



GALLOWAY AND SOUTHERN AYRSHIRE BIOSPHERE



LEARNING FOR SUSTAINABILITY TOOLKIT



'The study of LFS has truly opened our pupils' eyes to the world around them and this has allowed them to see it in a whole new light. It has given true insight to world wide issues as well as the wonderful area we are lucky enough to call home. Through the regular input of LFS sessions in our school, our pupils have engaged in meaningful conversations about their world. In doing so, they have up levelled their talking and listening skills and can offer opinions in a remarkably mature manner. It has brought huge enjoyment to our learners and teachers across almost all areas of the curriculum in a meaningful and inspiring way!'

Gayle Ferguson









Head Teacher, Girvan Primary School

'The development of LFS in our School has given me, as a teacher, immense job satisfaction. It has been, and continues to be, an exciting and worthwhile project to undertake. As the programme has evolved and grown over several years, I am very proud of the wide and varied learning opportunities it has given our pupils. In particular, I have enjoyed giving our pupils time and space to think about the things that matter to them in their world. They have loved having their voices heard. It has definitely strengthened their love for their local area as well as the wider world. It has provided a fun context for learning across the curriculum as well as giving excellent opportunities for community learning and links with the amazing people in our locality. We love our LFS sessions and look forward to what it might evolve into next!'

Sarah Blackie

Learning for Sustainability Teacher
Girvan Primary School

CONTENTS

INTRODUCTION	3
LEARNING OUTCOMES	5
 TOPIC 1: WHAT IS OUR AMAZING BIOSPHERE	6/7
 TOPIC 2: WONDROUS WILDLIFE	8/9
 WONDROUS WILDLIFE MAP	10/11
 TOPIC 3: FANTASTIC FLORA!	12/13
 TOPIC 4: A NOCTURNAL WONDERLAND	14
 TOPIC 5: COOL COASTS AND BRILLIANT BEACHES	15
 TOPIC 6: BUBBLING BOGS	16
 TOPIC 7: MARVELLOUS MINIBEASTS	17
ADDITIONAL RESOURCES	18/19



Sources: UNESCO & Forest School Association



INTRODUCTION



WHAT IS A BIOSPHERE?

The Galloway & Southern Ayrshire UNESCO Biosphere is a region of southwest Scotland that has been recognised as a world class environment for people and nature. The Biosphere designation was awarded by the United Nations Educational, Scientific & Cultural Organisation in 2012 and covers an area of more than 5200 km², landscapes which support many rural communities and a rich biodiversity of plant and animal life.

The UNESCO Biosphere designation represents a collective goal of living in harmony with nature: in Galloway and Southern Ayrshire people have a beautiful place to live and work, to connect with the land, and to celebrate a shared cultural heritage.

Biospheres are also 'learning places for sustainable development', as defined by UNESCO's Man and the

Biosphere Programme (www.unesco.org/mab), with support for education, research and knowledge exchange all critical components within the Biosphere ethos. As one among a global network of more than 700 UNESCO Biospheres, Galloway and Southern Ayrshire is the perfect place to grow consciousness on environmental protection, awareness and responsibility, and to expand thinking on sustainable futures.

LEARNING FOR SUSTAINABILITY

Learning for Sustainability (or LfS; also known as Education for Sustainability) is widely used to support learners in developing environmental awareness and an understanding of global connectedness. Learning for Sustainability is the underlying outcome of several learning approaches, such as Forest School, Outdoor Learning & Play, and Environmental Education, and can be integrated across all curriculum topics.

The Scottish Government's Learning for Sustainability Action Plan defines learning for Sustainability as:

'...a cross-curricular approach, which enables learners, educators, schools and their wider communities to build a socially just, sustainable and equitable society. An effective whole-school and community approach to Learning for Sustainability weaves together global citizenship, sustainable development education and outdoor learning to create coherent, rewarding and transformative learning experiences. ... It supports the development of knowledge, skills and the values at the heart of the curriculum's four capacities and provides a mechanism for promoting and working towards the UN's Sustainable Development Goals.'

Embedding high quality Learning for Sustainability is a crucial contributing factor in meeting Scotland's commitment to achieve the United Nation's Sustainable Development Goals, and the Scottish Government's National Outcomes, which link directly to the SDGs. <https://nationalperformance.gov.scot/national-outcomes>

'Education for Sustainable Development (ESD) empowers learners with knowledge, skills, values and attitudes to take informed decisions and make responsible actions for environmental integrity, economic viability and a just society.

... (It) is a lifelong learning process and an integral part of quality education. It enhances the cognitive, social and emotional and behavioural dimensions of learning. It is holistic and transformational, and encompasses learning content and outcomes, pedagogy and the learning environment itself.

ESD is recognized as a key enabler of all Sustainable Development Goals and achieves its purpose by transforming society. ESD empowers people of all genders, ages, present and future generations, while respecting cultural diversity.'

UNESCO



THE LFS TOOLKIT

This toolkit has been produced by Galloway & Southern Ayrshire UNESCO Biosphere in partnership with Girvan Primary School to support teachers and leaders to incorporate Learning for Sustainability into their practice, using examples that require minimal preparation time and resources, and which relate directly to both the Biosphere and the National Curriculum for Excellence.

The topics were chosen in consultation between teachers and most importantly, the pupils from Girvan Primary School. Our Biosphere is a wonderful tool to help pupils understand sustainability, and a truly accessible place for learning: quite simply the Biosphere is what we see when we look outside, or when we are outdoors in our school grounds, communities and gardens.

There are many excellent projects and resources available to schools across the Biosphere designed to support LfS provision (see Additional Resources section). In addition, there is a range of diverse but connected types of land use and enterprise within the Biosphere that offer potential for study. Among these are:



Forestry – Galloway Forest Park is the largest forest park in the UK and comprises part of the ‘buffer zone’ of the GSA Biosphere. Forestry in this region represents sustainable timber production and provides opportunities for recreation including off-road cycling and the Gold Tier Dark Sky Park.



Renewables – Generating energy through wind and hydro-electric schemes to contribute to a more sustainable world.



Conservation – Critical areas for research, and where action is taken in support of threatened habitats and species such as peat bogs, golden eagles and many more.



Tourism – Holiday accommodation; Dark Sky Park; food and drink providers; visitor attractions and outdoor experiences; natural scenic beauty; walking and cycling routes; archaeology, history, and the creative arts.



Large and small businesses – from companies with national and global connections to artists, creatives, and micro-enterprises.

TOPIC	LEARNING OUTCOMES	EXPERIENCES & OUTCOMES
1. What is our amazing Biosphere?	<ul style="list-style-type: none"> Recognise the geographical area that the United Nations Educational, Scientific and Cultural Organisation has designated a UNESCO Biosphere. Understand what the Biosphere is and why it is so important. To identify a variety of habitats within the Biosphere. To recognise a variety of features of the Biosphere. <p>Key vocabulary: Biosphere, woodland, climate change, habitat, freshwater, citizen science, ecosystem, wetland, bioblitz, marine.</p>	SOC 0-07a, SOC 0-08a, SCN 0-05a, SOC 1-07a, SOC 1-13a, SCN 1-05a, EXA 1-04a, SOC 2-10a, SCN 2-05a, EXA 2-04a
2. Wondrous wildlife	<ul style="list-style-type: none"> To explore some of the key species of the Biosphere. To understand the meaning of key vocabulary related to ecology. To explore wildlife behaviour and diet. To understand human impact on the natural environment and the impacts of climate change. <p>Key Vocabulary: native, species, adaptation, invasive, food chain, migratory, omnivore, carnivore, herbivore, nocturnal, diurnal, crepuscular, habitat, mammal.</p>	SCN 0-01a, SOC 0-08a, EXA 0-04a, SCN 1-02a, SCN 1-01a, SOC 1-08a, EXA 1-04a, SCN 2-01a, SCN 2-02a, SOC 2-08a, EXA 2-04a
3. Fantastic flora	<ul style="list-style-type: none"> To learn to identify and classify plants. To observe how plants and habitats change during the year and in different seasons. To document and observe the world, take notes on observations and record discoveries. <p>Key vocabulary: chlorophyll, pollinators, deciduous, coniferous, photosynthesis, petal, stem, leaves, stamen, stigma, pollen, nectar.</p>	SCN 0-01a, SCN 0-03a, EXA 0-04a, SCN 1-02a, SCN 1-01a, SCN 1-03a, EXA 1-04a, SCN 2-02a, SCN 2-02b, EXA 2-04a
4. A nocturnal wonderland	<ul style="list-style-type: none"> Understand the terms diurnal, nocturnal and crepuscular and recognise creatures that fit these categories. Recognise the appearance, habitats, habits, features and diet of a variety of nocturnal creatures. Explore a variety of constellations. Recognise the significance of the Dark Sky Park within our Biosphere. <p>Key vocabulary: echolocation, constellation, adaptations, nocturnal, diurnal, crepuscular, evolve.</p>	SCN 0-01a, SCN 0-06a, SOC 0-08a, SOC 0-09a, EXA 0-04a, SCN 1-01a, SCN 1-02a, SCN 1-06a, EXA 1-04a, SCN 2-01a, SCN 2-02a, EXA 2-04a
5. Cool coasts and brilliant beaches	<ul style="list-style-type: none"> Recognise the location, features and wildlife of our coasts and beaches. Create simple food chains and webs using wildlife found around our coasts. Use a range of ID charts and keys to identify and classify plants and wildlife of our coasts. <p>Key vocabulary: habitat, ecosystem, marine, crustacean, pollution, endangered, abundance, data.</p>	SOC 0-07a, SOC 0-08a, SCN 0-05a, SOC 1-07a, SOC 1-13a, SCN 1-05a, EXA 1-04a, SOC 2-10a, SCN 2-05a, EXA 2-04a
6. Bubbling bogs	<ul style="list-style-type: none"> Recognise what a bog is and identify why they are so important. Use discussion skills to explore a topical issue. Understand the ways in which we can protect and conserve bogs. Recognise a variety of wildlife found in a bog. To examine and create food chains and webs. <p>Key vocabulary: sphagnum, carnivorous, absorbency, food chain, food web, interdependence, ecosystem.</p>	SCN 1-02a, SCN 2-02a, SCN 2-02b, SCN 2-20b, LIT 1-02a, LIT 2-02a, LIT1-09a, LIT 2-09a, MNU 1-03a, MNU 2-03a, MNU 2-11b
7. Marvellous minibeasts	<ul style="list-style-type: none"> To recognise the different habitats of minibeasts. To use keys and guides to practice identification & classifying minibeasts. To name and describe the parts of an insect. To examine and create food chains and webs in pond and terrestrial ecosystems. To understand minibeast lifecycles. To understand how minibeasts are adapted to their ecosystem. <p>Key Vocabulary: habitat, aquatic, mollusc, ecosystem, vertebrate, annelid, food chain, food web, invertebrate, myriapod, freshwater, crustacean, adaptation, thorax, abdomen.</p>	SCN 0-01a, SOC 0-08a, EXA 0-04a, SCN 1-02a, SCN 1-01a, SOC 1-08a, EXA 1-04a, SCN 2-01a, SCN 2-02a, SOC 2-08a, EXA 2-04a

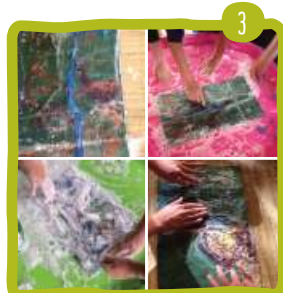
TOPIC 1

WHAT IS OUR AMAZING BIOSPHERE – AND WHAT DOES IT MEAN TO YOU?



This topic should be used to introduce to pupils to what the Biosphere actually is, and to ignite passion about living in such an awe-inspiring place. The activities of this section are designed to excite, amaze and get pupils marvelling at what their Biosphere means to them.

- 1 Begin by using the Biosphere map to explain the size of the Biosphere and the variety of landscapes and locations within it. Discuss how special this place is!
- 2 In teams, thought shower what pupils' favourite aspects of the Biosphere are and represent them in a clay plaque about the size of a dinner plate. Once dried, painted and coated in PVA or varnish, they can be hung and admired in a school exhibition!
- 3 Our Biosphere is home to lots of sheep farms! Can pupils work in teams to produce a Biosphere wallhanging using wet felting techniques? This activity requires wool, soap and water and instructions can be found through an online search. Individual wallhangings can be produced inside a ziplock sandwich bag; expect loads of bubbles and squeals of delight as pupils watch the product of our local sheep farmers turn into a wonderful and unique piece of art for their exhibition!
- 4 What better way to explore our Biosphere than to see and smell it within our classrooms? To do this, fill up tubs with natural objects and simply fill with water and freeze! Offer each group a frozen piece of Biosphere and watch with delight as pupils see, touch and smell the Biosphere as it melts. Once melted, the items can be collected by the pupils for further exploration and classification. Offering a tub from a season different to the current one is a brilliant way to discuss seasonal changes in a real context. Alternatively, try filling the tubs with items from a variety of habitats and discuss where they came from and how the contents differ e.g. garden, beach and woodland. Once the pieces are collected, use them to create a piece of transient art.



5 A great way for the pupils to engage with the wonder of the Biosphere is to help them use their senses to notice the small things! A sensory scavenger hunt would be an excellent way to do this. This could be undertaken on a walk in the local area or simply within your school grounds. Challenge pupils to find and bring back something from a theme e.g. something soft, green, rough, etc. IDEA! Pre-prepare a mat for pupils to categorise things using their senses – smooth, rough, bumpy, tiny, shiny etc. Use the data collected to create a simple graph or table. A selection of pre-collected objects could be used if using outdoor spaces isn't possible.



- 6 Setting up a nature table in the classroom could provide an engaging context for some MTV routines such as "I see, I think I wonder". Watch as pupils explore, discuss and think about the wonderful things nature provides, and encourage them to collect and bring their own found items!
- 7 Host a Bioblitz! Record as much wildlife in an area as possible within a time frame (typically a day). This activity can be repeated at different times of the day/season/year to explore how wildlife is active at different times. Choose a wilder area of your school grounds or nearby green space. Record any wildlife found in that area within the time given e.g. birds, insects, plants. Record the information and use data handling skills to interpret and then display the data collected!

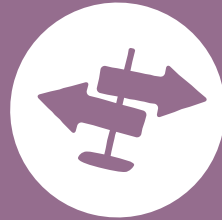


A school showcase of the finished items would make a fabulous exhibition which in itself would provide countless learning opportunities.



TOPIC 2

WONDROUS WILDLIFE – GET YOUR BIOSPHERE MAPS & ANIMAL ICONS READY!



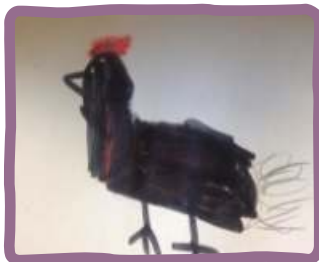
Activities for this topic are supported by the Biosphere map (p.10-11) and animal icons (p.19) which can be photocopied and cut out.

OSPREY:

The osprey is a large, migratory bird of prey that lives in West Africa during the Winter and in our Biosphere in the summer.



- 1 Wildlife videos are available on the 'Resources' page on the Biosphere's website (www.gsabiosphere.org.uk), tagged as 'Learning for Sustainability'. Show the osprey video or source footage of ospreys to share with pupils.
- 2 Ospreys use sticks to make huge nests, up to 6ft wide. In your school grounds or nearby woodland, challenge pupils to work in groups to make a full size osprey nest outside using sticks!
- 3 Ospreys mainly eat fish that they catch straight out of rivers and lochs with their powerful talons. Ask pupils where they think ospreys would live and place their markers on the Biosphere map.
- 4 Migration: Investigate the routes the ospreys take on migration to West Africa. Follow the real migrations of ospreys online in spring/autumn and find it on a world map. Look at online maps to see the habitats where it spends the winter in Africa. In summer, tune in to live osprey cameras of nests and chicks online from around Scotland.



RED DEER:

The red deer is the largest of Scotland's mammals and can be found all over our Biosphere.



- 5 Wildlife videos are available on the 'Resources' page on the Biosphere's website (www.gsabiosphere.org.uk), tagged as 'Learning for Sustainability'. Share the red deer video or source footage of red deer to share with pupils.
- 6 Ask pupils in what kind of habitat might we find a red deer? Ask pupils to place their red deer marker on the Biosphere map where they think they might live.
- 7 Draw, cut out and stick foods eaten by the red deer onto a paper plate: leaves, shoots, fruit, berries, grass.
- 8 Draw red deer footprints on a piece of brown paper to look like mud!
- 9 Can the pupils make a fact file about the Biosphere red deer?

PINE MARTEN:

The elusive pine marten is another mammal that lives in our Biosphere.



- 10 Wildlife videos are available on the 'Resources' page on the Biosphere's website (www.gsabiosphere.org.uk), tagged as 'Learning for Sustainability'. Show the Pine Marten video or source footage of pine marten to share with pupils.
- 11 Pine Martens are omnivores. Ask pupils what they think pine martens eat.
- 12 Ask pupils where they think pine martens might live and place their pine marten markers on the Biosphere map.



RED SQUIRREL:

This special mammal lives in our Biosphere. Red squirrels are protected because of problems caused by the invasive grey squirrel, including greys being more voracious feeders and carrying a disease called squirrel pox.



BLACK GROUSE:

This is one of Scotland's rarest birds. It lives in our biosphere and is one of our high focus species. Males are black with a white tail and fight with each other for females – this is called lekking.

- 13 Wildlife videos are available on the 'Resources' page on the Biosphere's website (www.gsabiosphere.org.uk), tagged as 'Learning for Sustainability'. Show the black grouse lekking video or source footage of black grouse to share with pupils.
- 14 Ask pupils what kind of habitat they think the black grouse lives in and place their marker on the map.
- 15 Investigate the habitat, appearance, diet and threats to Black Grouse to produce a fact file.

- 16 Wildlife videos are available on the 'Resources' page on the Biosphere's website (www.gsabiosphere.org.uk), tagged as 'Learning for Sustainability'. Share the red squirrel video or source footage of red squirrels to share with pupils.
- 17 Red squirrels are omnivores, ask the class to guess what they eat. EG shoots, flowers, nuts, fruits & seeds.
- 18 Squirrels use sticks and leaves to make nests called dreys. In your local area or in school grounds ask pupils to work in teams to collect sticks, moss and leaves to make a squirrel drey of their own.
- 19 Ask pupils where they think red squirrels would live in the Biosphere and place their squirrel markers on the Biosphere map.
- 20 Discuss how the squirrel prepares for winter, by hiding nuts. Hide a number of milk bottle lids or similar for the pupils to find, gather, hide and prepare for winter!

IDEA!

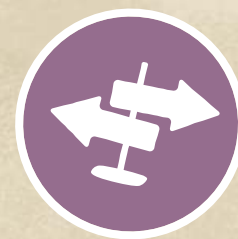
EXTENSION IDEA! Ask pupils which of these species might encounter each other in our Biosphere? Will they have an impact on each other and how? Which of these species are affected by people and how?

Weather research is showing that due to climate change, the weather in the West of Scotland is becoming warmer and drier in the summer and warmer and wetter in the winter. Ask pupils to look at the Biosphere map: What effects might climate change have on the habitats in the Biosphere? Which of the species mentioned today might be affected by climate change and how? Think about their habitats, behaviours and food chains.



TOPIC 2

GALLOWAY & SOUTHERN
AYRSHIRE UNESCO BIOSPHERE



NORTH
CHANNEL



STRANRAER



NEWTON
STEWART



GLENTROOL



GIRVAN



AYR



CUMNOCK



DALMELLINGTON



SANQUHAR



THORNHILL



DUMFRIES



DALBEATTIE



CASTLE DOUGLAS



KIRKCUDBRIGHT



WHITHORN



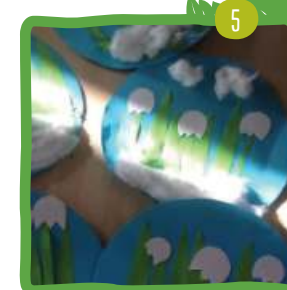
MAP UPDATED 2023

TOPIC 3 FANTASTIC FLORA!



There are so many incredible plants in our Biosphere, we are spoiled for choice in what to share with our pupils! This topic is to help them appreciate the spectacular plant life right here on our doorsteps!

- 1 Spend time looking at plants from the Biosphere with the pupils and discuss the wide-ranging colour palette they provide us with. This could be done on a nature ramble or by bringing some into the classroom. Be sure to explain that we only pick plants if it is safe and nature-friendly to do so, for example if we are going to use them for food or making something useful.
- 2 Using plants from the Biosphere, help pupils to produce a selection of natural dyes. Plants like Hawthorn, brambles and nettles can be boiled up to make excellent dyes, or crush brambles or berries and mix with water. Use the dyes to make a piece of tie dye cotton, or to paint with directly. Could pupils sew their fabric together into Biosphere bunting to decorate an area of their school?
- 3 Explore the colour pigments within our Biosphere plants using the Japanese technique of Hapa Zome – use rubber mallets or smooth stones to gently hammer plants onto white cotton. Marvel at the often unexpected colours transferred onto the fabric. Use the plants to make patterns and hang as wall-hangings or flags.
- 4 Spring in the Biosphere is a special time - a particularly lovely sight is the appearance of the snowdrop. Take a walk in the local area to spot some snowdrops or indeed other spring flowers – do pupils notice where most spring flowers grow (in woodlands). Explain that they flower early in the year to get sunlight before the leaves grow on the trees and take it all! Use what pupils have seen to produce some lovely artwork.



- 5 Plant some snowdrop or daffodil bulbs in autumn and watch them emerge in spring.
- 6 Read poetry that was inspired by the natural world such as 'Daffodils' by William Wordsworth, and use this as a base for a poetry session.
- 7 Lichens are an important type of plant. They are best known for being an air quality indicator, meaning the more lichens in an area, the cleaner the air. Ask the class to search the school grounds for lichens. Can they use an ID chart or key to identify the species? FACT! There was a time in Scotland when lichens were worth more than gold. This was due to lichens being used to dye sheep wool which would be woven into tweeds!
- 8 Fungi is abundant in the Biosphere at the right time of year! Ask the class to very carefully search the school grounds for fungi, beware some of them are very small!
- 9 Trees are an important part of the Biosphere and offer excellent learning opportunities. We all know that counting the rings of a tree lets us calculate its age, but there are many other ways to investigate a tree! Try working out the height of a tree, matching leaves to bark, or using seeds to identify species. Pupils can investigate the similarities and differences between conifer and deciduous trees, and learn about their lifecycles. Trees can also be explored as habitats for wildlife.
- 10 Identifying trees is especially challenging in winter when they have no leaves! Place winter twigs inside small plastic, numbered bottles and provide an iDial or ID chart to practice identification.
- 11 Hang facts about pine trees on card pinecones on a Christmas tree for pupils to read and recount later.
- 12 Use tree bark to make bark rubbings!



Make friends with a tree in your school grounds – what species, age, height is it?! How many people are needed to reach all the way around it?



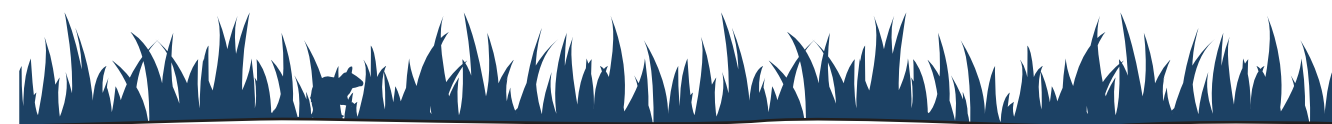
TOPIC 4

A NOCTURNAL WONDERLAND



Barn owls are nocturnal birds of prey that live in our Biosphere. Watch the barn owl video on the 'Resources' page of the Biosphere's website (wildlife videos are tagged as 'Learning for Sustainability') or source other footage to share with pupils.

- 1 Print a selection of owls and stick up as a display, ask pupils to discuss the similarities and differences between them.
- 2 Owls hunt silently due to the special feathers on their wings. They mainly eat mice, voles, and other small animals, regurgitating indigestible material such as hair and bone in the form of a 'pellet'. Make a cut-and-stick collage showing the diet of the barn owl, or if you are lucky enough to find an owl pellet you can break it open to reveal the tiny bones of their prey inside! Stick laminated 'bones' into a petri dish and ask the pupils to use an ID chart to decide what the owl has eaten.
- 3 Produce some lovely art based on the barn owl!
- 4 Thought shower what other creatures might be active at night in the Biosphere? Investigate bats and moths for special senses such as echolocation and seeing in the dark or make a collage of nocturnal creatures and their food webs!
- 5 The Biosphere is home to an internationally-designated Dark Sky Park! The constellations of the night sky provide a world of amazing stories and fabulous ways to learn. Constellations can be learned and replicated using pebbles and matchsticks, or gold pipe cleaners and beads. Explore the many myths and legends behind the Constellations, such as Orion, the Great Hunter in the sky.
- 6 For a creative writing task, ask pupils to create their own constellation and write the myth behind it.
- 7 Could pupils use drama techniques such as hot seating to act out and explore the stories of the night sky?
- 8 The study of the Dark Sky Park also lends itself to studying the seasons, the moon, planets, and the rest of the solar system.



TOPIC 5

COOL COASTS AND BRILLIANT BEACHES



We are thoroughly spoilt by the stunning coastlines we have here in the Biosphere and whilst nothing beats actually visiting a beach, these activities help you bring the beach easily into your classroom!

- 1 Fill "think tanks" (e.g. plastic fish bowls) with interesting items like shells, crab claws, seaweed etc, for excellent opportunities for exploration and discussion including MTV routines such as I See, I think, I wonder!
- 2 Fill small plastic jars with seaweed specimens in water and provide pupils with torches in order to examine the wonderful colours and structures of different species of seaweed from our beaches! ID charts and keys can be provided to help the pupils to name the specimens!
- 3 Place small specimens of beach life into ice cube trays and set with resin to make curiosity cubes which provide excellent investigation opportunities. This could be equally successful just by freezing in water and allowing pupils to investigate as they defrost!
- 4 Symmetry and transient art are easily achieved with shells and driftwood from the beaches and provide an engaging activity for pupils!
- 5 If beach visits are not easily possible, rockpools could be recreated using a Tuff spot tray and some resources collected from a beach. Alternatively, fill the "rockpool" with creature facts. As pupils "fish" the creatures out, they read the facts and build their knowledge.
- 6 The birds along our coasts offer an opportunity to explore diet, behaviours and adaptations. Print several sea birds with facts and stick up as a display – pupils can use binoculars to read the facts surrounding them, make observational drawings or undertake some creative writing and art work inspired by the birds.
- 7 Can pupils work on some food webs or chains based on the creatures found along our coasts?



IDEA! Our shorelines and seas suffer greatly from pollution, especially plastic run-off from the land. Can the class do a project on reducing plastic pollution, or even plastic use! Could your school become a Plastic Free School? <https://plasticfreeschools.org.uk/>



TOPIC 6

BUBBLING BOGS – SPECTACULAR SPHAGNUM & PHENOMENAL PEAT



Bogs are fascinating landscapes, both colourful and environmentally important places, and are a priority habitat within the Biosphere. A bog is formed when plant remains don't fully break down due to waterlogged conditions; over time the remains become compacted and form the rich organic soil that is peat. Raised bogs form when a lake infills with plant remains - an unusual event, but there are examples in the Biosphere! Bogs can also be created when sphagnum moss covers dry land and prevents precipitation from evaporating, holding water in the ground.



- 1 Bogs are super important for a variety of reasons – they act as a carbon store, a water store, and they provide clues to our past.
- 2 Bogs hold a wealth of amazing species. One in particular is a carnivorous plant called the sundew. Watch a video of a sundew catching an insect or do a research project on carnivorous plants!
- 3 Sphagnum moss, known as the “bog builder”, is an important plant in bogs. There are at least 30 species of sphagnum moss in the UK, which are very difficult to tell apart. These species range in colour from red and pink, to orange and green. Sphagnum moss plants are very small, but they grow together in close proximity forming spongy carpets; 'hummocks' are even created when the mosses grow together to form large mounds up to a metre high. It can hold up to 20 times its weight in water. An experiment to investigate this idea is to explore which other materials are as absorbent and hold as much water as sphagnum moss. Materials excellent for testing would include nappies, paper towels, towels and sponges.
- 4 Peat is very important in storing carbon. Peat forms when plant material does not fully decay in acidic and anaerobic conditions (in the absence of oxygen). This process takes a long time: it takes a year for 1mm of peat to form. The peat bogs we see in the Biosphere are thousands of years old! In fact, one of the core areas of the Biosphere is Silver Flowe, a peat bog of extremely high conservation value. It is also a Site of Scientific Interest and a RAMSAR wetland of 'international importance'. It is home to rare species such as the Azure Hawker dragonfly. Once pupils have explored how important and interesting peat bogs are, as a next step explore the importance of protecting them. Encourage pupils to consider the importance of using peat free compost in our school gardens or at home, find out more about the bogs around us and the plants and animals that they support. Visit a bog if possible.
- 5 Generate discussion activities to raise awareness... A Diamond 9 discussion task with statements to position after group discussion is an excellent way to highlight the importance of bogs and the pupils' feelings towards them. Mud isn't just mud!



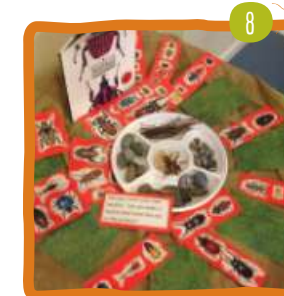
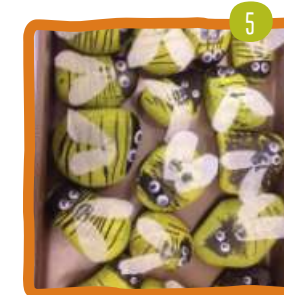
TOPIC 7

MARVELLOUS MINIBEASTS



A minibeast hunt in the school grounds is a great way to start engaging pupils with the amazing world of minibeasts, also showing how to respect and care for the world around us at the same time. Within our own classrooms there are endless possibilities to bring the wonderful world of insects indoors!

- 1 After investigating what types of mini-beats live in the Biosphere, plan and host an Ugly Bug Ball. Preparation work for the ball could include: invitation, musical instruments, dancing, menus, venue design, costumes etc.
- 2 Challenge pupils to plan, design and make a bug hotel for the school grounds. Lots of excellent Numeracy and Design & Technology links would be easily found in this task!
- 3 Allow pupils to research an insect of their choice. Provide a printed jar template and using ICT skills and other resources, ask them to draw a detailed observational drawing on one side and facts on the other.
- 4 Beetles and bees are both especially interesting to explore. Topics could include adaptations, diet, habitats, life cycles, food chains and pollination
- 5 There are different families of terrestrial minibeasts such as insects, crustaceans, bugs, molluscs etc. Many invertebrates prefer to live in dark, damp habitats. If mini-beast hunting, look in/under dead/rotting wood, or under stones for minibeasts. Scoop up the creatures using a spoon for a closer look, put them in pots while you identify them. Return them where they found them once finished.
- 6 Minibeasts also live in trees, eg caterpillars, spiders and aphids. Tree beating: A few pupils hold a sheet while another gently shakes a tree to see what falls onto the sheet. These creatures often fly so have a pot with a lid handy, to catch them quickly!
- 7 Different minibeasts live in grasses and vegetation. Try sweep netting: Using a large net with a handle, make long side to side sweeps through vegetation, long grass. Use a bug pot to collect bugs from inside the net. Once you have found the minibeasts, discuss/look at what they eat, watch how they move, look at where they live, discuss what might eat them.
- 8 Identify the head, thorax, abdomen of an insect. Count the 6 legs!
- 9 Create minibeast models using clay. Add natural items such as pine needles, or use sticks to make indentations in the clay. Challenge pupils to make a crustacean, arachnid or insect they have caught or studied. Collect pebbles and paint to look like minibeasts. If you have a school garden, the stones could be used to decorate it with a touch of varnish to protect them from the elements.



IDEA!

Dip into a pond or rockpool to find lots of interesting aquatic minibeasts. Use keys to identify them



ADDITIONAL RESOURCES

ONLINE RESOURCES

Galloway & Southern Ayrshire UNESCO Biosphere: www.gsabiosphere.org.uk

Learning for Sustainability Scotland: www.learningforsustainabilityscotland.org

UNESCO Sustainable Development Goals - Resources for educators:

www.en.unesco.org/themes/education/sdgs/material

UN Climate Change Challenge Badge: www.fao.org/3/i5216e/i5216e.pdf

Crichton Carbon Centre – Biosphere Explorers & Resource Pack: www.carboncentre.org/biosphere-explorers

NatureScot – learning outdoors and developing skills: www.naturescot

Forestry and Land Scotland – outdoor archaeological learning: www.forestryandland.gov.scot

South of Scotland Golden Eagle Project – Eagle Schools: www.goldeneaglessouthofscotland.co.uk

West of Scotland Development Education Centre: www.wosdec.org.uk

Eco-Schools Scotland: www.keepsotlandbeautiful.org/climate-action-schools/eco-schools

GLOBAL AWARENESS DAYS

World Wildlife Day – 3rd March / Earth Day – 22nd April / World Environment Day – 5th June

Also look out for national awareness events and themed days including the Scottish Nature Festival, National Outdoor Week, National Tree Week, Red Squirrel Week, Outdoor Classroom Day and National Mammal Week.

ID GUIDES

www.buglife.org.uk
www.rspb.org.uk
www.plantlife.org.uk

ID APPS

iNaturalist: www.iNaturalist.org
 iRecord: www.iRecord.org.uk
 Woodland Trust: www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/tree-id-app/

A NOTE OF THANKS:

The photographs and video resources incorporated within this Learning for Sustainability Toolkit have been generously shared with the GSA Biosphere by our friends Sarah Blackie, Iain Leach, Roy Robertson, Keith Kirk, SWSEIC, and the RSPB.

THIS TOOLKIT WAS PRODUCED
 IN PARTNERSHIP WITH
 GIRVAN PRIMARY SCHOOL

GIRVAN PRIMARY
 SCHOOL

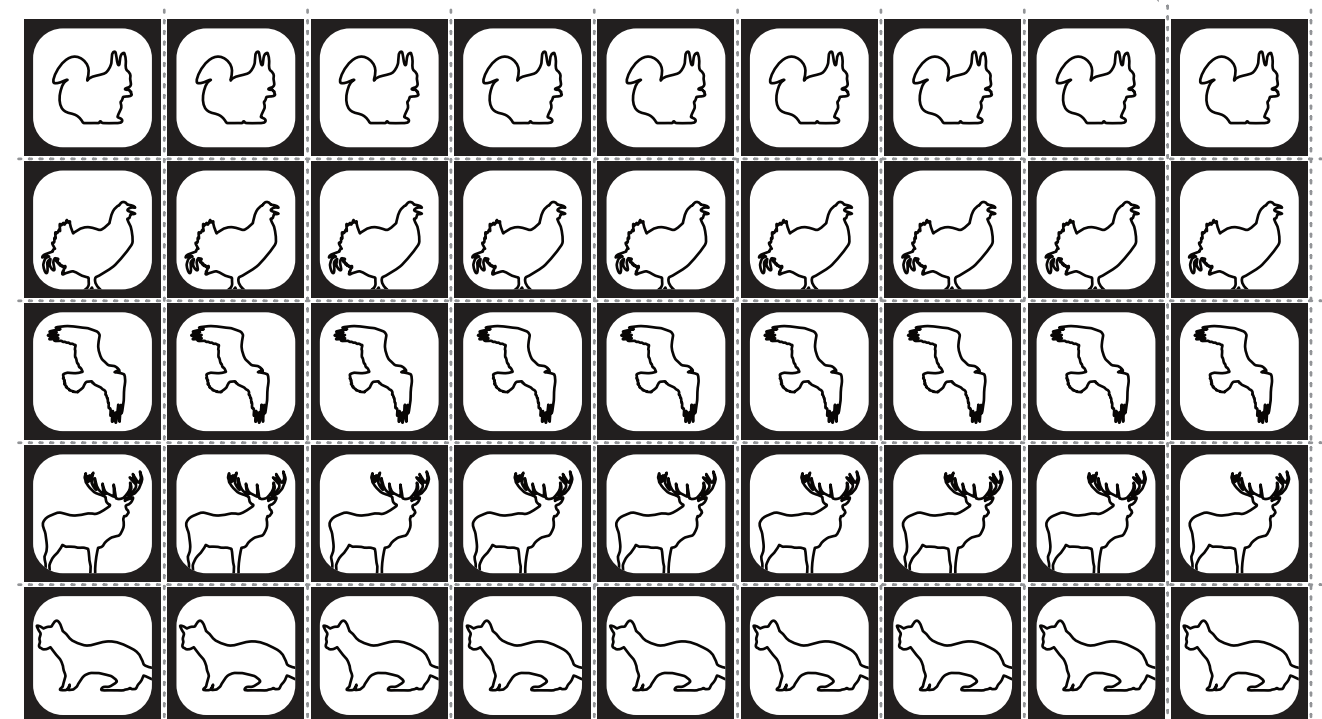


“This Learning for Sustainability Toolkit could not have been produced without the contributions of pupils from Girvan Primary School and their teacher, Sarah Blackie, who have shared their curiosity and creativity with our team – and now with young learners across the Biosphere! We wish them all many adventures and explorations to come.”

Ed Forrest, Director,
 Galloway & Southern Ayrshire UNESCO Biosphere

ANIMAL ICONS FOR MAP ACTIVITIES

Photocopy the Biosphere Map on p.11 and the icons below for hands-on activities. The icons can be cut out and coloured in.



"I LOVE LFS- IT HELPS ME TO THINK ABOUT MY WORLD! I LIKE WHEN WE WORK IN TEAMS TO THINK ABOUT PROBLEMS!"

JAKE AGE 9

"LFS TEACHES ME HOW TO CARE ABOUT EARTH. THAT'S IMPORTANT TO DO THAT"

NOAH AGE 6

"LFS GIVES US TIME TO THINK ABOUT WHAT IS IMPORTANT TO US. IT MAKES US BELIEVE WE CAN CHANGE THE WORLD FOR THE BETTER"

TYLER AGE 11

"LFS LET'S ME LOOK AFTER WEE BIRDS AND BUGS. THEY ARE VERY GOOD LESSONS"

CAMERON AGE 6



GALLOWAY AND
SOUTHERN AYRSHIRE
BIOSPHERE



unesco

Galloway & Southern Ayrshire
Biosphere Reserve
since 2012
Man and the Biosphere
Programme