



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

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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 encouraged 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

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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.



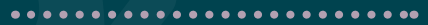
Task 3: Practice in your group to create a soundscape where the sound hangs together in a way that is interesting to listen to. You may decide to have more than one person making sounds at the same time. In doing this you are creating rhythm and harmony, and you are all working together to compose music.

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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