mammals, birds and fungi, plays a key part in healthy rivers, streams and ponds.

Deadwood provides nutrients for the soil, stores carbon and helps prevent erosion. A healthy woodland area has deadwood at different ages and stages of decay. This activity needs a patch of woodland.

Aim

To investigate and record the deadwood in a woodland area, getting a deeper understanding of tree life cycles and woodland ecosystems.

Activity

Place the learners into groups or pairs and look at your area of woodland or nature area for deadwood. Ask the learners to explore deadwood through the following tasks:

Task 1: Identify the types of deadwood

Task 2: Investigate the surface of the deadwood - what is growing on the outside? What invertebrates or other animals can you see?

Task 3: Investigate inside the deadwood - how soft is it? How far can you push a pencil into it? What is living inside the deadwood?

Questions to ask

- When a living thing dies, is it still part of the life cycle?
- Why might it be important to let deadwood stay on the ground?
- What do you think happens to the deadwood eventually – what does it become?
- What kind of habitat do the woodland invertebrates need (e.g. cool, damp, dark)?
- How have the invertebrates adapted to suit this habitat (e.g. brown/black for camouflage, feelers to find their way in the dark)?

Plenary

Compare findings and discuss. It can be fun to act out the characteristics of invertebrates that live in deadwood, for example to walk like a centipede or curl up like a millipede.

Take a minute together to look up at the trees and listen to the woodland – stretch your arms up high to the tree-tops and imagine your ‘roots’ going deep into the ground, connecting with all the other people and the trees in the wood.

Extension

Creating a deadwood habitat at school, for example by making a pile of branches or small logs in a suitable corner of the school grounds. Use wood from close by – don’t bring wood in from elsewhere to avoid spreading diseases.

Resources:

CV Dead Good Deadwood survey resources – includes tree ID sheet
<https://www.tcv.org.uk/scotland/dead-good-deadwood-survey/>

Woodland Trust Tree Tools for Schools – includes ID sheets
<https://www.treetoolsforschools.org.uk/menu/>

OPAL invertebrate ID guide PDF

Equipment

- TCV Deadwood survey sheets, if using (see resources)
- tree and Invertebrate ID sheets (see resources)
- Pencils, clipboards
- Magnifying glasses

LEARNING INTENTION

To give young people a good scientific understanding of how trees function and how important they are to the climate and biodiversity. This includes investigative science skills such as different ways to explore and identify different species and conservation.

Overview

Within the Science section of our Learning for Trees Learning Materials there are three Learning Activities. These activities take learners on a journey of appreciating the biodiversity found in a single tree or group of trees, what that means for nature and our forests' resilience, and also why it is important to have commercial forestry.

Learning Activity 1 asks learners to investigate a single tree and create a thorough list of species that live on, around, or in the tree. This is an opportunity for learners to expand their knowledge of local wildlife by using identification guides at a level appropriate for them.

Learning Activity 2 is a short activity demonstrating the importance of biodiversity and its impact on resilience. Learners will use groups of items such as coloured pencils to visualise how native and commercial woodlands can be affected by disease or climate change. This can be an opportunity to start increasing the biodiversity of the school grounds.

Learning Activity 3 asks learners to consider what benefits native and commercial forestry give to us, nature, and the country. This is a subjective task and is suited to group discussions where learners can appreciate both forest types, with an understanding that commercial forestry must not be created at the expense of our native forests.

WATCH TREES

All lessons are linked to the Trees Film



POINTERS FOR TEACHERS:

We use both the terms 'woodland' and 'forestry' here. A forest has a higher density of trees and less natural light, whereas a woodland is more spacious. You may wish to share these definitions with your pupils, but explain that both terms are talking about areas with lots of trees.

LEARNING ACTIVITY



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**TREES AND LIFE:
SPRING TO LATE AUTUMN**



Info

One tree can support a huge number of living things including invertebrates (including pollinating insects), birds, plants, lichens and fungi. Although we will only see a small fraction of these at any one time, we still want to give our learners an understanding of how important our trees are in terms of biodiversity.

Activity

The learners will count and note how many living things they can find around a tree. Three groups are best for this activity; they should have at least 10 minutes for each activity and to report back. You can count and identify species at the level appropriate to the group – this activity can be done with younger and older learners. See ID resources to support identification. At the end, explain what biodiversity is and relate it to what they have found.

Task 1: In the Tree – Look into any holes the tree may have, and also give tree beating a go: <https://www.rspb.org.uk/fun-and-learning/for-families/family-wild-challenge/activities/shake-a-tree/>.

Task 2: Around the Tree – How many different living things can the learners count/identify around the tree, both on the ground (anything within arm's reach of the tree will count), within leaf litter or under stones, or even any minibeasts which are flying around the tree?

Task 3: On the Tree – How many living things, touching the tree, can the learners count/identify? This will include moss, lichens, climbing plants (ivy or honeysuckle), birds, and minibeasts.

Extensions: Repeat the activity around a man-made object (lamppost or fence), or a non-native conifer tree.

LEARNING ACTIVITY

2

RESILIENCE AND BIODIVERSITY



Info

A woodland which is more biodiverse will be able to withstand disease, changing climates and invasive species better than woodlands which are less biodiverse. Typically, our native woodlands have a large mix of species, whereas commercial forestry (conifer plantations) have very few species. This has implications for the resilience of those forests, and subsequently also the plants and animals which live there.

Materials

Multiples of the same item in different colours or shapes – for example: lego or coloured pencils. You should have at least five or six different colours/shapes, with three to five in each colour/shape.

Task 1: Explain what biodiversity is by using the definition above and pointing out how your resource is diverse (“Can you see how we have lots of different colours of pencils, with many of each colour? This is a diverse collection of pencils. Imagine that each one is a tree in a woodland, where each blue pencil is one type of tree, and each red pencil is another type, and so on.”)

The learners may want to count and note how many individuals (e.g. pencils), and groups (e.g. colours) they have.



→ *Step 1*

Tell your learners that a disease like ash dieback has removed all of one group of your resource (e.g. all blue pencils). They must collect them and put them aside. How many individuals are left, and how many are gone?

→ *Step 2*

Tell your learners that warmer weather means some of your species are struggling. They have to remove half of their two endangered species (the two groups, e.g. colours, which have the fewest numbers), rounding up. They may want to count how many numbers, and colours, they have left.

→ *Step 3*

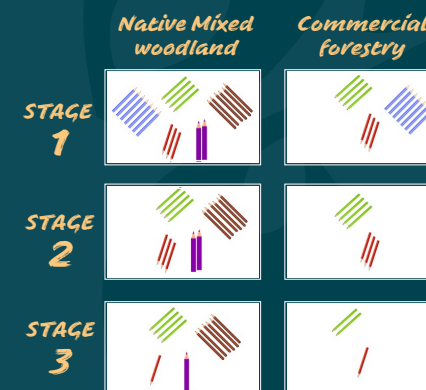
Explain how this could be the same as a woodland which is suffering from disease and a changing climate, but that because we had good biodiversity, the woodland as a whole (i.e. all of your resources as a group) will survive and still provide homes and food to other living things – you can remind the learners of the plants and animals they found in the previous activity.

Task 2: Now explain that you will play this game again, except that they can only have three different colours or shapes. You can explain that this is more like commercial forestry, which is often a monoculture (a single species in an area).

Go through the two steps again, counting how many your group start with and finish with and compare the two results. You may find that you lost more individuals from the first round, but there will be more species left overall. You can ask the learners what might happen if another disease or threat were to affect the commercial forestry – would it have many trees left?

POINTERS FOR TEACHERS:

You may wish to mention how there will be more threats to our wildlife as climate change progresses, emphasising that a more biodiverse ecosystem will be more able to survive this. You can use this to encourage learners to increase the biodiversity in the school grounds, their gardens, or green spaces in their communities by giving nature space to thrive (bird boxes, bug hotels, native wildflowers, garden ponds, tree planting, etc).



LEARNING ACTIVITY

3

WHAT DID COMMERCIAL FORESTRY EVER DO FOR US?

Info

Although the previous activity demonstrates how vulnerable our commercial forestry is, it is good for learners to understand why Scotland has so much of it and the impact it has on our rural economy. However, the importance of commercial forestry being planted in the right place, and that it should not replace mixed, native woodland or other key natural habitats, should be highlighted.

Task: As a class or in groups learners can list things that commercial forests and mixed native forests provides us in two columns. Before the groups get stuck-in, show pictures of a plantation forestry and a mixed broadleaf forest, and identifying local examples if possible.

To help, ask the learners:

- Do you visit nearby woodlands? What do you do there?
- How do you feel when you go to the woods?
- Does anyone know an adult who works with trees? What sort of trees do they work with?
- Will the trees be cut down? What might the trees be made into or used for once cut down?
- What do trees give us while alive?

Some answers you may receive include:

COMMERCIAL FOREST	MIXED NATIVE FOREST
Healthy living: Walking, biking, running, playing, den-building, etc.	Healthy living: Walking, biking, running, playing, den-building, etc.
Wellbeing: Feeling happy, peaceful, playful.	Wellbeing: Feeling happy, peaceful, playful.
Economy: Jobs.	Oxygen, clean air.
Building material or fuel (for fires or biomass boilers).	A lot of nature (these forests are often more established and native).
Oxygen, clean air.	Clean water, flooding prevention.

Extension: Get involved with a tree-planting scheme, take a class trip to a local forest, or ask someone who manages or is involved with a local woodland to speak to your class.

POINTERS FOR TEACHERS:

You may have other suggestions from the learners. What is important to emphasise is that there is more nature found in mixed, native forests, but that the commercial forests are planted to be harvested, so provide jobs and therefore contribute to the economy. There is space for both in Scotland, but commercial forestry covers far more of Scotland than mixed, native forests, which have declined significantly over Scotland's history, and this presents a problem for our natural habitats.

LEARNING INTENTION

To give young people an understanding of and to fire their curiosity about how trees have been important over time for different cultures and across the world and throughout history, as well today, and their role in the future. To share this research and new knowledge through various methods linked to the literacy skills.

Overview

The following Interdisciplinary Learning (IDL) Activities are research-based, where learners are encouraged to reflect on their learning so far on trees.

Following this, learners are asked to work in teams to carry out further research about how trees are viewed in different cultures, including spiritual beliefs, across the world, emphasising the Tree of Life.

There is information that can be shared with learners within the IDL Learning for Trees section. Learners are then asked to present their research in the form of either a poster about trees, a news report style roleplay, or a Powerpoint presentation.

The learning materials are designed to be delivered directly to learners with advice for teachers in the section Pointers for Teachers.

Info

Trees are truly remarkable, aren't they?

In many cultures across the world trees were worshipped and respected as life-giving for centuries before science discovered the way in which they relate to our environment. We now know that they are, indeed, life-giving through their ability to absorb carbon dioxide and emit oxygen, and we know they do this through the process of photosynthesising the sun's rays through their leaves and drawing up the earth's water through their roots. People knew that trees were special and they prayed to them, worshipped them, thanked them and meditated under them. People knew trees were good for wellbeing, they knew they were life givers, not just to humans, but to thousands of insects, birds and animals throughout the trees' lifetime, which for native trees can be over a thousand years. Even after they die, they fall back into the earth and continue to provide habitats, representing the cycles of life, death, regeneration and life again.

WATCH TREES

All lessons are linked to the Trees Film



POINTERS FOR TEACHERS:

Through these activities it will become clear how much information and knowledge about trees the learners have gleaned from the science lessons. The activities aims to be fun and accessible to all learners and their learning styles. However, skills may need to be scaffolded in order to achieve these outcomes for instance how to create a powerpoint, empowering the learners to have the confidence to perform in front of an audience, project their voice and work collaboratively.



In ancient times and even today in some cultures, trees have been given different meanings. These meanings relate to the nature of the tree; what it looks like, how it grows, the biodiversity it supports and its special characteristics. See below for some of the meanings:

Ash Tree – Known in Norse mythology as Yggdrasil, or 'Tree of the World', as their mythology held that a giant ash tree linked and sheltered all the worlds. Today we understand through science about the different habitats created by these trees, with many varieties of insects, birds and animals supported by the ash tree; it is indeed the Tree of the World or Tree of Life.

Silver Birch – As the glaciers of the last ice age receded it was the birch tree that was first to re-establish itself. This is why ecologists refer to birch trees as a pioneer species. In Celtic mythology the birch with its silver bark, is seen as a tree of purification and new beginnings. It was also celebrated at the Celtic festival of Samhain.

Aspen Tree - In Celtic mythology, the visual effect of an aspen trembling in the wind was said to be the tree communicating between this world and the next.

Rowan Tree – The rowan tree is also talked about as The Tree of Life, and was often planted outside houses as it was believed to protect places and people from evil spirits.

Oak Tree - Oak trees are important in many cultures and spiritual practices. In Scotland, Ireland, areas of England and France, the druids (wise

man and women of Celtic society in times gone by) believed that oak trees were sacred and came directly from heaven. They performed religious rituals under them, climbed them to collect their leaves and fruits for medicines, and believed these trees had healing powers. In England the oak tree is associated with the Green Man stories.

In Baltic and Slavic mythology it was believed that some of the gods they worshipped lived in oak trees and they had holy places in oak Forests. For them oak Trees symbolised the living world, while the root system symbolised the underworld.

The Banyan Tree - Another tree known as the Tree of Life, the banyan tree is highly revered in Hinduism. In this religion trees are viewed as living beings which experience emotions such as happiness and sorrow. As Scientists undertake research into how trees communicate they are catching up with some of these old belief systems discovering that in fact this is actually true. Hindus also believe each tree has a tree deity (god or goddess) who is worshipped and people would bring offerings to.

Nearly every culture has some folklore or mythology about the 'Tree of Life'. The stories may vary slightly, but the meaning is the same; trees should be appreciated, looked after and we should be grateful to them. Most trees given the cultural label of 'Tree of Life' are trees native to that country as they are most at home and flourish in the soil and climate. Therefore the 'Tree of Life' is always a native tree.

THE TREE OF LIFE



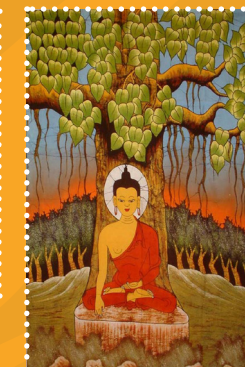
Celtic Tree of Life



Norse Yggdrasil depiction from 1847



16th century Tree of Life, South India



Buddhist depiction of the Tree of Life

LEARNING ACTIVITY

3

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**RESEARCH MORE ABOUT
TREES IN DIFFERENT
CULTURES ACROSS THE
WORLD**

Activity

Research more about the different trees mentioned in the film and share your research with the class through one of the following methods/outcomes:

Task 1: A poster all about trees - use drawing and your very best handwriting to share with others what you have found out about all the different trees you have been researching.

Task 1: Role play - working as a team create a performance or short live news report about trees; this could be about the tree's personality or the science behind trees and how they work. You could have some of your group being trees or each person reporting on different tree types.

Task 3: Powerpoint presentation - working in teams, present your research to the class with film clips, images, diagrams, sound and facts; remember to include the tree stories and the science behind how trees work. You might have different members of your group researching different trees. (Scaffolding skills: How to create a Powerpoint, how to present information in images and words.)

LEARNING INTENTIONS

To use drawing and the expressive arts to share what young people are learning about trees and how they work. The idea is that learners use their imagination to celebrate the beauty, functionality and power of trees.

Overview

Within the Expressive Arts section of our Learning for Trees Learning Materials there are three Learning Activities. The activities relate to previous learning about trees in Outdoor Learning, Science and IDL - RME/Literacy. The learning materials are written to speak directly to learners with 'Pointers for Teachers' section to offer advice to teachers.

The 1st Learning Activity is to design a tree (including the root structure). After learners have designed their tree, they can use annotated notes to show how much they have already learned about the science of trees and how trees function.

The 2nd Learning Activity explores how other artists have been inspired by trees and shows examples of famous paintings of trees. Then the learners are asked to create an expressive, imaginative painting of their own of the 'Tree of Life'.

The 3rd Learning Activity is to research the ephemeral (temporary) artworks made from autumn leaves by artist Andy Goldsworthy. Then learners are asked to create their own leaf artworks in an outdoor learning area or community woodland.

WATCH TREES

All lessons are linked to the Trees Film



POINTERS FOR TEACHERS

You may want to show the 'Trees' film at the beginning of the Design a Tree Challenge or show images of how the 'Tree of Life' is portrayed in different cultures, etc. To get the best results, encourage learners to embed their learning about trees into their design but also encourage them to be imaginative. If the tree is a rainbow-coloured tree then that's fine, or if it talks or sings that's also fine. It should be playful and fun but also embed the learning so far. Ideally, everyone's trees will be different, just like each learner is unique and different from each other. No tree is the same (I sometimes say this at the end of the lesson).

LEARNING ACTIVITY

.....

DESIGN A TREE FOR THE FUTURE



Info

Remember all the amazing things you have already learned about trees? Now you know about trees combatting climate change and creating a healthy environment for all life on earth. You know the things trees need in order to help support many different lifeforms, as well as each other. Your teacher will show you some images of how trees and particularly the 'Tree of Life' are important in different cultures and spiritual beliefs around the world and how they appear in those cultures.

Task 1: Working individually or as part of a team, on an A3 sheet and using pencils and coloured pencils or felt tips, create a 'tree for the future'. First discuss all the amazing things trees do and then work on A2/A1 paperwork together to design a 'tree for the future'.

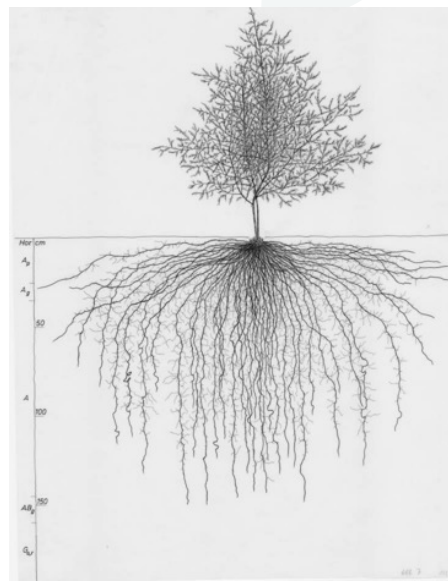
Task 2: When designing the tree try to include all the incredible things trees do such as taking in carbon dioxide and releasing oxygen into the environment. Fill the paper with your tree and remember to include the trees root system so your drawing shows how the whole of the tree works. What life/biodiversity will your tree support? You can show this in your drawing? Also, you or your group might use notes to describe how your tree works and how it connects to the environment through sunlight and water.

Task 3: Does your tree have a personality and feelings? Can you communicate this through the way you draw it, the type of lines and colours you use? Be as imaginative as you can - there are no rules in art!!

Extension: Design a forest/woodland area. What kind of trees will there be in your woodland? Are they native or non-native trees? Or coniferous trees? Your forest/woodland may be for a real place near your school or even in your school grounds.

Did you know that through the ground and the inter-connected web of roots, trees are said to communicate with each other? In fact, there is emerging research that there is a 'mother' tree that sends messages to the trees around it, distributing water and nutrients to younger trees.

Examples of tree drawings in various styles, showing root systems and foliage:



LEARNING ACTIVITY

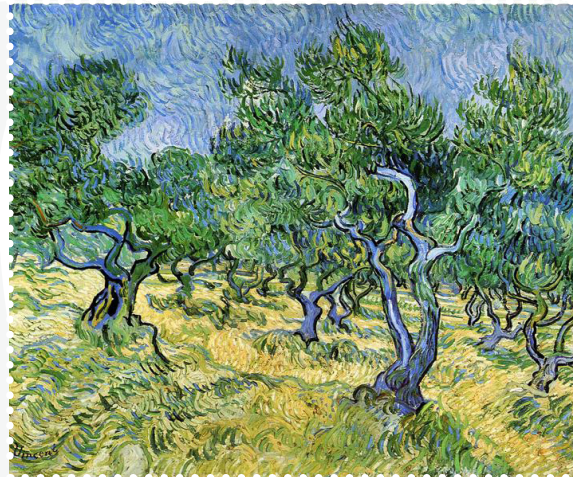


.....
VIEWING AND DISCUSSING
PAINTINGS AND CREATING
YOUR OWN VERSIONS

Info

How do artists depict and respond to trees in their artwork?

Artists through time have been inspired by the character, energy and visual qualities of trees.



Vincent Van Gogh used oil paints, water colour and line drawing to create artworks depicting the French landscape. The vibrant, surreal colours express emotion, bringing the landscape to life, the olive trees in this painting look like they are moving across the land towards us.

Van Gogh led this style of artwork called "Expressionism".

Olive Grove by Vincent Van Gogh, 1889



Gustav Klimt created a decorative style of 'Tree of life' using oil paint in gold hues. Inspired by the 'Tree of Life', it has two female figures on either side of the painting. If you look carefully you can also see a blackbird and mushrooms within the tree's design.

Klimt was a key artist in the 'art nouveau' movement.

The Tree of Life by Gustav Klimt, 1905

Your teacher will show images of tree-inspired paintings on a large screen and will have class discussions about the scale of the paintings, the materials used, the scale of the paintings, when they were created, what art movement the paintings are linked to and what the artist was trying to convey through their work.

Task 1: Research Gustav Klimt's 'Tree of Life' (1905) and Vincent Van Gogh's 'Olive Grove' (1889) and discuss the scale....

Task 2: Now you know more about these tree-inspired art works, choose your favourite and experiment and explore the painting techniques the artist used to create the artworks. Find a tree that inspires you and do some pencil sketches of the tree. You can create a small sketch book for this experimental work.

Task 3: In a second session create a painting using similar painting techniques to your favourite of these artists' work using poster paint or acrylics on white card (A3)

Extension: To experiment with paint to create your own painting style and your own Tree of Life inspired artwork. The paintings we have researched were created over 120 years ago, before people knew about the science of trees and how they work, and well before we were aware of the 'climate crisis'. Often trees were depicted on the land but we didn't see their roots or the life they support.

Let the knowledge you now have about trees inspire your artworks and create an imaginative 'Tree of Life' artwork relevant for 2023.

POINTERS FOR TEACHERS

Take one of the learners's sketches of their favourite tree from the first session then do a demonstration for Van Gogh and for Klimt's painting technique for your learners. Encourage the learners to be brave and that nothing is ever wrong in art! Emphasise and encourage individual responses to the artworks so everyone's painting is unique and different. We suggest the learners work on card as paper would buckle with experimental painting.

LEARNING ACTIVITY



.....
**NATURE ART - BEST CARRIED
OUT IN AUTUMN**

Nature Artist

Andy Goldsworthy uses nature as a medium to his art. He creates artwork in the environment, playing with colour, line, texture, contrast, light and shade to create beautiful ephemeral (temporary) artworks that make us look at nature more closely and notice its beauty. Many people see Andy's work through photographs he takes of these temporary artworks. Much of his temporary work is created near his home in Dumfries and Galloway.

Andy works all over the world in cities like Hong Kong, London, Berlin and New York, bringing nature into galleries through his photographs.



'Green to Yellow Leaves' by Andy Goldsworthy



'Sycamore Tree', Andy Goldsworthy, 2013.

Your teacher will share with you some images of Andy Goldsworthy's ephemeral abstract artworks created using autumn leaves.

Task 1: You can have a whole class discussion about the materials used and how Andy uses colour, composition and line in his artworks.

Task 2: Go into an area of woodland, or the playground if you have a nature area, and create your own leaf-inspired artworks. Either work alone or in groups, working in groups will enable you to create larger artworks.

Task 3: Once you have completed your work, borrow the school camera or ipad and take some photographs of the nature artwork. Does it look better as an images than it does in real life?

Task 4: Have a walk around the woodland area looking at everyone's artworks and reflect on how they make you feel. Do they use contrast and colour? Are you really painting with leaves?



POINTERS FOR TEACHERS

Encourage learners to work in the abstract like Andy Goldsworthy as this will be better for their learning and allow them to really observe nature while creating the artwork rather than creating a 'thing'. A fun activity at the end of the lesson is to ask the learners how they felt while making the artworks (usually they will say happy or relaxed, as they are in nature). You might want to emphasise that they can make nature art anytime or just go into nature to relax and feel rejuvenated.



GRASSLANDS

All lessons are linked to the film Grasslands



To view



Subtitled

Learning for Grasslands

Overarching Learning Intentions

The aim of this package of lessons linked to the film 'Grasslands' is to help young people understand how grasslands work and how much they do for our natural environment. The lessons aim to give young people an empathy and wonder about the magic and beauty of grassland and also its role in supporting biodiversity, combatting climate change and contributing to their health and wellbeing.

INTRODUCTION

'Grasslands' shows how the Threave landscape restoration project is allowing the recovery of key grassland habitats such as wildflower meadows, encouraging a diversity of insects, birds, and wildlife.

Healthy grassland is vital to biodiversity, as well as carbon and water storage, and maintains soil health. Grassland that is depleted by overgrazing and over-fertilisation leads to poorer land and animal health long-term, and increased water run-off that can contribute to flooding.

To help restore the grassland, the project is using 'holistic planned grazing', which moves cattle and sheep across the land in a way that allows the grass

and soil time to recover between grazing and is sympathetic to the time of year and the way the land and wildlife is responding.

The project is using cutting-edge technology in the form of GPS collars for the livestock (<https://www.nofence.no/en-gb/>). The invisible boundaries are programmed in using an app. When the livestock comes near this 'fence' they hear a noise – if they keep going they get a small electric pulse, teaching them where they can and can't graze. The farmer can change where the boundaries are as needed. This has also allowed the project to take down 8000m of the old fencing on the reserve, opening up the landscape and allowing wildlife to move freely.

POINTERS FOR TEACHERS

This series of interdisciplinary lessons/learning activities cover 2nd and 3rd level curriculum areas of Science, Outdoor Learning and IDL/ Expressive Arts.

They are best presented to young people after watching the 'Grasslands' film as it gives an introduction to grassland/ meadows and pollinators. The lessons are suggestions and to be interpreted by teachers creatively and in relation to learners' knowledge and needs. The lessons can be taught as part of a Learning for Sustainability/ IDL topic or independently by subject.

CURRICULUM LINKS

SCIENCE	TECH/HWB	LITERACY	EXPRESSIVE ARTS/ SOCIAL STUDIES
SCN 2-01a - I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction.	TCH 2-05a - I can investigate how product design and development have been influenced by changing lifestyles.	LIT 2-04a - As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes.	EXA 2-03a - I can create and present work that shows developing skill in using the visual elements and concepts.
SCN 2-02a - I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.	TCH 2-07a - I can make suggestions as to how individuals and organisations may use technologies to support sustainability and reduce the impact on our environment.	LIT 2-05a - As I listen or watch, I can make notes, organise these under suitable headings and use these to understand ideas and information and create new texts, using my own words as appropriate.	EXA 2-05a - Inspired by a range of stimuli, I can express and communicate my ideas, thoughts, and feelings through activities within art and design.
SCN 2-02b - Through carrying out practical activities and investigations, I can show how plants have benefited society.	HWB 2-26a - I am experiencing enjoyment and achievement on a daily basis by taking part in different kinds of energetic physical activities of my choosing, including sport and opportunities for outdoor learning, available at my place of learning and in the wider community.	LIT 2-06a - I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.	EXA 2-07a - I can respond to the work of artists and designers by discussing my thoughts and feelings. I can give and accept constructive comment on my own and others' work.
SCN 2-03/3-03a - I have collaborated in the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use.	MNU 1-03a - I can use addition, subtraction, multiplication and division when solving problems, making best use of the mental strategies and written skills I have developed.	LIT 2-07a - I can show my understanding of what I listen to or watch by responding to literal, inferential, evaluative and other types of questions, and by asking different kinds of questions of my own.	SOC2-08a/3-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible. I can identify the possible consequences of an environmental issue and make informal suggestions about ways to manage the impact.

SCIENCE	TECH/HWB	LITERACY	EXPRESSIVE ARTS/HWB
SCN 2-17a - Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses.		LIT 2-25a - I can use my notes and other types of writing to help me understand information and ideas, explore problems, make decisions, generate and develop ideas or create new text. I recognise the need to acknowledge my sources and can do this appropriately.	SOC 3-08b - I can consider the advantages and disadvantages of a proposed land use development and discuss the impact this may have on the community.
SCN 3-01a - I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.		LIT 2-26a - By considering the type of text I am creating, I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.	SOC 3-10a - I can investigate the climate, physical features and living things of a natural environment different from my own and explain their relationship.
SCN 3-05b - I can explain some of the processes which contribute to climate change and discuss the possible impact of atmospheric change on the survival of living things.			SOC 2-13a/3-13a - I can explain how the physical environment influences the ways in which people use land by comparing my local area with a contrasting area. By comparing settlement and economic activity in two contrasting landscapes, I can reach conclusions about how landscapes influence human activity. I can explain my findings clearly to others.
SCN 4-01a - 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.		LIT 2-28a - I can convey information, describe events, explain processes or combine ideas in different ways.	
SCN 4-12b - Through investigation, I can explain how changes in learned behaviour due to internal an external stimuli are of benefit to the survival of species.			

Outdoor Learning

LEARNING INTENTION

Young people gain an experiential first hand understanding of grassland habitats through observation, exploration and investigation. They develop their connection with local grassland areas, and can identify actions that could support and improve grassland habitats.

Overview

The Outdoor Learning activities for 'Grassland' are designed to give teachers and outdoor educators a starting point for successful learning in the outdoor environment. They can be adapted to suit the site you have available and the time of year, and also list equipment and resources to aid preparation. There is a link to a risk benefit assessment that covers the outdoor learning sessions, which you can adapt if required. We hope all of these will be useful either directly or as inspiration and support for taking learners outdoors.

Relevant Topic/IDL links

Minibeasts, Living Things, Habitats, Environment, Ecosystems, In the Garden.

Time of year

Spring/summer - term four and term one

Site

Any area of grass! Ideally, the potential to compare two or more grassland areas that have different uses and management, for example a playing field, a grass verge or less frequently mown area, and/or grassland in a nature reserve or relatively untouched area. To focus on invertebrates, a larger area of summer grassland will give more interest and variety. Areas can either be close to each other to enable comparisons to be made on the same day, or if further apart they can be visited on different different days and then the observations compared. Remember to get landowners' permission and check any environmental or wildlife conservation restrictions first (see Risk Benefit Assessment in the panel to the right).

WATCH GRASSLANDS

All lessons are linked to the 'Grasslands' film



LINKS

Safety

Risk Benefit Assessment

Warm-up activity - settling into the outdoor environment

Sound map - see Warm-up activity sheet

LEARNING ACTIVITY



.....

INVESTIGATING GRASSLAND HABITATS – GRASSLAND HEALTH INDICATORS (SOIL AND PLANTS)

Info

Healthy grassland has a wide variety of plants with healthy leaves and strong roots that lock carbon into the soil and help the soil absorb water. It supports a wide variety of invertebrates, including pollinators, as well as larger animals and birds.

Like all habitats, grassland's health is dependent on soil health. It takes hundreds or thousands of years to create healthy soil, but over-grazing, over-use of fertilisers, lack of plant diversity and compaction by machines and animals all degrade soil quality very quickly.

The 'Grasslands' film shows how efforts are being made to improve soil health by changing how often and when cattle graze the land. To assess how well this is working, regular monitoring of soil and grassland health is carried out.

Aim

To assess the health of an area of grassland, looking at soil and plant health and diversity. To compare the health of different areas of grassland.

Activity

Split the class into smaller groups. Each group is given a quadrat (see Resources in sidebar on the next page), to place in a different area of grassland. If possible, find a site with a variety of different types of grassy areas, for example a playing field or mown area next to a verge or unmown area - or spend some time in one then move to a different location.

Demonstrate first - place the quadrat on the ground, looking closely at the area within the quadrat.

Use the Grassland Health Scoring Sheet (see resources sidebar on the right) to help assess the health of your area.

Give your area of grassland a health score. Compare with other areas - what do you think influences the health of your patch?

Plenary

Gather round and compare scores. Ask the learners to try to predict the scores of different areas first, if applicable.

In turn, share what you have observed and something you have discovered from the activity.

Resources

The World Beneath our Feet
- connecting soils and the curriculum PDF - Smarter Scotland

Meadow ID Guide PDF - Save our Magnificent Meadows

Grassland Health Scoring Sheet

Equipment

- Quadrats - something to mark out an area 1m² or another consistent size, for example metre sticks, string and pegs, hula hoops
 - Trowels or small garden forks
 - Bottles of water, cup to measure 100ml
 - Rulers
 - Grassland Health Scoring Sheets
 - Pencils/pens/clipboards
-

LEARNING
ACTIVITY

2

.....
INVESTIGATING GRASSLAND
HABITATS – GRASSLAND
BIODIVERSITY (MINI-SAFARI)
Info

Grassland and meadows support a huge variety of invertebrates, mammals, birds and micro-organisms, which are all essential parts of our ecosystem, and food webs. Some creatures, for example some species of butterflies and bees, are indicator species - these help tell us a lot about how healthy our wider environment is.

When monitoring our grassland, we do surveys of pollinators, butterflies, dragonflies and invertebrates every year.

Aim

To investigate the different life an area of grassland supports, particularly invertebrates. To enjoy spending time in grassland.

Activity

Place learners into groups, or work as individuals. Their task is to hunt for invertebrates (minibeasts) in the grassland area. Encourage them to look very carefully and get right down among the grass. If they find something, they can gently tip or move it into a collection pot using a soft paintbrush, for a closer look.

Task 1: Sweep-nets - demonstrate how to sweep the nets gently through long grass, then carefully investigate the contents, tipping or brushing gently into collection pots.

You might expect to catch leaf-hoppers, true bugs, beetles, shield bugs, grasshoppers, day-flying moths.

Task 2: Pitfall traps – see ‘How to Make a Pitfall Trap’ in resources – these are easy to make and can be made in the morning and checked in the afternoon, or made in the evening and checked in the morning.

When checking the trap, carefully lift it out of the hole and gently tip the contents into a light-coloured tray or large tub. Gently investigate what has been caught – you might expect to catch grubs or larvae, beetles and spiders.

Task 3: Recording – ask the learners to draw what they have found, either on individual pieces of paper or one big sheet. This is a great way to encourage them to look carefully. Ask them to make notes around the drawing – where they found it, the colour, any other observations. They can use the ID sheet to find out what it might be.

Let the invertebrates go where you found them, being careful not to keep them in tubs too long, especially on a warm day.

* Do not put slugs or snails into a pot with other creatures – they can get stuck in the slime!

Questions to ask

- What do you notice about it? What else..?
- Why might it be that colour?
- What part of the grassland does it live in?
- What challenges do you think it might face?
- What might eat it?
- What might it eat?

Equipment

- Sweep nets if available (large fine gauge nets with short handles) for long grass
- Trowels or small forks
- Magnifying glasses
- Small paintbrushes for moving invertebrates
- Small tubs for looking at invertebrates
- ID sheets (see Resources section on the next page)

Plenary

Gather round the drawings that have been made. In turn, ask learners to point to a drawing they like or are curious about. Ask them why they like it or find it interesting.

Ask learners questions like “What was the most interesting thing you found today? Why?”

Extension

These drawings can be taken back into the classroom to form part of a grassland wall display.

Resources:

Meadow ID Guide PDF – Save our Magnificent Meadows

Invertebrate ID Guide PDF – OPAL

Scottish Butterfly ID chart PDF – Butterfly Conservation

How to make pitfall trap
<https://www.bnhs.co.uk/youngnats/to-do/build-a-pitfall-trap/>

There are many more invertebrate ID resources online to suit different ages and stages

LEARNING INTENTION

These learning experiences focus on the importance of grazing levels to our grasslands. There is a 'right amount' of grazing which brings the most benefits to biodiversity, soil health, and land management, depending on the climate and location. We will use art, maths, and games to understand how we can change our grazing practices across the world for the better.

Overview

Within the Science section of our Learning for Grassland Materials there are three Learning Activities. These activities consider how important grassland diversity is, and how effective low intensity grazing can be used to benefit this important habitat.

Learning Activity 1 asks learners to map and categorise a natural outdoor space using descriptive words and colours. Does their map look like a mosaic of micro-habitats, or big blocks of colour – and what might that mean for biodiversity?

In **Learning Activity 2**, learners will use maths to understand how farmers can manage cattle to benefit the grassland biodiversity. With the right number of cattle, for the right length of time, farmers can increase the health of the habitat.

Learning Activity 3 will help learners to understand how cows can be managed without fences, using technology, as described in the film. They will alter playground games to see how their behaviour can be learned and changed, just like it was for the cows.

WATCH GRASSLANDS

All lessons are linked to the Grasslands Film



POINTERS FOR TEACHERS

Since these lessons talk about grazing and cattle, there may be some questions from pupils or even parents, especially in rural areas with a big farming economy. The evidence linking intensive grazing to loss of soil is readily available, but you can also get in touch or point them to a regenerative farming network to find out more. There is one for Southwest Scotland, and a quick internet search will find them..

LEARNING ACTIVITY



GRASSLAND DIVERSITY

POINTERS FOR TEACHERS

Older pupils can identify the most popular species in each square and use that for their key instead. You could also measure each square of the graph paper using quadrats (2 1m sticks can measure this out if you have no quadrats). If doing it this way, pupils shouldn't colour in squares that are mostly manmade structures – e.g. pavements. See how much area is blank at the end.

Info

Pupils will use graph paper to block a map of a local grassland (the school grounds may work), developing a key of descriptive words.

Task 1: Pupils explore the site that they will map and categorise areas depending on physical characteristics. Encourage them to use descriptive words like yellow, lush, or short. Each word will be part of their key and will relate to a colour.

Task 2: Explain to pupils that they will use graph paper to create the map, using the key developed. Each square should be one colour, depending on the most prominent characteristic of the area it corresponds to. You may need to help pupils decide a scale (one stride could be one square, and make sure pupils can orientate their map by assigning a corner of the graph paper to a corner of the site). This can be done collectively, all with the same key, and put together to create a giant map – or individually. You can discuss at the end what they found, if they observed more of nature and diversity than usual, and how they think their map might look if they did it in, for example, a car park or a nature reserve. What might those differences mean for the biodiversity of those areas?

LEARNING
ACTIVITY

2

.....
GRAZING CAPACITY
Info

Each unit of grassland has a maximum number of cows it can support, as the Grasslands video showed. This depends on how long the cattle will be grazing in the area, but also how productive and diverse the area is. If you overgraze an area, you can damage the soil underneath – but if you graze an area the right amount, you can build soil, which is important for our future.

Task 1: Remind the pupils about the film. Explain to them that a healthier and more biodiverse grassland will build the amount of soil in the grassland over time. Ask them if they know what soil is made of (organic matter plus inorganic matter – basically, dead plants and animals or poo, and broken-down rocks or shells). Soil can take hundreds of years to form even as much as 1cm. Unfortunately, it only takes one or two years to damage or lose it – and the way that humans now farm often removes rather than builds our soil. We need to manage our land right to make sure we have soil for the future.

Ask the pupils to work through the Grazing Capacity Maths sheet and answer the questions as best they can. You can change the numbers and create your own version to suit the level of the pupils – just make sure to replace all of the same numbers and make sure the best field for grazing is the wildflower meadow in the sun (field 3).

The pupils should find that grazing on wildflower meadows with the right number of cows gives us the best results. But if we keep our cows on any land in our examples for too long, they will overgraze and damage the soil!

LEARNING ACTIVITY

3


LEARNED BEHAVIOURS

Info

Animals can respond to new things in their environment, which keeps them safe or benefits them. Pupils can also demonstrate learned behaviour – as we will find out!

Task 1: Ask the pupils why we might want to remove fences in our farmland and countryside. If they're not sure, remind them of the film. If they had fences on the edge of that paper, could wildlife easily move through their fields? Unfortunately not! But we must still be able to stop our cattle from overgrazing land or we will lose our soil, so we have to come up with a new way of keeping our cows in one place. Does anyone remember the neck collars from the video and how they worked? If not, explain that the collar warns the animal with a noise and then a small shock follows if the cow goes beyond the boundaries that are created via an app that the farmer can use. The cows learn to associate the noise with the shock, and so move away from the invisible boundaries to avoid the shock – they have learnt to alter their behaviour. Let's play a game in the school grounds to show pupils how that happens.

Task 2: Go outside and tell the pupils to stand behind a line or landmark. Then choose a child to be 'it' (or 'the monster'), and all the other children have to move towards the person who is 'it' (the person stands about 15 metres away, facing the opposite direction, and freezing whenever that pupil turns around. If they are still moving, the pupil names them and they go back to the start. It is important in the first couple of goes that there is no clue when the pupil turns around – they can do it at any time! The first pupil to reach the 'monster' becomes the monster for the next round.



Task 3: Once the pupils have completed a few rounds, tell them that from now on the monster must roar before turning around. You may need to practice to make sure the monster knows they can only turn AFTER they roar! Play this for a few rounds.

Task 4: Ask the pupils how they changed their behaviour once the monster roared – hopefully they will say that they knew to stop when the roar happened. Explain that they have developed ‘learned behaviour’. They learnt that a roar meant they had to freeze, even if the monster hadn’t turned around quite yet. They responded to a change in their environment by changing their behaviour – and that kept them (hopefully) safer!

Now apply this to the cows. The cows have learnt that the sound from their collars meant that they would soon get a shock, so they backed away even if they couldn’t see a fence.

Extension Activity

Ask the pupils to change another playground game to make the class learn a new behaviour, or even to make one up!

Expressive Arts / IDL / Literacy

LEARNING INTENTION

To build up an understanding about biodiversity in grasslands and how this has changed through time. Through a series of creative activities and looking at how artists have depicted grasslands in the past, we will build up an understanding and empathy for the natural world.

Overview

The Threave Landscape Restoration project aims to re-establish a variety of species in their grasslands. The following series of lessons are interdisciplinary with a creative focus on the tasks to evoke understanding and empathy.

Learning Activity 1 encourages learners to look at paintings from the 19th century by the French artist, Claude Monet. Then learners are asked to compare the biodiversity and variety of wild flowers and grasses to modern day grasslands through a series of creative tasks.

Learning Activity 2 focuses on how animals use the grasslands and explores, through a series of playful tasks, grasslands from an animal's perspective.

Learning Activity 3 is linked to the new "no fence" technology used at the Threave Nature Reserve for its herd of native Galloway cows. It encourages problem-solving and improvement of the existing technology and the use of "cow collars".



WATCH GRASSLANDS

All lessons are linked to the Grasslands Film



POINTERS FOR TEACHERS

In the film, Hew talks about the feeling of running through a wild meadow. Depending on where your young people live and how the fields are farmed, many young people may not have experienced running through a meadow. So, it might be worth taking them to a meadow near the school (there will be considerations such as nesting birds and landowner's permission – see Outdoor Learning section) or showing them a clip from a film of young people running through a flower meadow. You can also show your young people paintings of wild flower meadows from the past. The 19th century artist Claude Monet painted the landscape as it was in 1870s. This illustrates how much biodiversity there used to be in our grasslands.

LEARNING ACTIVITY



.....
EXPRESSIVE ARTS/HEALTH

Activity

To find out a little more about grasslands in the past let's do some research into the landscapes painted by Claude Monet. First, do an image search on the internet for Monet and have a really close look at the meadows in his paintings. Can you see lots of different flowers and grasses? Find out when and where the paintings were painted. How many years ago were they painted? Do the fields around where you live look like these paintings or have they changed from the past?

Task 1: Make a powerpoint and share your discoveries about meadows in the past with the class.

If you have fields close to your school, you could compare a grazed field which has lots of cattle in it with a meadow. If you don't have access to fields you can compare the fields of now with the fields from the past using images in your powerpoint.

Now re-watch the 'Grasslands' film - what do the fields look like in the film? So, if the fields around where your school is don't look like the Monet paintings of meadows have a think, share, and discuss within your group why most of our fields don't look like that anymore.

Task 2: Monet was a very famous artist and was part of a painting movement called the Impressionists. He used a technique of painting that helped communicate the changing light and colour within a landscape which used dots or sweeping marks of different coloured paint to describe the interaction of light and colour.

Using watercolour paints on thick A2/A3 paper, create a wildflower meadow like the one seen in the film or Monet's paintings. Through different marks made on the paper describe the variety of flowers and grasses. Try to create in your painting the very best meadow in Scotland or even the world!! You could also collaborate with your research group on the creation of a bigger painting, perhaps compete with other groups to see who can create the biggest and the best.

Task 3: Discussion – think about cows grazing on a field that is mostly green grass, then think about what it must be like to be a cow grazing on a meadow full of different types of grasses, flowers and herbs. Think about your diet if you ate just one type of food how would that make you feel? Would you feel as healthy as you would by eating a varied diet of lots of different vegetables, salads, fish, bread and meat? How does a varied diet make you feel?

POINTERS FOR TEACHERS

Try to make sure your young people constantly change the water they are using for their watercolour paintings, so it doesn't get muddy. If possible, encourage them to use soft brushes. It is suggested that you could have a little bit of experimental paper to try techniques with water and paint marks. For instance, they can also use sponges and wet the paper a little before putting the marks and colour onto the page.

LEARNING
ACTIVITY

2

.....
IDL/SCIENCE/LITERACY
Info

Watch the 'Grasslands' film. Did you notice all the amazing insects, birds and wildlife in the film? What animals did you notice who lived in the meadows or who depended on the rich variety of grasses, flowers, and soil for habitat and for food? Did you hear all the insects in the film? Let us try to imagine what it is like to be one of those animals or insects.

Task 1: Close your eyes and imagine you are a bumble bee flying through a diverse grassland full of lots of lovely flowers and herbs. What does the grassland look like from your perspective (viewpoint)? What does it smell like? What does it sound like? What is your job as a bee? Do you have any predators you need to be looking out for?

Then imagine yourself a different type of animal – a hare perhaps, or a cow. Or a bird who uses grasses to build their nest. Close your eyes and imagine being all these animals. What are they thinking? Feeling? Experiencing?

Task 2: Blog/Diary Writing – now you have imagined what it might be like to be one of these animals, insects, birds and flowers who live within the grasslands. Let's help other people imagine with you, can you help them be that animal too? You can do this through the following creative learning activities.

Choose an animal/bird/insect and write about your day as if you were telling the story.



For instance, if you were a cow, what is it like wearing the collar and what is the funny beeping sound you hear before you get a strange tingle from the invisible fence? In your blog remember to set the scene by saying who you are, where you are, and describe what is around you. Then tell us about your day. What do you eat? Who are your friends are? How are you feeling? What is it like when you interact with other animals, insects or humans?

To help you imagine, you might want to draw a picture first and then write your blog or you might want to write the blog first and then draw an illustration to go with it.

Suggested Format – typed as a digital file or handwritten like a diary page.

Task 3: Cartoon strip – your teacher will show you what a cartoon strip looks like. There are boxes for drawings that sit next to each other to tell a story. Sometimes the drawings have speech bubbles coming out of the character’s mouths. Now have a go and create a cartoon strip of a day in the life of a cow, bee or ground-nesting bird.

Suggested Format – A3 pencil and paper, you can use coloured pencil if you want.

Task 4: News Report – you will need to work as part of a pair. Imagine you are a news reporter for the BBC News who is visiting this grasslands restoration project. Ask the other person to choose an animal e.g. a cow. Now imagine you are a news reporter interviewing that animal. Imagine that animal can communicate with humans. What would they say? How would they answer the questions you ask? What questions would you ask? You can make it funny or serious, it is up to you. Now either record the news interview and play it back to the class or perform the news report in front of the class. You may need to write a script or practice it a little first.

When other people read your blog, diary page, cartoon or news report, they will be able to see the world as a cow too or other animal too.

POINTERS FOR TEACHERS (TASK 1)

This is an exercise that helps your young people get into the “creative zone” and fosters empathy for the animals and how they live and survive. It also helps encourage imaginative thought in terms of different perspectives on an environment or inter-species.

POINTERS FOR TEACHERS (TASK 2)

The drawings don’t need to be perfect it is really an exercise for young people who prefer drawing to be able to imagine what it is like to be one of the animals, insects or birds. You can question them as they are drawing so they expand their thinking as they are creating the cartoon strip.

LEARNING ACTIVITY

3

TECHNOLOGY

POINTERS FOR TEACHERS

It would be great to lead a class discussion on how the technology of the cow's collar works and its impact on the restoration of grasslands. The activities are a suggestion but might help young people better understand the technology behind the collars. Learners may have never seen an instruction sheet before so it might be an idea to bring some sheets in for them to look at as well as show them some images from the work of product designers or inventors.

Info

Watch the 'Grasslands' film again and listen very carefully to how the cow's collars work. This is cutting-edge technology that is just in its early stages of being tested. Have a group or class discussion about the use of the collars and the technology behind them. Think about how the collars work. How do the cows know how to keep their distance from the fences? If you were a cow what would you think of the collar? Why are the collars good for the restoration of grasslands? How do they help the environment and help wildlife thrive?

Task 1: Make a diagram or poster explaining how the collars work and how they are good for encouraging meadows to grow and supporting other wildlife and plants.

Suggested Format - A4/A3 paper and coloured pencils.

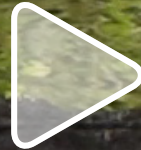
Extension Activity

Can you design a better collar for the cows to wear? How would it work? Can you improve on the existing design to make its technology and design even better for the environment and the cow? Create an instruction sheet with drawings and notes to describe how your collar would work.



WATER

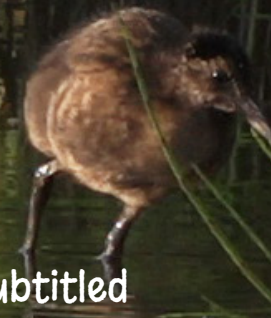
All lessons are linked to the film Water



To View



Subtitled



Learning for Water

Overarching Learning Intentions

The aim of this package of lessons linked to the film 'Water' is to help young people understand how water is integral to habitats, biodiversity and life. The lessons will give young people an understanding and reminder of the role of water in nature and for a variety of species. The IDL learning experiences focus on rivers and streams and how important clean water is for all life, including humans across the world.

INTRODUCTION

Water shows how the Threave Landscape Restoration Project is supporting the recovery of key wetland and freshwater habitats on Threave Nature Reserve.

Healthy wetlands are vital to biodiversity, carbon and water storage and are one of the most endangered habitats in the world. Wetlands have been depleted by drainage and flood management practices over time, reducing the habitats and the wildlife that depends on them but also in many cases causing an increase in flood damage due to decreasing how much water can be absorbed naturally into the landscape.

Healthy streams and rivers are also key to biodiversity. Management practices such as 'canalisation' (straightening a stream or river) as well as a reduction in the amount of trees along waterways causes these habitats to degrade and the freshwater life become increasingly vulnerable to pollution and temperature change.

To help restore the freshwater habitats, the project used hydrology mapping to predict the effects of change in water flow, then breached the old flood wall along the riverbank in two places, allowing the wetlands to flood naturally. It also took measures to restore the Mill Burn, introducing obstacles to mimic a more natural variety of water flow and depth, and planting along the bank of the burn. The changes will be monitored as the project progresses.

POINTERS FOR TEACHERS

This series of interdisciplinary lessons/learning activities cover 2nd and 3rd level curriculum areas of Science, Outdoor Learning and IDL including Social Studies, Health and Technology. They are best presented to young people after they have watched the 'Water' film ([link above](#)) and had an introduction to the science of water. The lessons are suggestions and should be interpreted by teachers creatively and in relation to learners' knowledge and needs. The lessons can be taught as part of a Learning for Sustainability/IDL topic or independently by subject.

CURRICULUM LINKS

SCIENCE	SOCIAL STUDIES/TECH	LITERACY	EXPRESSIVE ARTS/HWB
<p>SCN 2/3/4-01a - I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction.</p> <p>I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.</p> <p>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.</p>	<p>SOC 2-07B - I can describe physical processes of a natural disaster and discuss the impact on people and landscape</p>	<p>LIT 2-04a - As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes.</p>	<p>EXA 2-04a - Through observing and recording my experiences across the curriculum, I can create images and objects which show my awareness and recognition of detail.</p>
<p>SCN2-02a - I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.</p>	<p>SOC2-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible.</p>	<p>LIT 2-05a - As I listen or watch, I can make notes, organise these under suitable headings and use these to understand ideas and information and create new texts, using my own words as appropriate.</p>	<p>EXA 2-05a - Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through activities within art and design.</p>
<p>SCN 2-02b - Through carrying out practical activities and investigations, I can show how plants have benefited society.</p>	<p>SOC 2-08b/3-08b - I can describe the advantages and disadvantages of a proposed land use development and discuss the impact this may have on the community.</p>	<p>LIT 2-06a - I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.</p>	<p>EXE 2-06a - I can develop and communicate my ideas, demonstrating imagination and presenting at least one possible solution to a design problem.</p>

CURRICULUM LINKS (CONTINUED)

SCIENCE	SOCIAL STUDIES/TECH	LITERACY	EXPRESSIVE ARTS/HWB
SOC2-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible.		LIT 2-07a - I can show my understanding of what I listen to or watch by responding to literal, inferential, evaluative and other types of questions, and by asking different kinds of questions of my own.	EXA 2-09a - Inspired by a range of stimuli, I can express my ideas, thoughts and feelings through creative work in dance.
SOC 2-08b - I can consider the advantages and disadvantages of a proposed land use development and discuss the impact this may have on the community.		LIT 2-28a - I can convey information, describe events, explain processes or combine ideas in different ways.	HWB 2-26a - I am experiencing enjoyment and achievement on a daily basis by taking part in different kinds of energetic physical activities of my choosing, including sport and opportunities for outdoor learning, available at my place of learning and in the wider community.
SCN 3-01a - I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.	TCH 2-09a - I can extend and enhance my design skills to solve problems and construct models.		HWB 2-35a - When preparing and cooking a variety of foods, I am becoming aware of the journeys which foods make from source to consumer, their seasonality, their local availability and their sustainability.
SCN 3-05b - I can explain some of the processes which contribute to climate change and discuss the possible impact of atmospheric change on the survival of living things.			
SCN 2-14a - By investigating the lifecycles of plants and animals, I can recognise the different stages of their development.			

Outdoor Learning

LEARNING INTENTION

Young people gain an experiential, first-hand understanding of how freshwater ecosystems work through observation, exploration and investigation. They develop their connection with local areas of water/wetlands and can identify actions that might support or improve water habitats.

Overview

The Outdoor Learning activities for 'Water' are designed to give teachers and outdoor educators a starting point for successful learning in the outdoor environment. They can be adapted to suit the site you have available and the time of year, and also list equipment and resources to aid preparation. There is a link to a risk benefit assessment that covers the outdoor learning sessions, which you can adapt if required. We hope all of these will be useful either directly or as inspiration and support for taking learners outdoors.

Relevant Topic/IDL links include

Water, Living Things, Habitats, Ponds, Rivers, Minibeasts, Weather and Climate, Ecosystems

Time of year

Spring/summer - term four and term one. Freshwater life is more abundant in spring and summer. Kick-sampling should not be done between late autumn and spring (see below).

Site

A pond or area of stream or burn that is shallow and easily accessible. Remember to get landowners' permission and check any environmental or wildlife conservation restrictions first.

WATCH WATER

All lessons are linked to the Water Film



LINKS

Safety

Risk Benefit Assessment

Warm-up activity - settling into the outdoor environment

Rainfall symphony - Warm-up activity sheet

LEARNING ACTIVITY

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INVESTIGATING FRESHWATER HABITATS – POND DIPPING OR KICK SAMPLING

Info

A healthy pond or stream needs shade, and different habitats within it – for example, shallow parts and deeper parts, fast flowing parts and slow flowing parts (eddies), deadwood and plants for food and nutrients. If water is too warm (lack of shade along the banks) or acidic (pollution, acidic run-off from commercial forestry) then water life can't survive. For example, if the water is too acidic it can stop salmon eggs from hatching properly, and fry and parr (young fish) won't survive if the water is too warm.

Freshwater invertebrates are important indicators of water health. You can use the OPAL resources with these activities to explore this further and measure water health.

Aim

To find freshwater invertebrates and use them to help assess the health of the pond or stream.

Task 1: Pond Dipping – have your trays to hand with some pond water already in them. Young people gently dip nets in and scoop out what they catch into the tray. It's a good idea to get clumps of pondweed and debris/sediment into the trays, and gently sift through them. Take lots of time to examine the contents of the trays – often smaller shrimps in larvae will be hard to see initially. Poking through the contents of the tray can be very absorbing.

Using the OPAL ID guide, record what you find on the OPAL recording sheet and use scoring to indicate water health (for a younger class, you can omit this and instead use the simpler Pond Dipping ID sheet to record what you find using tally marks).

Gently empty trays back into the water and rinse trays, nets, wellies and other equipment thoroughly under a tap as soon as possible.

Task 2: Kick sampling in streams or burns – *this should not be done between late autumn and early spring as you can disturb fish redds (egg laying sites). Get landowner permission first and ensure it is not a protected areas i.e. SPA, SAC, etc. Local fisheries organisations or ranger services can help identify appropriate areas (see Risk Benefit Assessment), and may be able to do the activity with you.

Stand in shallow moving water (burn or shallow river) and gently kick/disturb the bottom of the water with your feet, for one minute. You can also carefully lift up and replace rocks to dislodge what's underneath. Have a partner hold a net 50 centimetres to 1 metre downstream of where you disturb the waterbed to catch whatever is dislodged.

Tip into a tray to examine as above. It is useful to have some deeper buckets or tubs with more water in them for any small fish, etc, you might find.

Be gentle and slow in movements, for safety and to avoid disturbing creatures and churning up water more than necessary.

Record what you find using the OPAL scoring to indicate water health. Gently empty trays back into the water and rinse trays, nets, wellies and other equipment thoroughly under a tap as soon as possible.

* American signal crayfish (ASC) – these are an invasive species rapidly colonising rivers and streams in Scotland. They eat native fish eggs and fry and destabilise riverbanks by burrowing. It is illegal to purposefully trap or move them, and if caught they should be destroyed. The larvae can travel on equipment or footwear and pass to other water areas – all equipment should be properly cleaned out, disinfected on-site, and left to dry out entirely before being used again. If you are kick-sampling in an area where they are, we advise doing so with an organisation who can take charge of any ASC dispatching should they be caught – for example a local Ranger service or fisheries organisation.

Resources:

OPAL Aquatic Invertebrate ID guide

OPAL Amphibian ID guide

OPAL freshwater scoring sheet (in OPAL booklet)

Pond Dipping ID sheet (for younger learners)

Equipment

- fine gauge nets (rock pool nets are fine)
- sample trays (any white or light-coloured trays for example Gratnell trays)
- smaller tubs or pots for example ice cream tubs
- magnifying glasses
- freshwater invertebrate ID sheets (laminated!) – see Resources
- OPAL freshwater scoring sheets – see Resources
- pencils, clipboards

LEARNING ACTIVITY

2

.....

INVESTIGATING
FRESHWATER HABITATS
- HEALTHY HABITAT
CHARACTERISTICS

Aim

Aim to look at different characteristics of the water area and assess what could be improved - this can be done alongside Activity 1.

Task 1: Exploring the pond or stream - exploring and observing the water area together, discuss its features.

Questions to ask

- Describe the pond or stream - what does it look like? What does it smell like? Do you think it's natural, or made by people? Why?
- Is the water high or low, deep or shallow? Are there areas specific where the water is shallower, or deeper?
- (For streams) is the water fast or slow? Are there areas where the water is slower, or is it all the same?
- What is along the edge? Are there shaded areas? Are the banks high and steep?
- Where might this water come from?
- What might contaminate water and make it less healthy for plants, animals and humans?

Task 2: Testing the acidity of the water – take a sample of the water in the beaker and use the pH strip to test the acidity. Note this on your OPAL record sheet from Activity 1, if using.

Plenary

Gather together and ask learners some of the observations they have made about this pond or stream. In turn, ask them one thing they could do, or share with others, to help keep water habitats healthy.

Extension

Watch the excellent short film 'Riverwoods' (www.scotlandbigpicture.com/riverwoods) about rivers in Scotland, how they are under threat and what can be done to help them.

Link to discussion about larger bodies of water – lochs, or the sea. How does pollution, temperature change, etc, affect life in these places?

This is also an ideal opportunity to introduce water safety: there are many local and national organisations able to give talks about water safety RNLI – <https://rnli.org/safety>, Scottish Fire and Rescue – <https://www.firescotland.gov.uk/your-safety/outdoors/water-safety/>

Equipment

- pH testing strips (these can be easily sourced from secondary school biology classes)
- beakers or small tubs

LEARNING INTENTION

These learning experiences focus on using art and movement to visualise and underpin scientific concepts of how most species need water to survive. Species adapt to thrive in their environment, and we will look closely at aquatic adaptations. These lessons are aimed at second level but can be adapted for first level or third level.

Overview

Within the Science section of our Learning for Water Materials there are three Learning Activities. These activities will help learners understand our aquatic species, how they are adapted to thrive in their watery environments, and what their life in water is like.

In **Learning Activity 1**, learners will look at ways in which our aquatic life is adapted to the water. They will begin to link features of species that they can see with success in their environment. Using art, learners will create their own creatures with adaptations to further embed their understanding.

In the shorter **Learning Activity 2**, learners will see how some species depend on the water for some or all of their lifecycle and consider what might happen to the species if areas of the water they depend on suddenly disappear.

Finally, in **Learning Activity 3**, learners will create a water food chain in groups with a level of specificity appropriate to their age. They will begin to understand concepts such as energy loss and how toxic chemicals or microplastics become concentrated along the food chain, if suitable for their learning level.

WATCH WATER

All lessons are linked to the Water Film



POINTERS FOR TEACHERS

Adaptation is the process of change by which an organism or species becomes better suited to its environment. An adaptation is the heritable trait that helps an organism survive and reproduce in its environment.

LEARNING ACTIVITY

.....

WADING AND SWIMMING ADAPTATIONS

Info

All species are adapted to their environment, which helps them to survive and thrive. We can often see how they are adapted by looking and using a bit of logic.

Task 1: It is recommended to begin with the World Wildlife Trust's (WWT) great resource on waterfowl adaptations if your class is not familiar with this topic.

Task 2: Pupils can copy and label pictures of other animals seen in the films (or, if you have done pond dipping, from them) such as water boatman and caddisfly larvae, and think about how they could be adapted to their environment (see table below). You can have pictures on the board or print-outs for them to copy from.

WATER BOATMAN	CADDISFLY LARVAE
Long oar-like legs for swimming	Encased to provide camouflage
Front legs which can grab food	Encased to provide protection
Dark colour to blend in with water surface	Encased to be more streamlined so can survive strong currents
Long legs help them to stay on water surface	Legs can grab onto things on river bed to move them



Task 3: Pupils can create (via drawing or arts and crafts) their own animals that are perfectly adapted to life in or on water, again labelling their features.

Extension

If the class have already completed the Water food chains (activity 3), they can create new animals through this activity to fill those roles (using the 'general food chain' as a guide). Encourage pupils to name, label, and choose a habitat for their creations.

LEARNING ACTIVITY

.....

LIFECYCLES OF OUR RIVER ECOLOGY

2

Info

All living things have a life cycle which includes their birth, growth to maturity, reproduction, and death. Some living things will have several life stages where they can look very different and live in very different environments. All environments are important to protect and conserve as we never know what might be living in them (a ditch, puddle, watery hole in the ground, etc). Let's learn to recognise stages of the mayfly development.

Task 1: Pupils fill out the mayfly lifecycle worksheet using online references: 1, 2 - they can write information on each stage using the internet as well. The pupils should draw a swarm of adult mayflies for the last square (mating dance).

Task 2: Once completed, ask the pupils to stand behind their chair and decide on movements for each stage of the lifecycle and then dance through the lifecycle in one go!

Task 3: Ask the pupils where they think the mayfly might live during each stage and if they all live and if they all live in the same habitat (the answer is no). What happens if the habitat of one part of this life cycle is altered or removed? Pupils may suggest they can find somewhere else, or that they might struggle to survive or even die - this is all correct and the discussion can move onto why it is so important to protect all habitats, as they each play a role for many species!

Extension

Draw a similar life cycle poster for salmon - there are plenty of references online.

LEARNING ACTIVITY

.....

WATER FOOD CHAINS

Info

Energy flows through our food chains from the sun, the producer, and the consumers - but at each stage energy is lost via mating, hunting and growth, which has implications for the numbers of living things at each subsequent stage of the food chain, and also how toxic chemicals can affect those at the final stages.

Task 1: Your pupils will draw six parts of the food chain (below) in a group - one pupil will draw both the sun and one other part. Put pictures up on the board for them to draw from if helpful.

General Food Chain (younger pupils)	Specific Food Chain (older pupils)
Sun	Sun
Plant	Algae
Small insect (6 legs)	Mayfly larvae
Large insect (6 legs)	Great diving beetle
Fish	Salmon
Bird	Heron

Task 2: Once drawn, pupils can arrange them in the order of the food chain. Explain how energy moves up the food chain. You can use the words “producer,” “primary consumer” and so on, if suitable. Then ask your pupils to fold in half everything past the plant. Ask them to fold in half again everything past the first insect, and so on. The heron should have been folded 4 times (see image on right). Explain that although energy travels through the food chain as shown, less and less gets to the end as each animal uses it to grow, hunt, mate and so on.

– Ask: How the heron will get enough food to survive?

Answer: The heron must eat quite a few fish to survive.

– Ask: How many herons do they think might be in the food chain, and how many small insects?

Answer: There will only be a few herons, but many insects.

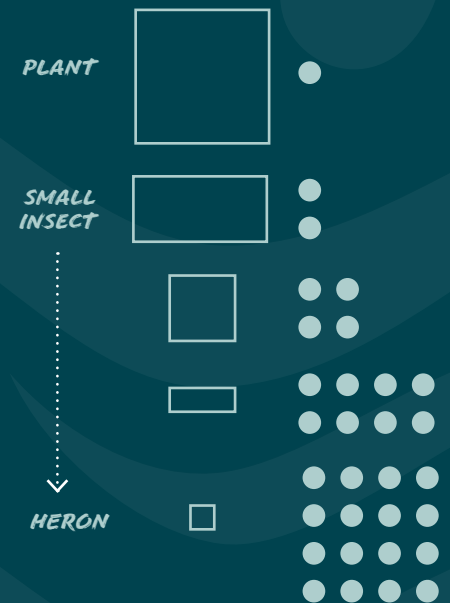
Task 3: Demonstrate how toxic chemicals or microplastics become concentrated along the food chain (“bioaccumulation”) by using sticky dots, or colouring in dots on the paper. Because each part of the food chain must eat multiple of the level below, each part doubles the toxin and therefore the dots. The plant starts with one toxin to represent chemical fertilisers that are often used in our farming. The heron will end up with 16 toxins. You could use this to practice maths and ask them to times by three or so on instead. What does this mean for the heron? It might get sick, and it might not be able to hunt or mate because of it.

Extension activity

Research chemical fertilisers, herbicides and pesticides. Research potential alternatives such as organic farming, companion planting (e.g. “nasturtium companion plant” – nasturtiums are easy to grow and all parts of them are edible although strong in flavour, which can be a fun classroom activity!).

Resources:

A set of six sheets of A5 paper for a group of five.



IDL/Social Studies/Health/Technology

LEARNING INTENTION

Young people will explore how streams and rivers flow through the landscape, experimenting through model-making to form an understanding of how water flows and carves the geography of places. They will investigate the impact of water on the environment as a result of climate change and how climate change might affect our environment in the future. Lastly, they will learn about the UN Rights of a child to access clean water.

Overview

The following IDL focused Learning Materials explore rivers and then how important water is to our lives and how climate change is affecting water flow and access to water around the world.

The first Learning Activity draws inspiration from the film 'Water' and looks at water flow in rivers and the impact of straightening a river's flow. Then they ask learners to work in groups to make a model of a river and the landscape it flows through, from its source to the sea.

The second Learning Activity explores the impact of climate change on rivers, biodiversity and water flow. This lesson would suit upper primary and goes into third level learning.

The Third Learning Activity explores the importance of clean water to life on earth. Through a series of suggested links the learners can explore the importance of water across the world.

(These learning materials are written to talk to learners directly).

Info

Watch the film clip on water. This film clip shows us how a landscape restoration project is restoring its water through allowing the river to flood as it wants to naturally. They are also putting in obstacles such as rocks into the streams to encourage the stream to curve around the landscape again, as it did in the past.

You will see from the film that ecologists, who are sort of nature scientists, are exploring what type of species of fish and insects live in the river and streams. Can you remember what kind of fish they would like to see in the streams and river in the future?

WATCH WATER

All lessons are linked to the Water Film



POINTERS FOR TEACHERS

The Outdoor Learning and Science sections of these learning materials allow your learners to get a really in-depth understanding of water. It would be really useful to spend some time with your learners exploring the knowledge they already have about water and then to reflect on what they have learned so far before embarking on the learning in this section which is focused on geography and health.

LEARNING ACTIVITY

.....

WATER FLOW

Introduction

In nature rivers create the landscape form. The water roars through the landscape over thousands of years, making river valleys, water falls or meandering rivers like the River Dee in the film.

People in the past tried to control where rivers and streams naturally wanted to go because of different types of land use at the time. They created straight rivers and streams. Do you know why people wanted to straighten the rivers? Do you think a straight river is more prone to flooding than a meandering river? Shall we find out? Let's experiment...

Task 1: Recreating a River – do you have a sand pit in your playground? Or some loose soil and rocks? Think about the journey a river makes from starting up in the hills to flowing down into the valley and then flowing out into the sea. Can you use the loose soil, stones and found objects to create a landscape for your river.

First start by creating a river with lots of bends and curves. Work together in a group moulding the soils or the sand and creating a space for your river. Then take a jug of water and test it to see where your river goes.

Then straighten the river through the valley, so the river flows from the high hills in a straight line down to the sea.

Alternative Classroom Activity for Task 1

Rather than create the model of the river out of stones and sand in the playground, you could make a model inside the classroom. This could be made with chicken wire for the land, covered in paper and then covered in PVA (to make it slightly waterproof). It could be made in mini form using a plastic tray as a base or you could make sections in a series of old plastic trays and then put them together. If the plastic trays were not needed again, you could drill holes in either end to allow water to flow from the higher one into the lower one. Half the class could create a straight river and the other half could create a meandering river.

Task 2: Prediction – what do you think will happen when the river is straightened? Do you think the river will flow slower or faster?

Well let's see shall we? Pour a jug of water on the hills and see where the river flows...

Task 3: Compare and Contrast – which river flows the fastest? Is it good the river flows fast? What are the advantages and disadvantages of a straight, fast flowing river and a slower, meandering river?

Working in groups and using your wipe board, compare the advantages and disadvantages of the two types of rivers:

POINTERS FOR TEACHERS

Don't worry about mess while the rivers are being created. You can ease mess concerns by covering desks with plastic sheets and running the pouring of water in the two rivers outside in the playground.

Advantages

Straightened River	Meandering River

Disadvantages

Straightened River	Meandering River

Task 3: Working in a group with a large sheet of A1 paper, design your perfect river: Where would it start? What kind of trees, plants and animals would live along your river? What kind of life would it sustain? What kind of fish, insects and birds would it support? How would you ensure it was healthy water? Would it be healthy for fish? And insect life? Well let's see shall we? Pour a jug of water on the hills and see where the river flows.

Suggested Format: Use coloured pencils to draw and make notes or use descriptive words to create a map of your perfect river. If you and your class has access to magazines, you could also use collage to create your maps

**POINTERS FOR
TEACHERS**

Don't worry about mess. Suggest the whole class has a discussion about the film and the effects of fast flowing rivers on insects and fish. Then introduce the idea of flooding and what type of river is most likely to flood. Then ask your learners to consider the impact of flooding on humans and on insects, birds, plants, grasslands and habitat.

You could ask learners to do Task 3 and then have the discussion, this might help you assess how much knowledge they already have or have gleaned from the film. Then ask them to go back and add anything else they can think of that has come up as a result of the discussion.

LEARNING ACTIVITY

.....

CLIMATE CHANGE

2

In the film they mentioned that the flood dykes along the river Dee were taken down so the river could flood again, creating more of a meandering river with great habitats for insects, fish and birds.

Introduction

Rivers, water and climate change are linked. In Scotland it is predicted that we will have more extreme weather in the future. This is already starting to happen with storms, flooding and droughts. A river meandering down a river valley is less likely to create flooding than a straight river. A river with more plants growing in it and other obstacles slows down the speed the river flows which also helps stop flooding.

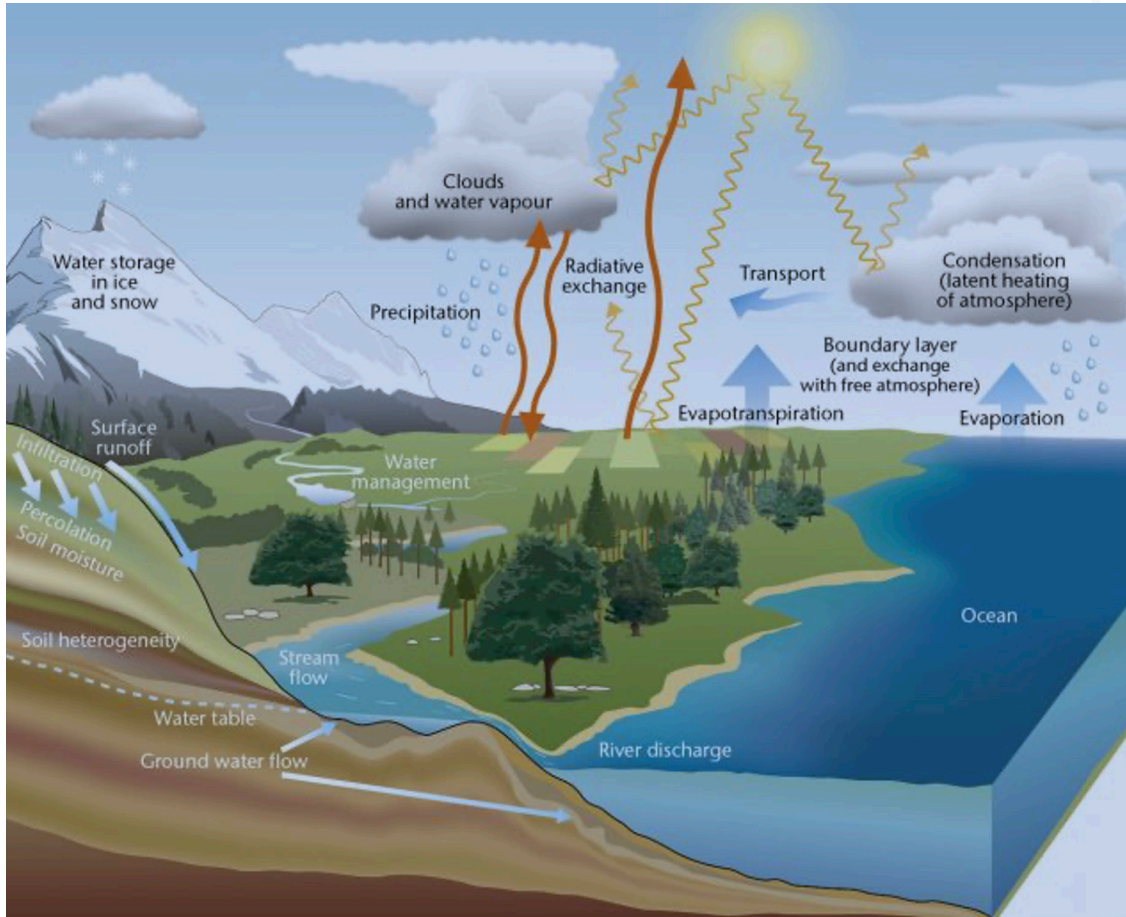
Our world is connected, what happens in Scotland can have an impact on rivers here and across the globe. For instance, if the water temperature goes up, sadly, fish might die and then the birds and animals who eat fish don't have anything to eat. Humans also eat fish so we might have to change our diet too. If you want to find out more about the impacts of climate change please follow the links on W22.

Water and climate change are inextricably linked. Climate change affects the world's water in complex ways. From unpredictable rainfall patterns to shrinking ice sheets, rising sea levels, floods and droughts - most impacts of climate change come down to water ([UN Water](#)).

Climate change is exacerbating both water scarcity and water-related hazards (such as floods and droughts), as rising temperatures disrupt precipitation patterns and the entire water cycle ([UNICEF](#)).



Task 1: Creating a Diagram



POINTERS FOR TEACHERS

Many of the examples of diagrams online are complex and use complicated descriptive words. We suggest that you do an example diagram or maybe more than one diagram to demonstrate how to communicate the information in diagram form creatively. Allow a creative response and then encourage the young people to use labels or descriptive notes. The drawing of the diagram is a learning process so it doesn't need to be visually perfect and it can be "loose" in style.

Using your model or outdoor experiment as inspiration, create a diagram showing how climate change is affecting water levels and water temperatures in rivers. You can show how this is impacting on the lifecycles of insects, fish and birds.

Suggested Format: A3 paper and coloured pencils.

LEARNING ACTIVITY

3

.....
UN RIGHTS OF A CHILD/
HEALTH AND WELLBEING

Introduction

The United Nations makes good rules that apply to all people across the world to provide a fair and equal world. They also have a special charter about the Rights of the Child.

“The right to water entitles everyone to have access to sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic use.”

How does drinking water make you feel? Does it feel good? Did you know the recommended amount of water for you to drink every day to stay fit and health is 6–8 cups of water? Your body is made up of 70% water so it's important to keep feeding it water, which like food, is important health-giving fuel.

Unfortunately, not everyone has access to clean drinking water – to find out more, follow the links below:

https://www.un.org/en/climatechange/science/climate-issues/water?gclid=CjwKCAjw__ihBhADEiwAXEazJgZaFR8P8icMbl2VLA8WGaM-EAyNmG3Yn7rqpm5cjHjpcZaALTbRyxocsAQAVD_BwE

<https://www.unwater.org/water-facts/human-rights-water-and-sanitation>

<http://childrensrightseducation.com/2-water.html>

Task 1: Brainstorm Solutions – why is water not clean? Where is it not clean? Why is there not enough water in some countries?

Can you think up some great solutions to how the whole world can get access to clean drinking water? First spend 5/10 minutes discussing your ideas. Then working in a team, brainstorm ideas for solving the global water crisis?

Suggested Format: A3 paper and coloured pens or pencils. One person writes down the ideas of the group.

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**POINTERS FOR
TEACHERS:**

Climate change and water shortages across the world can be difficult for young people to hear therefore it is important to be mindful about not causing them anxiety. This is why it is very important to empower learners to explore solutions to these challenges.

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BIODIVERSITY

All lessons are linked to the film Biodiversity



To view



Subtitled



Learning for biodiversity

Overarching Learning Intentions

The aim of this package of lessons linked to Biodiversity is to help young people understand how biodiversity is integral to life. The lessons will give young people an understanding and reminder of the role different species have in ecosystems and how this variety and interconnectedness is vital for all life on our planet.

INTRODUCTION

The film 'Biodiversity' shows examples of plant, animal and insect life at Threave Nature Reserve, and how the Threave Landscape Restoration Project is supporting biodiversity by creating better habitats for more species to thrive.

Biodiversity is vital to the health of our planet, including food production and climate change mitigation. It is recognised that we are currently facing a biodiversity crisis as well as a climate crisis, and the two are very much linked. Changes in land use and the reduction of natural habitats over many years, as well as stressors such as disease

and temperature change, have resulted in a decline in biodiversity globally and in Scotland.

Healthy levels of biodiversity require healthy habitats such as those being restored at Threave Nature Reserve, and in other projects across the country – habitats such as wetland, healthy grassland, mixed woodland as well as peatland, heathland, machair and others.

Key to supporting biodiversity is the focus on how everything is interdependent, and finding ways to balance human activity with protecting and restoring the conditions nature needs to thrive.

POINTERS FOR TEACHERS

This series of interdisciplinary lessons/learning activities cover 2nd and 3rd level curriculum areas of Science, Outdoor Learning and IDL/ Expressive Arts. They are best presented to young people after they have watched the 'Biodiversity' film and had some introduction to the concept of ecosystems and how plants and animals depend on each other, for example through food webs and habitats. The lessons are suggestions and should be interpreted by teachers creatively and in relation to learners' knowledge and needs. The lessons can be taught as part of a Learning for Sustainability/IDL topic or independently by subject.

CURRICULUM LINKS

SCIENCE	MATHS/HWB/TECH	LITERACY	EXPRESSIVE ARTS/ SOCIAL STUDIES
<p>SCN 2-01a - I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction. 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.</p>	<p>HWB 2-26a - I am experiencing enjoyment and achievement on a daily basis by taking part in different kinds of energetic physical activities of my choosing, including sport and opportunities for outdoor learning, available at my place of learning and in the wider community.</p>	<p>LIT 2-04a - As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes.</p>	<p>SOC2-08a/3-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible.</p> <p>I can identify the possible consequences of an environmental issue and make informal suggestions about ways to manage the impact.</p>
<p>SCN 2-02a - I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.</p>	<p>TCH 2-11a - Representing ideas, concepts and products through a variety of graphic media.</p> <p>I can use a range of graphic techniques, manually and digitally, to communicate ideas, concepts or products, experimenting with the use of shape, colour and texture to enhance my work.</p>	<p>LIT 2-05a - As I listen or watch, I can make notes, organise these under suitable headings and use these to understand ideas and information and create new texts, using my own words as appropriate.</p>	<p>SOC 3-08b - I can consider the advantages and disadvantages of a proposed land use development and discuss the impact this may have on the community.</p>
<p>SCN 2-02b - Through carrying out practical activities and investigations, I can show how plants have benefited society.</p>		<p>LIT 2-07a - I can show my understanding of what I listen to or watch by responding to literal, inferential, evaluative and other types of questions, and by asking different kinds of questions of my own.</p>	<p>SOC 3-10a - I can investigate the climate, physical features and living things of a natural environment different from my own and explain their relationships.</p>
<p>SCN 2-03 - I have collaborated on the design of an investigation into the effects of fertilisers on the growth of plants. I can express an informed view of the risks and benefits of their use.</p>	<p>MNU 1-03a - I can use addition, subtraction, multiplication and division when solving problems, making best use of the mental strategies and written skills I have developed.</p>	<p>LIT 2-25a - I can use my notes and other types of writing to help me understand information and ideas, explore problems, make decisions, generate and develop ideas or create new text.</p> <p>I recognise the need to acknowledge my sources and can do this appropriately.</p>	<p>EXA 2-05a - Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through activities within art and design.</p>

CURRICULUM LINKS (CONTINUED)

SCIENCE	MATHS/HWB/TECH	LITERACY	EXPRESSIVE ARTS/ SOCIAL STUDIES
SCN 2-17a - Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses.			EXA 2-07a - I can respond to the work of artists and designers by discussing my thoughts and feelings. I can give and accept constructive comment on my own and others' work.
SCN 3-01a - I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution.			EXA 2-08a - I can explore and choose movements to create and present dance, developing my skills and techniques.
SCN 3-05b - I can explain some of the processes which contribute to climate change and discuss the possible impact of atmospheric change on the survival of living things.			EXA 2-09a - Inspired by a range of stimuli, I can express my ideas, thoughts and feelings through creative work in dance.
SCN 4-01a - 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.			EXA 2-16a - I can sing and play music from a range of styles and cultures, showing skill and using performance directions, and/or musical notation.
SCN 4-12b - Through investigation, I can explain how changes in learned behaviour due to internal and external stimuli are of benefit to the survival of species.			EXA 2-17a - I can use my voice, musical instruments and music technology to experiment with sounds, pitch, melody, rhythm, timbre and dynamics.

Outdoor Learning

LEARNING INTENTION

Young people gain an experiential first-hand understanding of biodiversity through observation, exploration and investigation of plant and animal life in a given area. They understand the importance of biodiversity in relation to food webs and interdependence. They develop their connection with the local natural environment and can identify actions that might support or improve biodiversity.

Overview

The Outdoor Learning activities for Biodiversity are designed to give teachers and outdoor educators a starting point for successful learning in the outdoor environment. They can be adapted to suit the site you have available and the time of year, and also list equipment and resources to aid preparation. There is a link to a risk benefit assessment that covers the outdoor learning sessions, which you can adapt if required. We hope all of these will be useful either directly or as inspiration and support for taking learners outdoors.

Relevant Topic/IDL links include

Living Things, Environment, In the Garden, Ecosystems, Trees, Minibeasts, Life Cycles

Time of year

Spring to autumn initially - later in term three, term four or term one, but it can be very useful to repeat at a different time of year for comparison.

Site

Anywhere outside, but an area that is a wildlife habitat will produce more results - this can be done alongside any of the other outdoor activities in this pack. Remember to get landowners' permission and check any environmental or wildlife conservation restrictions first (see Risk Benefit Assessment).

WATCH BIODIVERSITY

All lessons are linked to the biodiversity Film



LINKS

Safety

Risk Benefit Assessment

Warm-up activity - settling into the outdoor environment

Who Am I? - Warm-up activity sheet

LEARNING ACTIVITY

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BIOBLITZ – DISCOVERING AND RECORDING BIODIVERSITY

Info

A BioBlitz is an informal and fun way to get a snapshot of the biodiversity in a given area over a given time. BioBlitzes can be a big event, involving many different groups, and often run over 24 hours. However, they are also a great way to involve young people in discovering and recording nature over a shorter timescale - the information recorded may not be entirely accurate or comprehensive, but the process will be valuable and, especially if repeated or compared with other areas 'BioBlitzed' in the same way, will produce interesting results. Creating a way to record the information is also a useful exercise and can be explored beforehand in the classroom.

BioBlitzes are also a great way to involve parents and other members of the community, and can be easily advertised as an event.

Aim

To carry out a BioBlitz, recording as much life as possible, as accurately as possible, within a given area and time.

Activity

The BioBlitz will need some planning, which can be done beforehand with the class.

Task 1: You will need to decide:

- where and when the BioBlitz will take place
- how long for
- how you will record what you find
- will everyone record everything, or will different groups look for different things, e.g. plants, invertebrates, mammals..?

You may decide to do a short practice session first, then make tweaks as necessary. It is helpful to keep the area small – e.g. an area of woodland, or school nature garden. Alternatively, you can use quadrats or mark out an area to give each child or small group a patch to BioBlitz.

Task 2: Allow enough time for learners to really look, and perhaps different methods like pitfall traps and tree beating (see resources), but short enough to keep their attention – it's not a race, but a concentrated effort to really investigate and observe as much as possible.

You can adapt your method of recording to suit the age and stage of the learners – for example, you might use a tick-sheet or tally-sheet with pictures of insects, plants, birds and animals commonly found in the area you will be in. Or you can use broader categories like 'Bugs with six legs', 'Bugs with more than six legs', 'Birds', 'Flowers', etc. Or you can ask young people to photograph or draw what they find.

Task 3: Using 'Seek' – if you have the capacity to do so, you might want to try the version of nature recording app iNaturalist designed for younger users called Seek (see resources). This allows you to photograph what you find using a phone or tablet, link to the iNaturalist database to receive ID information, and record your finds on a class database. Unlike the iNaturalist app, it doesn't record your location or send the information to the ecological records centre – however, there is an option for the teacher to do so should you wish your finds to be logged.

'Seek' is a great way to engage young people with nature via technology, and an entry point into citizen science activities.

Plenary

Write a note of thanks or a wish for the tree you have been focusing on – this can be done on (ideally) recycled card and tied to the branches of the tree. Or just ask each participant to verbally thank their tree or find a word to describe their tree.

Resources:

BBC Wildlife BioBlitz
Beginner's Guide
<https://www.discoverwildlife.com/how-to/identify-wildlife/bioblitz-beginners-guide-how-to-get-started/>

Seek – a nature ID and recording app for young people, by iNaturalist -
https://www.inaturalist.org/pages/seek_app

How to Tree-Beat, RSPB
<https://www.rspb.org.uk/fun-and-learning/for-families/family-wild-challenge/activities/shake-a-tree/>

How to make a pitfall trap

Equipment

- pencils, paper and clipboards
- recording sheet
- magnifying glasses
- tablets or phones if using Seek
- quadrats or area markers e.g. hula hoops if using (see below)



Extension

Tree planting at school or in the community. There are lots of local tree-planting initiatives across the country, and you may also find help to purchase trees through the Woodland Trust. You can research the best types and placement of trees using some of the knowledge the class have gained from investigating trees and woodlands. The best time of year for tree planting is October to March. Tree seeds such as acorns and ash keys can also be gathered and planted in pots in Autumn/Winter.

Track a tree through the seasons, for example by drawing, photographing or filming the tree.

The 'Tree Tools for Schools' website (see resources) has lots of tree-related films and activities.

LEARNING INTENTION

These learning experiences focus on using creative thinking to relate to local biodiversity, and to understand the process of how biodiversity can develop and evolve.

Overview

Within the Science section of our Learning for Biodiversity Materials there are three Learning Activities. These activities give learners an appreciation of the vast biodiversity around us and how it has developed – and what happens when it is threatened.

Learning Activity 1 asks learners to consider why common names have been chosen for their species, and to apply that knowledge to each other and the nature around them. By naming something for its colour, behaviour or defining characteristics we can become familiar with, and notice more of, the species around us.

Learning Activity 2 is a short activity demonstrating how biodiversity came to exist by using the iconic example of Darwin's finches. This links the adaptations that species have developed to thrive in their environment to evolution and therefore biodiversity.

Learning Activity 3 engages learners with the concept of ecosystem webs and the biodiversity inherent in even small areas of nature local to us. Learners will see the implications of stressors like disease or climate change on an ecosystem and, with a teacher's help, will understand their own role in nurturing biodiversity by protecting nature.

WATCH BIODIVERSITY

All lessons are linked to the biodiversity Film



POINTERS FOR TEACHERS

A lot of the species on this planet are small, and so we often don't notice biodiversity without paying close attention to the nature around us. There are almost as many species of ladybirds as there are mammals – around 6000! Try to instil a love and respect for even our smallest insects during these activities. They're thought to make up about 50-70% of the world's biodiversity, after all.

LEARNING ACTIVITY

RENAMING


Info

The common (everyday) names we use for nature are often very descriptive – some of the examples from this film include treecreeper and ‘meadow brown butterfly’. Can pupils guess what animals and plants might be like based on some names, and can they come up with anything better?

Task 1: First, taking examples from the film, ask pupils to think about how the names describe the species. Other names from the film include the spotted flycatcher, willow warbler, song thrush, creeping thistle – can they think why these species have been called those names? A dictionary or thesaurus may be useful here.

Task 2: Encourage pupils to rename themselves or those sitting next to them based on physical characteristics and personalities – you may want to remind them to be positive only and, if using appearance only, refer to characteristics which pupils have control over like coat or shoe colours, for example.

Task 3: Next, ask them about some other names in the film that perhaps are not so clear. chaffinch, ash tree, greylag goose – are these as descriptive? Sometimes names aren’t as helpful, so now the pupils will get a chance to rename parts of wildlife they know (and may have seen in other workshops during identification activities or outdoor learning). Go outside and start easy with the most recognisable species such as daisy or clover. Build up to the appropriate level for the pupils’ knowledge, and then go one step further and find species they don’t know the name of and rename them too! They may be able, in the future, to



recognise the species by sight and their new name even if they don't know the 'real' common name. Don't be put off if you don't know the name of the species - the point of this activity isn't to identify something but to be able to recognise it even if seen in another area.

Extension activity: Pupils can create their own plant or animal to name. See Water, Wading and Swimming Adaptations activity if you wish to challenge the pupils to create something that is adapted to a certain environment.

LEARNING ACTIVITY

2

..... EVOLUTION AND BIODIVERSITY

Info

How does biodiversity come to exist? Well, biodiversity increases over time as species adapt and evolve. We will look at the famous example of Darwin's finches to help us understand how species evolve to fill niches (the role a species plays in an ecosystem) in their environment, which increases biodiversity. (Not suitable for younger pupils.)

Task 1: Explain to the class who Charles Darwin was, his expedition, and why this expedition helped him to develop the theory of evolution - more info [here](#). You may wish to use a map to help pupils understand where the islands are, and that there are several - this is important as the birds evolved differently on different islands due to the food sources.

Task 2: Explain that two million years ago, a group of finches from South America (again, point on a map) flew over 600 miles to the Galapagos islands as one species. They settled there and, over this span of time - as evolution happens over such time periods - evolved to be well-adapted to the island. But they didn't all evolve as one group, in one area where seeds were everywhere, the finches evolved to be able to eat them, whereas in another, where nectar was everywhere, the finches evolved to eat that. And so several different species evolved from one bird to take advantage of different food sources.

Hand out copies of our Darwin's finches image, or put it up on the board for pupils to look at. See if pupils can work out which beaks might be best for which food source. You can get creative and ask students to create specifically shaped beaks out of card and test them out!



Task 3: Once you have completed Task 2, show the final image to the class to show how we now believe the different species evolved, where the base is their common ancestor.

You can then link back this learning to the renaming activity B10 or Water: Wading and Swimming Adaptations activity to the Extension Activity on B11 to show familiar examples of adaptations that animals and plants have evolved.

LEARNING ACTIVITY

3


THE BIODIVERSITY CRISIS

Task 1: Choose a local green site familiar to most of your pupils. Ask them to think about the species that might be there throughout the year and create a list. Try to get a few plants, invertebrates, birds, mammals and amphibians or reptiles if suitable. Your pupils are going to make a giant ecosystem web with this list, so make sure there is one for each pupil (and don't forget the sun!) and you can ask them to write/draw their organism on a sticker or name card.

Task 2: Using wool or string, begin to draw links between the organisms. This isn't just a food web, though that is an easy place to start, encourage the pupils to think about where insects may lay their eggs, how our nocturnal or seasonal organisms are linked to the sun, or if something may hide in vegetation from predators. Older pupils can research their organism beforehand too.

Task 3: Once you have built a veritable spider's web of links, choose a pupil to go locally 'extinct'. Ask them to back up and begin to pull on their strands. Anyone else who feels a tug should let go of their strings too - they can also sit down if you're standing in a group, to make it clearer who is 'out'. Eventually most, if not all, of the ecosystem will be affected.

Task 4: It's time to discuss what this means for the real world. Our ecosystems are complex and must rebalance when one part of them is removed. In reality, an ecosystem does this constantly, but when several parts are removed it is much harder and much more at risk of collapse. Explain that when an ecosystem has multiple stresses - such as disease, weather changes, human disturbance, local



extinctions – it and all the organisms which depend on each other are at risk from collapse. This is what we are seeing across the world – so what can we do about it?

Task 5: Thinking about the local site that you chose as your inspiration, what could the community do in general to protect it? And what about all the parts of the ecosystem that aren't as loved as the hedgehogs or birds of prey? The midges are just as important as the swallows! This could be a theoretical or practical exercise, maybe your class can pick litter, ask for the grass not to be mown until autumn, or pledge to become the site's protectors.

LEARNING INTENTION

To explore biodiversity through the senses with a particular focus on sound and movement. To practice the art of listening and observing movement and then place that sound and movement in real places. Taking it further to express and create a biodiverse soundscape and/or dance.

Overview

The following interdisciplinary learning materials are focused on mapping, sound, music and dance as a way to explore the outdoor environment and celebrate biodiversity. The lessons start with mapping a particular real life landscape and overlaying a soundscape onto the original map.

Then the lessons take a more expressive arts focus with learners being encourage to listen and mimic the sounds in their environment and then eventually bring the sounds they have developed together into a performance.

Learning Activity 3 brings in movement and dance as another expressive way to celebrate biodiversity.

Introduction

Watch the film biodiversity. When you are watching the film, think about all the different species of plants, trees, insects, animals and birds that are shown in the film. Think about how they look and also how they sound. Identifying species of animals, birds and insects is not just about what they look like but also how they sound.

Rangers and wildlife conservation people are very good at listening to the sounds of birds, insects and animals and can often identify them without even seeing them.

The different sounds that are made by birds, for instance, can mean different things. Some sounds are like songs telling their friend they are here in the landscape. These sound happy and full of joy. Then other sounds mean “watch out there is danger coming!” or “oh no here comes a human!!” These sounds are more like a siren or a screech.

WATCH BIODIVERSITY

All lessons are linked to the biodiversity Film



POINTERS FOR TEACHERS

These learning experiences have an expressive arts focus and help the learners look, listen and notice biodiversity from the film and within their environment through their senses. The expressive arts create memorable playful experiences that will stay with young people going forwards.

These lessons are aimed at second level but can be adapted for first level or third level.

Learners can research the sounds birds make on the RSPB website or by downloading the Merlin App which does sound ID through a phone.

LEARNING ACTIVITY

.....

MAPPING SOUNDS

Info

We are going to create a sound map of an area of your playground or a natural space near your school.

Task 1: Use coloured pencils to show the different areas and what they are used for. Then start drawing the different animals, green areas and pathways through the space. You can use different lines, shapes, patterns and textures to create a map of the different areas, routeways and uses of the outdoor area.

Task 2: Take your map and walk around the space again but this time identify the different sounds located in the different areas of the map. Note these down in descriptive words, markmaking or drawing on your existing map.

This exercise can be carried out in pairs or in a group working on a large sheet of paper. If you are excited by technology, you could create a digitally-drawn map and embed sound files with QR codes into it. This technology is used more and more in mapping and wildlife apps.

LEARNING ACTIVITY

2

MAKING A NATURE SOUNDSCAPE


Info

Watch the film again but this time listen to the sounds being made. Pick a bird or insect and have a go at using just your voice to create the sound the bird or insect makes.

Task 1: Practice making the sound and then think about making two sounds, one sound that expresses joy and happiness and one sound that communicates danger and fear. Your teacher may take you into the playground to practice the sounds as it might be quite noisy in the classroom!!

In the playground, your teacher will now split the class into two groups. Remembering the sounds which you have developed and practiced, stand in a circle with all the people in the group. Your group is the orchestra. Going around the circle, take turns sharing the sounds for joy and happiness that you have created, inspired by bird or insect life. Next, go around the circle sharing the sounds for danger and fear.

Task 2: Now choose one person (the conductor) to stand in the middle of the circle. First focus on joy and happiness sounds, when the person points to you, you have to share your joy and happiness sound. The person will point to different people and they will share their sound. Working together with the conductor you are making a soundscape. Take turns being the conductor and ask everyone to share both the danger sounds and the joy and happiness sounds. For instance, you might start with joy and happiness, then your orchestra could communicate danger and then you could finish with peaceful, happy sounds again.



Task 3: Practice in your group to create a soundscape where the sound hangs together in a way that is interesting to listen to. You may decide to have more than one person making sounds at the same time. In doing this you are creating rhythm and harmony, and you are all working together to compose music.

Task 4: Now it is time to share your soundscape with the other group, who will sit inside your circle and listen as your composer directs the sounds around the circle by pointing to people in the way you have practiced. Your orchestra is creating a soundscape (musical work) inspired by birds and insects. Through this musical piece and the variety of sounds, your orchestra is communicating biodiversity in nature.



POINTERS FOR TEACHERS

Please feel free to run this activity in one session or as a series of lessons whatever you feel would work best for your class. The part at the end of the activity “Your orchestra is creating a soundscape (musical work) of sounds inspired by birds and insects. Through this musical piece and the variety of sounds your orchestra is sharing you are communicating the biodiversity in nature” could be communicated to your class at the beginning of the activity rather than the end as a learning outcome if you feel this would give them a reason “why” they are making bird and insect sounds.

LEARNING ACTIVITY

3

DANCING BIODIVERSITY

POINTERS FOR TEACHERS

You could show your class examples of different native people's dances inspired by animal and bird life. For instance, Aboriginal and Native American animal-inspired dances can be found by searching YouTube. Many of these dances celebrate animals and birds which represent different meanings in native culture. The dancers' communicate the feelings towards these animals and birds through costume and the dancer's movements.

Info


Watch the film 'Biodiversity'. Now think about a landscape near you where there is lots of biodiversity. It might be a woodland area near your playground or a park or even farmland near where you live.

Think about all the species of birds, insects, plants and trees in your chosen landscape. Think about how they move across the landscape and how they interact with each other.

Many native cultures use animal symbolism in their dances, communicating their different characteristics, and also to tell stories about these animals, birds and insects. For instance, the Aboriginal people dance using the way animals move as inspiration.

Task 1: Working as part of a group choose an animal, bird or insect and think about how they move. Using a free space in your playground try to move like this creature. How can you communicate how birds fly? How they eat? How do they interact with each other through movement? Experiment with the different movements and share them within your team.

Task 2: Choose some of your best movements and think about creating a series of dance moves to express the way your chosen creature moves. Then practice and express how your bird, animal, or insect moves when it is happy or scared (it might not move if it is scared it might freeze in one place). Choose three dance movements to express how your animal, bird, or insect moves and then add how it moves when it is scared and how it moves when it is happy. These movements which you are creating are called "motifs". Practice the motifs and take turns in teaching them to your friends' in your team.



Task 3: Putting together these movements or motifs is called choreography. Now it's time to choreograph a dance or choreograph a dance. Working in your team decide which motifs you are going to perform together and which motifs you are going to perform individually. Think about the rhythm of the dance, who performs first and when in the dance you all perform the movement together.

Task 4: The whole class will now link their choreographed dances together to create a collaborative, connected dance that expresses the biodiversity of nature through dance. Your teacher may want to have sound playing to support the dance. This would be something you would discuss with your whole class in a teacher-led discussion.

Once you have all practiced the class Biodiversity dance together, explore an opportunity to perform this amazing dance with others. This might be at an arts event, to parents and carers, or even at assembly. Through your amazing Biodiversity dance, you are educating others about the importance of biodiversity in nature.



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POINTERS FOR TEACHERS:

You might want to give everyone a time limit for the length of the dance to ensure that when the whole class performs their choreographed dances it all works together as a larger Biodiversity dance performance.

You can pre-record the musical performance in Activity 2 and use that as a backdrop to the dance. Or you may want to link the dance lessons to the sounds in the film or even help your learners create their own soundscape to support the dance..

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PEOPLE

All lessons are linked to the film People



To view



Subtitled



Learning for People

Overarching Learning Intentions

The aim of this package of lessons linked to the film 'People' is to encourage an awareness of, and thoughtfulness about, how humans interact with the natural environment and explore ways to live in balance with nature and landscape in the future. As we become more aware of climate change and the biodiversity crisis, let's explore how our behaviour can make a difference.

INTRODUCTION

The film 'People' shows young people and adults involved in Go Wild, an outdoor and nature activity week at Threave Nature Reserve, talk about spending time in nature. It also looks at the archaeological activity on the reserve that reveals how people have lived in and used the landscape over thousands of years.

One of the aims of the Threave Nature Reserve Landscape Restoration Project is to engage people with nature, and make it more accessible. It recognises the importance of the motivation and experiential understanding that comes from developing greater empathy and connection with the natural environment.

The Go Wild project stemmed from the desire to give young people an opportunity to spend high-quality time in their local natural environment.

Young people are among those who are more likely to experience barriers to accessing nature (see Mental Health Foundation link in side bar.) The benefits of being outside in nature are well recognised, and it is important for learners to begin to recognise and express these for themselves, as they have done in the film. Schools are the ideal way to ensure that all children have the opportunity to connect with and experience nature in a way that feels safe and enjoyable.

Understanding how land use has changed over time gives an important wider context in which to place our interaction with nature, the current challenges we face, and those that young people will face in the future. We see the increasing impact human activity has had over more recent generations, as well as the potential to change these practices to ones that are more balanced and take into account the vital part that protecting and supporting nature plays in human survival.

POINTERS FOR TEACHERS

This series of interdisciplinary lessons/learning activities cover 2nd and 3rd level curriculum areas of outdoor learning, science, health and wellbeing, social studies and expressive arts. They are best presented to the learners after they have watched the 'People' film. The lessons are suggestions and should be interpreted by teachers creatively and in relation to their environment, knowledge and needs. The lessons can be taught as part of a Learning for Sustainability/IDL topic or independently by subject.

www.mentalhealth.org.uk

CURRICULUM LINKS

SCIENCE	TECH/HWB/MATHS	LITERACY	SOCIAL STUDIES/ EXPRESSIVE ARTS
<p>SCN 2-01a - I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction.</p>	<p>TCH 2-07a - I can make suggestions as to how individuals and organisations may use technologies to support sustainability and reduce the impact on our environment.</p>	<p>LIT 2-05a - As I listen or watch, I can make notes, organise these under suitable headings and use these to understand ideas and information and create new texts, using my own words as appropriate.</p>	<p>SOC 2-04a - I can compare and contrast a society in the past with my own and contribute to a discussion of the similarities and differences.</p>
<p>SCN 2-02a - I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area.</p>	<p>MNU 2-20a - Having discussed the variety of ways and range of media used to present data, I can interpret and draw conclusions from the information displayed, recognising that the presentation may be misleading.</p>	<p>LIT 2-06a - I can select ideas and relevant information, organise these in an appropriate way for my purpose and use suitable vocabulary for my audience.</p>	<p>SOC2-08 /3-08a - I can discuss the environmental impact of human activity and suggest ways to be more responsible.</p> <p>I can identify the possible consequences of an environmental issue and make informed suggestions about ways to manage the impact.</p>
<p>SCN 2-02b - Through carrying out practical activities and investigations, I can show how plants have benefited society.</p>	<p>MNU 2-20b - 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.</p>	<p>LIT 2-07a - I can show my understanding of what I listen to or watch by responding to literal, inferential, evaluative and other types of questions, and by asking different kinds of questions of my own.</p>	<p>SOC 2-13a/3-13a - I can explain how the physical environment influences the ways in which people use land by comparing my local area with a contrasting area.</p> <p>By comparing settlement and economic activity in two contrasting landscapes, I can reach conclusions about how landscapes influence human activity. I can explain my findings clearly to others.</p>

CURRICULUM LINKS (CONTINUED)

SCIENCE	TECH/HWB/MATHS	LITERACY	SOCIAL STUDIES/ EXPRESSIVE ARTS
	<p>HWB 2-26a - I am experiencing enjoyment and achievement on a daily basis by taking part in different kinds of energetic physical activities of my choosing, including sport and opportunities for outdoor learning, available at my place of learning and in the wider community.</p>		<p>EXA 2-05a - Inspired by a range of stimuli, I can express and communicate my ideas, thoughts, and feelings through activities within art and design.</p>
			<p>EXA 2-07a - I can respond to the work of artists and designers by discussing my thoughts and feelings. I can give and accept constructive comment on my own and others' work.</p>

Outdoor Learning

LEARNING INTENTION

Young people can identify ways we depend on the land and nature for our survival, how the ways we interact with land and nature has changed over the years, and the impact people have on the land and nature. They develop their connection with nature and awareness of the positive impact it has on wellbeing and build confidence through problem solving and learning new skills in an outdoor environment.

Overview

The Outdoor Learning activities for 'People' are designed to give teachers and outdoor educators a starting point for successful learning in the outdoor environment. They can be adapted to suit the site you have available and the time of year, and also list equipment and resources to aid preparation. There is a link to a risk benefit assessment that covers the outdoor learning sessions, which you can adapt if required. We hope all of these will be useful either directly or as inspiration and support for taking learners outdoors.

Relevant Topic/IDL links include

Life Through the Ages, Historical Topics, Environment, Geography, Health, Technology, Living Things, Climate Champions.

Time of year

Any time - warmer weather will make for a more enjoyable experience all round, but building shelters in colder or wetter weather if appropriate, gives a different understanding of the need for shelter and warmth and can build resilience and respect for nature.

Site

Ideally somewhere that there is scope to set up camp for a few hours and/or return to regularly so learners can feel a connection to the place and have time to relax and explore. Remember to get landowners' permission and check any environmental or wildlife conservation restrictions first (see Risk Benefit Assessment).

WATCH PEOPLE
All lessons are linked
to the people Film



LINKS

Safety

Risk Benefit Assessment

Warm up activity-
settling into the outdoor
environment

What doesn't belong -
Warm-up activity sheet

LEARNING ACTIVITY

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MAKING CAMP



Info

Some young people will have spent a lot of time outdoors doing these kinds of activities, and some very little or not at all. They will have different comfort zones. Encourage learners to organise themselves, and work together to allocate tasks and problem solve, and to assess risk. Prompt as they go, for example by asking 'what if it rains?' or 'how could you make that more secure?'.

Aim

To make a camp/shelter outdoors, using natural and found materials for shelter. To work as a team, problem solve and enjoy being outside.

Task 1: Place the learners into groups of three or four, ideally. Start by sitting all together in the area you have chosen. Discuss a hypothetical scenario - for example, they are stranded in the woods/on an island, or they are living 1,000 years ago. What would they need to survive here?

Introduce basic needs - shelter, water, food - and community. Discuss what they would focus on first, and why - this can be done in small groups and the answers compared once back together.

Alternative: This could be done in class before heading outside - if so, learners could look at/research some examples of homes and shelters through the ages in Scotland or those used by people in different parts of the world today. Look at what they have used, why, how designs have evolved to suit the natural surroundings/habitat /climate. How do they compare to our houses? What impact do you think they have on the environment, compared to our houses? Where do the materials come from?

They can also look at some examples of different shelter designs in the mini shelter video (see Resources), and have a go making some 'mini-shelters'.

Task 2: Come together in the middle of your chosen site if you have not already done so for Activity 1a. Recap the discussion you had for Task 1.

Ask each group to make their own shelter, or den, and to think about:

- The materials available - not damaging live trees or plants, or habitats
- A good site - can they make use of what is already there, e.g. a living tree branch, natural hollow? Which way should the shelter face?
- How big it needs to be, and what would make a good shape?

Give them a time limit and help with securing (knots, etc.) and cutting dead branches if required.

If you have time, or are able to return to the camp, develop a communal area together - for example, a circle of seating, a focal fire area (see Extensions section on P8), some fencing made of vertical sticks with thinner branches woven between.

Plenary

Come together and walk round looking at each group's shelter in turn. Give the group the opportunity to talk through what they did, how and why. What worked well? What might they improve on or add next time?

Gather again in the middle and think of a name for the camp. This could be painted or drawn on a piece of wood or similar if desired. If the young people were to live here, what might they add, or do next? What else would they need (e.g. food, water) and where might they get it from?

Equipment

- Tarpaulins, sheets or similar
- Thin rope or paracord, some pre-cut into 2m lengths
- Hand saws, bow saws or folding saws (adults)
- Preparation: it is a good idea to do some preparation at the site in advance - making sure that there are enough materials around for all learners to use to make dens or shelters, for example longer branches, small sections of log for seating, brash or bracken for 'thatching', being aware of the boundaries and potential hazards (see Safety on P5).

Depending on the site, the shelters/camp area could be kept for some time, to allow young people to return, or it may need to be dismantled on the day. When dismantling, talk about leaving no trace (see Activity 3 - Create a Nature Code on P11).

Extensions

Campfires and cooking - having a campfire and cooking outdoors with young people is a great experience and encourages perseverance, teamwork and creativity, as well as confidence and trust. If you have not done this before, it is very worthwhile doing a short CPDL or other course or gaining practical experience in fire-lighting and campfire cooking with other adults until you are confident and feel prepared. We are also happy to arrange demonstrations and learning opportunities here at Threave Nature Reserve (ThreaveNature@nts.org.uk).

It is vital that conditions for safe fire lighting are observed, due to the potential damage to wildlife, especially in dry weather conditions.

Fire Guidance PDF - Outdoor and Woodland Learning (OWL) Scotland

The children in the 'People' film enjoyed being interviewed by John Wallace about their time outside - learners could make their own video interviews of each other talking about their time outdoors and experience making shelters.

The shelters could also be used for Learning Activity 2 - Sit Spots (see P9), and as places to sit and observe wildlife.

Resources:

Bushcraft for Kids - How to build a mini shelter
<https://www.youtube.com/watch?v=O5OLy5hIZxI&t=45s>
(fun introduction to different shelter designs that could be shown to class in preparation)

Learning Through Landscapes - Den Building and Hiding
<https://www.youtube.com/watch?v=R0gYORak-sk>

Knots: Square Lashing (useful and easy knot for shelter building - many more knots are available online, but stick to one or two at a time!)

LEARNING ACTIVITY

2

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NATURE FOR WELLBEING – 'SIT SPOTS'



Info

Being outside, especially in woodland, can have a noticeable effect on mental health and wellbeing. It has been shown to lower blood pressure and cortisol levels. This can be the case whatever the activity, but it can be valuable to take time to allow young people to relax and be quiet in nature. This can be incorporated into Learning Activity 1, or separately. It's best done once learners are 'settled in', and not when hungry or tired.

Aim

For each child (and adult) to find their special spot outside, to spend time there and return to it, and feel connected and safe there.

Task 1: Decide on the boundaries for your area, ideally large and varied enough to provide plenty of different places for learners to identify a personal 'spot'. Explain that they can find their 'sit spot' and spend some time there by themselves – perhaps let them know in advance, so they have time to look for spots while they are doing other activities/exploring the site. Give them five minutes (longer or shorter depending on their age and stage) to sit quietly in their spot and relax.

Encourage them to use all their senses (except perhaps taste!) to get to know their spot. See what they notice around them, above them and below them. It's a good idea for the adults to do this exercise too, so they can experience it and also to get an idea of a good length of time to spend on it.



Plenary

At the end, gather together and ask learners how they feel, what it was like, what they noticed.

If possible, allow learners to return to their Sit Spots regularly, or use the same exercise back in the school grounds.

Extensions

Allow learners time to develop their connection with their Sit Spot' - this could be through drawing, photographing it, creating a piece of art or writing about it.

As noted in the Activity 1 Extension, the children in the 'People' film enjoyed being interviewed about their time outside, and learners could make their own video interviews of each other talking about their Sit Spots, or about their time outdoors.

Resources:

Mental Health Foundation -
How Connecting with Nature
Benefits our Mental Health
<https://www.mentalhealth.org.uk/our-work/research/nature-how-connecting-nature-benefits-our-mental-health>

LEARNING ACTIVITY

3

CREATE A NATURE CODE – RESPECT, RESPONSIBILITY AND CARE FOR NATURE

Info

It is important for people to be aware of the Scottish Countryside Access Code and Leave No Trace ethos, for safe and happy outdoor experiences that also respect others and the environment. This activity can be done in the classroom, but it is nice to do it, or at least begin it, outside, where learners can use what's around them and the experience they've had for inspiration.

The discussion and creation of a 'Nature Code' can extend beyond responsible behaviour outdoors to include responsible, caring behaviour towards nature in general.

Aim

To write a 'Nature Code', and compare it to the Scottish Countryside Access Code and Leave No Trace, and/or wider environmental laws and codes of practice.

Task 1: Ask young people to think about how they would like people to behave when they are outside in nature. What do people do that harms nature? What would they like them to do instead? What does it mean to Leave No Trace?

Start to put this together into a 'Countryside Code' or 'Nature Code', discussing and agreeing on key points. This can be done as a whole group, or in smaller groups which then bring the ideas together and see which are the same or different. Agree on a class 'Code'.

The 'Nature Code' can also be compared to your 'School Code' e.g. Be Kind, Be Safe, Be Respectful and discussion about how they might be similar, and why we need to apply these to the land and all living things, not just each other.



Extension / alternative

Ask learners to write a message or letter in first person from a tree, animal or habitat that they've seen or experienced during outdoor learning (perhaps from their 'sit spot', see Activity 2) to humans. What would their chosen example of nature ask people to do, or not to do? (see also Science - Activity 2)

Equipment

If outside, a portable chalkboard or big piece of paper is ideal, or if not available paper and clipboards, pens, etc.

Resources

Scottish Outdoor Access Code
<https://www.outdooraccess-scotland.scot/>

#Know the Code – Outdoor Access for Young People
<https://young.scot/campaigns/knowthecode/>

Leave No Trace
<https://lnt.org/why/7-principles/>

UN Sustainable Development Goals
<https://sdgs.un.org/goals>

NatureScot – Scotland's Nature Agency
<https://www.nature.scot/>

LEARNING INTENTION

Young people can identify how we depend on the land for our survival, how the ways in which we use and interact with the land has changed over the years, and the impact people have on the land. Young people create surveys which explore how they use and feel about land. The intention through these lessons is to help evoke a sense of empathy for the land and critical thinking in terms of how we use the land and how we might use the land in the future.

Overview

Within the Science section of our Learning for People Materials there are two Learning Activities. These activities will ask learners to investigate the relationship between land and people – and vice versa.

In **Learning Activity 1**, learners will design or use a survey to find out from people in their life how often they are outside, and what their relationship with the land is. The class will pool their data and analyse it to find out if there is a link between time spent outside and opinions on the land.

Following this, in **Learning activity 2**, learners will imagine that they are the land. Using empathy and different communication styles, they will explore what the land might wish to say or show to the communities living on and around it.

WATCH PEOPLE
All lessons are linked
to the people Film



LEARNING ACTIVITY

THE COMMUNITY TO THE LAND

Info

How do people interact with the land? Are people aware of how much they rely on the land? Do some people think more about the land than others, and if so, why? Let's gather some data to answer these questions.

Activity 1a: Ask pupils to think about how many minutes or hours they spend outside a week. What do they do when outside? How do they feel when they're outside? Then, discuss with them how they feel about the land outside - you may need to define 'the land' first, and can do this as a group, or simply explain that it is the ground and soil beneath our feet, which we build roads, shops, and houses on, which we might walk, cycle, or play on, and which all our plants and animals (including those on farms) cannot live without.

Task 1: Tell the pupils you are going to design a survey for people in the community as a class. Each pupil will ask one or two adults to answer the survey as homework, and the class will pool their results.

The survey must have 3-5 questions which aim is to see if people who spend more time outside feel closer and more protective of the land, and if they realise how much they depend on the land. The questions you can ask for those answers can be varied and the pupils might like to come up with them. However, they should have set answers such as yes/no or scorings of 1-10, where 1 is the lowest answer (for easy comparison of results). It must also ask the respondent to estimate how many hours or minutes they spend outside each week, which includes for their job, commuting, hobbies and so on.

For younger pupils, you may wish to give them the survey ready-made. Pupils can write the questions in a notebook to take home and ask 1-2 adults or you can print off a survey for them.

Questions can be:

Do you enjoy being outside?	Yes/No
How close do you feel to the land around us [include the definition of land that pupils have agreed on]	1 (not at all) - 10 (extremely)
How important is it to protect local natural areas?	1 (not at all) - 10 (extremely)
How much do you think you rely on the land to survive?	1 (not at all) - 10 (extremely)
Can you estimate how many minutes you spend outside each week, including for jobs, commuting on foot/bikes, hobbies, etc?	

Task 2: First sort the surveys into respondents who spend a lot of time outside (the class may want to decide how many minutes is 'a lot'), or with older pupils you can average the time of all respondents and place them into 1 of 2 groups, above or below average. Then you can average the responses for each answer for both groups - at this point pupils may be able to put the data into a graph to compare, if appropriate for their level - or you can simply compare numbers to see if the groups had different responses.

Task 3: You can discuss what the results tell us and what conclusions we can come to, and how we can use this data in real life - e.g. if people who spend more time outside feel more connected with the land, are they more likely to care for it? Can we increase the time spent outside in other groups so that our land is more cared for?

LEARNING
ACTIVITY

2

.....
THE LAND TO THE
COMMUNITY
Info

Our local land doesn't have a voice and humans often assume that means there is nothing it wishes to communicate. However, if we spend some time thinking about the land - about areas that are being built on, littered, conserved, restored - we would probably realise that is untrue!

Task 1: Start with a discussion with the pupils about local areas and if they can think of ways the land is being changed, treated well, or treated badly. You can make a list together. If you have already looked at the other films, you can also encourage them to think about the levels of biodiversity around them and what that might tell us about the treatment of the land.

Task 2: Ask pupils to think about how they would feel if they were treated like the land they see around them that is treated badly, and then land they see around them that is treated well. What would they want to communicate to the humans around them in both these scenarios?

Task 3: The pupils will then write a letter from the land to the community. You may even wish to write two - one from land that is treated badly, and one that is treated well (if doing this, end with the latter). If writing a letter is not appropriate for pupils, they can talk as if they are the land, make a poster, identify emotions the land may feel via nonverbal communication boards, etc. Communication isn't only writing - pupils could even think about facial expressions, body language, art - this list is not exhaustive.

Extension

Pupils may wish to share their work with the community, which could be a very powerful message. This could be via the school's social media, website/newsletter, a small exhibition in the local hall or library, etc.

LEARNING INTENTION

To ensure young people are aware of the role they have to play in tackling biodiversity and the climate change crisis. To help young people understand the role adults play, and to give young people the tools to spread the word within their families and community about what they can do to be more sustainable and support our natural world.

Overview

The following interdisciplinary learning materials focus on the term "NatureClimate" and explores what that means. First, learners are asked to reflect on all the films ('Trees', 'Water', 'Grasslands', 'Biodiversity' and 'People') from Threave Landscape Restoration Project. Focusing on the nature balancing work which is taking place as part of the restoration project.

Then armed with knowledge from the films, learners are then asked to use research and idea generating skills to explore the term further through brainstorming charts and posters.

Finally, the Expressive Arts section shows how artists have helped with the NatureClimate Crisis through socially engaged art practice which empowers people to get involved and help.

(The IDL Learning materials are designed to talk directly to the learners).

Introduction

Let's think about all the things we might be able to do to help re-establish a balance with the natural world so the landscape and its biodiversity begins to restore as it is doing at the Threave Nature Reserve.

Watch the film 'People' to learn about our about our human relationship through time with the landscape at Threave. We have seen on the film and experienced first-hand (through the Outdoor Learning and Science/Maths lessons) how nature can be good for our health, wellbeing and sense of community but what can we do for nature? I wonder what we can do individually and as a community to support nature and help with the NatureClimate crisis?

WATCH PEOPLE
All lessons are linked
to the people Film



POINTERS FOR TEACHERS

The People section of our Threave Learning Resources are best delivered as the 'last' film to ensure your young people have the knowledge they need to answer some of the questions around how we live in balance with the land and help with the NatureClimate crisis. IDL/ Social Studies/Expressive Arts lessons are planned to come after the lessons in Outdoor Learning and would be best delivered in close connection to the Science/ Maths lessons above. The learning activities link to the aims and objectives of the Climate Champions and Learning for Sustainability.

LEARNING ACTIVITY

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NATURECLIMATE' CRISIS

Info

The climate change crisis and the biodiversity crisis are interlinked. People are using the word 'Natureclimate' crisis (all one word). For the next series of activities we will be working in a group of 4/5 young people.

Task 1: Warm-Up Exercise – think about the films you have seen about: 'Biodiversity', 'Water', 'Trees', 'Grasslands', and 'People'.

Working in your group think about and then come up with a variety of answers for each warm-up question below:

1. Climate change raises the temperature in water, how does that affect the fish?
2. Trees take in carbon dioxide, how does that help with climate change?
3. Is it good for biodiversity if the river is allowed to flood?
4. What happens if you have lots of cows grazing the same field and that field is regularly fertilised? What happens if a smaller group of cows move through a landscape, grazing using electric collar technology?
5. Why is the Threave restoration project encouraging a variety of species in their grasslands? Does mixed grassland help take in carbon dioxide? Does it help encourage more biodiversity? Is it better for the cows diet?
6. If the temperature across the globe rises how does that impact on people and animals in Africa? In Scotland? In Iceland?



Plenary

Create a brainstorming chart with the answers to your questions. Share the answers as a class with your teacher and other class members.

Task 2: Brainstorming the meaning behind “NatureClimate” crisis – now everyone’s brains are all warmed up and working as a group, discuss and research the answers to the following two questions:

1. Why do you think that environmental organisations are using this phrase “natureclimate crisis”?
2. Why do you think climate change and nature restoration are interlinked?

You will need to access online material including film clips and web-based info. Then use a large sheet of A3/A2 paper and coloured pens to capture your ideas – you can write or sketch your answers too.

Plenary:

Nominate one person to share the ideas from your brainstorming sheet with the whole class then as a group share what you have discovered.

Task 3: “NatureClimate” Poster – using the information on the brainstorming chart and working individually create an A4 poster or infographic using pencils and coloured pencils to communicate your ideas of why nature and climate change are interlinked. Title the poster “NatureClimate”.

Task 4: “NatureClimate” Solutions – now it is time for some clever practical and creative solutions. In your groups let’s have a brainstorm about how we can help nature flourish and help with the climate crisis. **What can you do? What can your school do? What can your community do? What can Scotland do? What can the world do?** Once you have collected all your brilliant ideas, design a advice sheet which can be shared with friends, teachers, parents/carers and community.

POINTERS FOR TEACHERS:

Some of the ideas the young people come up with in their brainstorm might be something the school wants to get behind and support. For instance, tree planting schemes, creating a nature garden in the school or community, having a Climate Champions demonstration with signs or designing a NatureClimate Crisis T shirt which is printed....I’m sure there will be many excellent ideas. The young people may want to set up their own eco group.

LEARNING ACTIVITY

2

SOCIALLY ENGAGED ECOLOGICAL ART

POINTERS FOR TEACHERS

You might throw in some ideas, first emphasising that no answer is wrong. But once the ideas are thought through a little more some might be more deliverable than others (depending on scale and resources). Ideas you could throw into the mix might be: Trees planted in a certain layout? A bug palace of a bug hotel? Create an awareness-raising event? Create a beautiful mural of a vision for a future world that fosters biodiversity like the Threave Landscape Restoration Project?

Info

One way people can educate adults about the NatureClimate crisis is to make thought-provoking art. There are many artists who have dedicated their life's work to helping people protect the natural environment and think about our relationship with nature. One of these artists was called Joseph Beuys.

Show learners this image of Joseph Beuys' work, 7,000 Oaks. In 1982 very few people knew or understood about climate change and the nature crisis. Joseph Beuys used his status and reputation as an important artist to raise peoples' awareness to ecology and the environmental crisis that was happening around the world. He believed in social and community action art and believed everyone was an artist. In his mind the very act of planting a tree is art. Through the 7,000 Oaks project he could encourage more and more people to come together and plant trees enabling art to change the world. In many ways it doesn't matter if it is called art or outdoor learning or science or education for sustainability, by planting a tree we are helping our planet. What could be more important than that?



'i believe that planting these oaks is necessary, not only in biospheric terms, that is to say, in the context of matter and ecology, but in that it will raise ecological consciousness - raise it increasingly, in the course of the years to come, because we shall never stop planting.' - Joseph Beuys, 1982

7,000 Oaks by Joseph Beuys



Task 1: Creative Solutions – think about all the great solutions you came up with to help with the NatureClimate crisis could you use your creativity to create a solution which could also be a socially engaged art project. Working as an individual or in a group draw what you want to create. Then think about all the materials you need to create the artwork/event and finally make a plan of what it would look like and how you can create it or make it happen.

Task 2: Tree planting as socially-engaged art – if you decide to do a tree planting project like Joseph Beuys did in his 7,000 oaks project, here is some advice that will help with you creative planting ideas – see the ‘Trees’ learning pack for more information on trees, woodlands and tree planting:

You normally plant trees in October/November or February/March.

1. What species of tree will you plant and where would be a good place to plant the tree? It will need good soil and sunlight to grow. Is it safe from damage? If it is in your playground you will need to choose somewhere your trees won't get damaged.
Ask your teacher to give you a tree-planting demonstration and then invite your class to join you for a tree planting session.
2. Reflect on what a great thing you have all done for nature, biodiversity and climate change. Imagine your trees when they are fully grown, can you calculate how much carbon dioxide the tree will hold and how much oxygen the tree will give out. Also, how about biodiversity, how many insects, birds and animals will your tree support ?

Well Done! you have helped with the NatureClimate Crisis.

POINTERS FOR TEACHERS

There are many organisations that give tree planting grants. Contact your local authority's countryside team, Local Woodlands Trust or the Woodland Trust nationally to find out more. If you haven't planted trees below these organisations can sometimes offer training or will run a tree-planting session in your school. Emphasise how important planting a tree is for our planet. The ClimateNature crisis is very scary and by teaching your young people to plant a tree you are empowering them to be able to make a difference, helping with any anxiety they may have around climate change or the ClimateNature crisis.

A HUGE THANKS

Thanks to filmmaker, John Wallace, for creating the 5 beautiful films which are part of the 'Balance in Nature' Learning package.

Jan Hogarth, Galloway Glens Education Officer, Mary Smith, Threave National Nature Reserve's Engagement Ranger and Carys Mainprize, Education Officer with the Crichton Carbon Centre. The development of the films and the learning package was supported by Threave Nature Reserves Head Ranger, David Thompson with ranger, Phil Downey helping with Outdoor Learning ideas.

The National Lottery Heritage Fund has contributed funding and time to the project through Galloway Glens Scheme, an initiative of Dumfries & Galloway Council's Environment Team.

The Balance in Nature Education Package forms part of the National Trust for Scotland's Threave Landscape Restoration Project. For any queries, contact the Threave Nature Reserve Team.