Biodiversity

We accept that the term 'biodiversity' may not be used explicitly with all learners

Eco Schools objectives

The Eco Schools objectives are to:

- Raise awareness amongst teachers and pupils of the term 'biodiversity', and the level of understanding of its scope.
- Communicate the benefits and values associated with biodiversity.
- Communicate the scientific and technical concepts and skills relating to biodiversity.
- Raise the number of local, outdoor experiences involving direct contact with nature, and those working to care for it.
- Demonstrate the benefits of integrating biodiversity outcomes into an Eco Schools' strategy. How it will affect the quality of life of the whole school, and tie in with its other strands e.g. School Grounds, Health and Well-being.
- Encourage schools to make choices that improve the biodiversity value of their local surroundings, and that use natural resources in more sustainable ways.
- Encourage schools to make national/international links with other schools to explore the local and global aspects of biodiversity issues and other's perspectives.

Learning outcomes

Through work on biodiversity pupils should be enabled to:

- Describe carrying out an outdoor site survey/audit, and planning and completing associated practical, local, outdoor investigations.
- Describe the importance of biodiversity in their local area and what can be done to improve it.
- Describe the scope of biodiversity in connection with wider/global issues of sustainable development – e.g. health, consumerism, climate change, genetic modification technology, and the introduction of exotic species.
- Develop enquiry skills and know where to find out more.
- Develop critical thinking and communication skills.
- Make choices and decisions that affect their lives (either individually or with others), and do something long-term for biodiversity – locally or globally.

SCOTTISH BIODIVERSITY FORUM

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Biodiversity pictures

1. Biodiversity - It's in Your Hands (Scottish Executive)
2. Bluebells in the Wood of Cree (RSPB)
3. Investigating the log pile, Crieff Road Nursery (SNH)
4. Orkney Mainland from the Air (RSPB)
5. Common starfish and Sea Anemones, St Kilda (Sue Scott/SNH)
6. An outdoor place for learning and teaching
7. Wild Atlantic salmon returning to spawn (SNH)
8. Getting out at Chatelherault PS
9. Enjoying their wild flower meadow at James Aiton PS (SNH)
10. Otter (SNH)
11. Our totem pole, The Royal School, Dunkeld
12. Helping biodiversity in an urban Glasgow school
13. Our wildlife garden, Pittenweem PS
14. Painted Lady butterfly (SNH)
15. Getting to grips with identification (SNH)
16. Highland landscape with native Scots pine woodland (RSPB)

> Fortunately around my native Dunbar, by the stormy North Sea, there was no lack of wildness, though most of the land lay in smooth condition. I loved to wander in the fields to hear the birds sing and along the sea-shore to gaze and wonder at the shells and seaweeds, eels and crabs....

JOHN MUIR (AMERICAN CONSERVATIONIST), BOYHOOD IN SCOTLAND 1913

The big picture

John Muir, walking along the beach at Dunbar or through the nearby fields today, almost 100 years later, would be amazed by what he saw and heard. Most of all he would notice how the views had changed. He would see more buildings and roads, less countryside and wild coast, cleaner, more mechanised farms. Also, he would hear more non-natural sounds, and see fewer birds and other animals. Does this matter?

Just as our health and well-being is affected both by our immediate surroundings and by things going on across the globe, so too is the health of our planet. Key indicators of our planet's health are found in the condition of its biodiversity – locally and globally.

Biodiversity at its simplest is the variety of all living things on our planet and their interaction in time and space. From the commonest to the most endangered - animal, plant, fungus or microbe. It includes the differences between species, differences within species and the range of habitats in which they live.

So far, about 1.75 million (M) species are identified. Scientists believe the total is nearer 13M.

All species, including humans, require a range of basic resources to keep them alive and healthy. We need oxygen to breathe, water to drink, food to eat and shelter from the weather, sun or rain. The living things on our planet provide many of these things for us. Some call it our 'life support system'.

*3 take a look at **Appendix 6** for examples*

- Biodiversity also carries out other helpful functions for the human race[3]:
- Plants **enrich and protect our soil** and prevent it washing away;
- Plants and animals are part of our **traditions and culture**;
- Our **major industries** rely on our biodiversity as their key resource – agriculture, fishing/fisheries, forestry and even tourism;
- Plants and animals remain important sources of modern **medicines**.

Whether we know which plants and animals may be useful to the human race, or not, there is an argument for protecting all plant and animal species for their own sake, because they are there. Similarly, we should conserve natural habitats and wild landscapes.




Between the 1940s and 1980s there was a 23% reduction in heather moorland, built and bare ground increased by 37%, the length of ditches doubled (mostly draining mires) and hedgerow length halved. 60% of farmland birds decreased their range and 40% of native land mammals were thought to be in decline.

There are many factors effecting species populations and ranges – find more about it at ***www.snh.org.uk/trends***

There are indications that the planet needs our help. Looking at the changes in character of our Scottish biodiversity in recent times, there are warning signals close to home. The good news is we can all do something to help. Through everyday choices and actions we can make a difference. Particularly, if we all understand the processes that have led to where we are now.

Processes of change

Our natural heritage and biodiversity, in Scotland as elsewhere, is the result of millions of years of evolution shaped by natural processes and, increasingly, by the influence of humans. Since the time John Muir lived in Dunbar, human ingenuity has brought us the internal combustion engine, aero and space technology, hydro and nuclear power, chemical pesticides and herbicides, telecommunications and computer technology, to name but a few. In recent years, new technologies have given humans the capacity to bring about significant changes, even to our global environments. In many cases this capacity has led, unfortunately, to damaging effects for our planet e.g. global warming, habitat destruction, species extinction, while the precautionary principle has been ignored.

The impacts we bring about are not only a consequence of the technologies and lifestyles we choose, but also of the ways we choose to value and use our land and its wildlife.

In Scotland, the UK and across the world, people mostly view land as a resource that should be made use of and/or 'tamed'. Only recently, in the last fifty years in the UK, have some people begun to value and celebrate 'wild land' for its own sake. To see the natural heritage (on land and in the sea) as a valuable resource for tourism and local economies. Something John Muir understood over 100 years ago.

The key processes that have damaged, and are still damaging, our local biological potential and biodiversity are:

- Habitat loss
- Habitat change
- Species targeting
- Species introductions

> We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong we may begin to use it with love and respect

ALDO LEOPOLD (AMERICAN CONSERVATIONIST), SAND COUNTY ALMANAC 1949

The Scottish Primrose only occurs in the north of Scotland, nowhere else in the world. It is restricted to the coastal machair grassland – lose this and this plant becomes extinct.

Some examples include:

Habitat loss: In Scotland/UK, technological and economic development since the end of the last World War has had a significant impact on wildlife habitats. The widespread use of concrete and tarmac in constructing our roads, housing estates and industrial complexes has resulted in direct loss of a variety of habitats, from heathland to salt marsh. The use of larger machines has meant the widespread removal of hedges across lowland areas and drainage of wetland sites. Many plants and animals are associated with specific habitats and it is these that are especially affected by such habitat loss. This is particularly serious for species that have a very 'local' distribution.

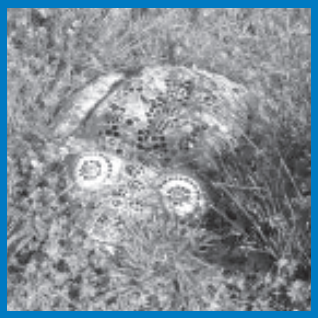
Habitat change: In Scotland/UK, farming methods have changed greatly, with mechanisation taking the place of people, horse drawn ploughs and reapers. Fields in the past were strewn with weed plants, spilt grain and weed seeds today they are 'swept' clean. Grass meadows naturally contain a variety of grass and herb species (wild flowers), unlike today's 'improved' meadows sown with a single species (rye grass). This variety of plants, seeds and spilt grain supported a complex food web of interdependent species (herbivores, carnivores, omnivores, fungi and detritus feeders) but today this complexity has gone.

Deer fences protecting the conifers have led to significant losses of birds that have flown into them, such as Capercaillie and Black Grouse, but also songbirds.

Species targeting: In Scotland/UK, certain species, for example, birds of prey like red kites, hen harriers and white tailed eagles have always been considered a nuisance by gamekeepers and farmers protecting grouse and sheep. Sadly, even today with the re-introduction of kites and sea eagles, the unscrupulous still set out to poison, destroy the eggs of, and/or shoot these large birds. Herbicides and pesticides, and now indirectly genetic modification, seek to eradicate 'weed' species. They are so effective, some native plant and invertebrate species are severely endangered.

Traditionally, snakes and spiders have been persecuted because they are snakes and spiders, and people find them scary.

Species introductions: In Scotland/UK, over the years people have brought species in from other countries to enhance their estates, for economic purposes, or for fun. This causes a variety of problems for our native wildlife. Native Arctic Charr populations are threatened by competing fish species introduced to the lochs where they live; Sika Deer are now interbreeding with our native Red Deer; hedgehog numbers on the Uists now threaten ground-nesting bird populations; the Japanese Knotweed, a garden escapee, threatens to out-compete other native plant species.

Some species are more vulnerable to these changes than others. Some have benefited at other species' expense. Magpie numbers have increased in recent decades due to their efficiency as predators. As hedges and woodlands have been made thinner and easier to see through, magpies spot nests more easily and predate eggs and young of smaller birds.

Read about it at ***www.rspb.org.uk***

Many of these changes are reversible through changing attitudes and land (and water) management practices. The Corncrake is a success story. Incentives for farmers in the Highlands and Islands to mow their meadows at particular times of year have resulted in a marked increase in this once endangered bird. Corncrakes were common across Scotland until the 1940s. On the Isle of Iona, off Mull, they are now commonly seen on the school field!

We have learnt that, whereas we used to think protecting and managing habitats was enough, we also have to manage for the specific needs of particular species, because we have interfered with the balance of nature too much. However, we will only achieve long term success by getting many more people involved in positive action for biodiversity, through increasing awareness, understanding and enjoyment of our natural heritage - locally and globally.

Have a look at ***www.un.org/geninfo/bp/enviro.html***

Local and Global – working together

A global approach to protecting our biodiversity really came together in 1992, at the first Earth Summit in Rio de Janeiro, Brazil. Discussion over what needed to be done to conserve biodiversity took place between government representatives from many countries. An agreement was drawn up called the **Convention on Biological Diversity**. Those signing up undertook to conserve the variety of the planet's plants and animals, and to make sure biodiversity was used in sustainable ways.

Over 159 countries signed the Convention; have a look for otters or barn owl at the website ***www.ukbap.org.uk/plans/index.htm***

The UK government signed up, and in 1994, the UK government published its plan for biodiversity – the **UK Biodiversity Action Plan** (UK BAP). It describes the actions government and others are expected to take in the UK to conserve our biodiversity. It identifies some nationally threatened species and habitats. It also outlines action plans seeking to protect and conserve these vulnerable habitats and species and the organisations that should take a lead in putting them into practice.




Local action - what's going on?

Do you know what is going on in your own backyard and beyond - in the local area and Scotland – in support of biodiversity?

In Scotland, the Scottish Executive launched its strategy for Scotland's biodiversity in 2004, with a publication *Scotland's Biodiversity – It's in Your Hands: a strategy for the conservation and enhancement of biodiversity in Scotland* . Developed in partnership with the **Scottish Biodiversity Forum**, the strategy sets out a vision for the future health of biodiversity in Scotland. It lays out a framework for action over the next 25 years, to conserve and enhance biodiversity for the enjoyment and well-being of everyone in Scotland. In addition, each 'region'[4] in Scotland has its own **Local Biodiversity Action Plan (LBAP)** and a group of people working on it. Most Local Authorities now have a LBAP officer. Have a look at the website **www.biodiversityscotland.org.uk**

4 *In some cases this matches individual local authority boundaries, but for some like Tayside, the 'region' is made up of several unified local authority areas. See the map at the website* ***www.biodiversity scotland.org.uk***

This is a perfect opportunity for schools to find out about how things fit together in their local world of biodiversity and discover the broader links with citizenship. In this way pupils will be given a chance to get in touch with and wonder at nature, gain understanding of the issues and experience in practical skills, such as project management, data handling and nature conservation, as volunteers.

So what can be done? Simply, find out about your local area, what's out there – common or endangered, what was there and could be there. Investigate the Old and New Statistical Accounts for Scotland and find out common plants and animals recorded for your parish in 1799 and 1844. Celebrate local and Scottish native plants and animals – what is your Local Council's flower emblem? Explore the importance of protecting both common and endangered species and habitats. What are the kinds of practical nature conservation activities that can help improve biodiversity? Get involved in doing some conservation – from a window box to a woodland.

Look for the Statistical Accounts for your school's parish at website ***www.edina.ac.uk/stat-acc-scot****/. Find out your Council's flower emblem at* ***www.plantlife.org.uk***

Biodiversity provides an obvious opportunity for making links between your school and the wider local community. Visits (in or out of school) with 'expert' naturalists who can share their knowledge and expertise with pupils; asking in enthusiastic




gardeners willing to work with pupils on particular 'wildlife friendly' projects; growing flowers and vegetables; involving parents or local businesses, who can help with materials or expertise in building bird/bat boxes, creating a tree nursery or pond or just lending support to fundraising events.

Whoever gets involved is guaranteed some enjoyment and satisfaction. Though, you may have to guard against those enthusiasts who want to take over. Make sure the pupils are given responsibility for the organising and getting things done.

The 'ecological footprint' is a useful concept. Described on p 123 in this Handbook, with a website to explore how it can be used as a tool by schools.

A new Handbook insert describes the Global Footprint project in Scotland, with its website ***www.scotlandsfootprint.org*** *to find out more (see also Additional Activities).*

What it means for pupils and schools

An Eco School can demonstrate care for others and biodiversity in several ways. It will show positive attitudes and values for the health and well being of the local habitats, plants and animals, as well as the people. It will encourage the use of the outdoors and first hand experience –by using the school grounds and local area for teaching and learning about, and demonstrating care for, biodiversity. In addition, in making choices that affect the use of natural resources e.g. purchasing goods, providing school lunches, transport, energy, water and waste minimisation, an Eco School will aim to reduce its 'footprint' on habitats and species, locally and globally. Biodiversity has connections with all the different environmental strands that, drawn together, characterise a healthy and caring Eco School.

For more ideas have a look at the following

- ***www.gflscotland.org.uk***
- ***www.ecoschoolsscotland.org***
- ***www.sptc.info***

What schools can do

Where you start will very much depend on your situation. What are your school grounds like – tarmac, mown grass or expansive and varied? What is your local area like – is there green space, a park, or community-owned land close by and easy to access? Where do you want to focus your efforts in association with biodiversity – improving school grounds, or making links with the wider community? Much will also depend on the staff/adult help, time, transport and funds available, as well as positive support for required timetabling. There are several sources of help.

A first step should be to visit the Scottish Biodiversity Forum's website at **www.biodiversityscotland.org.uk**, or **www.ukbap.org.uk/scotland**. Use these to find out who the LBAP officer for your local authority area is and how to contact them. The Local Authority LBAP officer, Countryside Ranger or your local Scottish Natural Heritage Area office (look in the telephone directory), should be able to




advise you. They may help put you in contact with key local people and organisations, or locate a site, and/or species that would suit your needs, take groups out, or come into the school grounds and share a talk/ walk on a 'nature' theme, and give advice.

Offering an opportunity to learn the skills and experience the feelings of wonder and enjoyment gained by a naturalist is an important gift in itself. For some it will become a source of recreational 'lifelong learning' and enjoyment. It can also lead to a range of employment and volunteering opportunities in adult life – journalism; photography/ art/sculpture; landscape architect; horticulture, practical/advisory roles in conservation land/water management through forestry marine, natural heritage and recreation management – countryside rangers, and monitoring for environmental protection and research.

Curriculum Links

Biodiversity can fit into the school's formal curriculum in a variety of exciting and stimulating ways. It can have outcomes that contribute to play, positive behaviour and responsible citizenship, as well as promoting the school as a healthy, happy and supportive place in which to work and learn.

At the research stage, pupils can seek and share outdoor experiences provoking a sense of wonder of the natural world. They can do this through developing skills in, for example, expressive arts, outdoor education, English or religious and moral education. A science-based investigation into habitats and species in the school grounds may have its data collected, analysed and presented through skills found in ICT, maths, personal and social development, geography/social studies, biology/ science, English and the expressive arts.

At the planning, implementation, monitoring and evaluation stages, pupils will draw on the content and skills learnt in all of the above areas together with skills in design and technology, citizenship and enterprise education. Overall, the achievements and outcomes for the pupils and staff, the increased use and improvement of the school grounds and local area, and making links/working with the wider community will help you meet all five National Priorities in Education.

> The near landscape is valuable and lovable because of its nearness, not something to be disregarded and shrugged off; it is where children are reared and what they take away in their minds to their long future. What ground could be more hallowed?

FRANK FRASER DARLING (SCOTTISH CONSERVATIONIST), BBC REITH LECTURE WILDERNESS AND PLENTY 1969

Although acknowledging the constraints of a subject based curriculum and timetable, try to avoid the traditional 'boxing up' of biodiversity within subject areas e.g. biology and geography (14-18), or Environmental Studies – Science and Social Subjects (5-14). Rather, use biodiversity as a vehicle to make the links and demonstrate the connections between all the different strands of a pupil's learning -the knowledge, understanding and skills across all subjects and cross-curricular themes.

Check out the Scottish Executive Education Department's new guidance " Health and Safety on Education Excursions" (HaSEE) 2004, find it at ***www.scotland.gov.uk/***

Health and Safety

If you are taking pupils out of the school grounds, possibly on a regular basis, it will be important to discuss with the head teacher/senior management team positive strategies, which will enable pupils to be taken out for constructive periods of time.

It will be particularly important to have established procedures for gaining parental consent, transportation (if required), additional adult/senior pupil assistance and their briefing, and to have completed any risk assessment process. Local authorities differ in the protocols to be followed for out of school visits – check yours out.

Activity: Making biodiversity matter

You may have already undertaken your school grounds audit following the ideas provided in the School Grounds unit and/or the environmental review checklist. You may, therefore, have decided to focus on biodiversity because of this. You may have decided to use biodiversity as a context for teaching and learning about the responsibilities of citizenship through improving links with the local community. In this way you may achieve a positive change for a habitat/s on a local action site near to the school and build on the foundations of what you have done in the school grounds.

Wherever you are coming from we hope to provide you with some ideas for enhancing the biological potential of your local area/school grounds, and studying the changes you have made, as a means for learning, enjoyment and celebration.

*Take a look at the guidelines for success given in the **School Grounds Unit** see p109.*

This approach will help you identify existing built and natural landscape/ habitat features that support wildlife, and then to think about what might be missing in the local area. The learning outcomes will be achieved more effectively if those involved in making choices and plans to improve the area for nature/biodiversity have responsibility for making the changes themselves. They should also be responsible for the monitoring, sharing and celebrating of their success.

1 Introduction : What do we think now?

A useful way to start, and a means of evaluating both pupils' learning and achievements, is to use an activity to take a 'measure' of what pupils know and feel now about the wildlife in their local area. It helps to define the area they are thinking about – for example, you may be concentrating on the school grounds or a local meadow. You can do it whether you have a housing estate with a tarmac/grass desert or a varied rural local 'patch'. Depending on how you want to use it for evaluation/ assessment, this could be a class 'brainstorm', a simple questionnaire completed by each individual or an outdoor individual/paired activity like *Special Places*[5] , or Grounds for Learning's *Sensitive Senses* and *My Space Cut Ups*[6] activities, or look at *Wordstuff* activities in *Talking to the Earth*[7]

5 *reference for First Nature and Second Nature see p167*

6 *See Ground for Learning's website at **www.gflscotland.co.uk***

7 *reference for Talking to the Earth see p166*

2 Class discussion: Why should we care about biodiversity?

You might prefer to start with a discussion about our dependence on nature/ biodiversity. Look at the benefits we derive from nature/biodiversity, following an introduction like, "Can anyone think of a food they have ever eaten that didn't connect back to a plant?" Encourage them to think about it and then collect the suggestions in and counter their claims! They may offer salt – a mineral. Correct. It is about the only one. You could make connections with the past – did people have the same choice of food? Why not? Where (geographic and/or process) does our food come from today?

Move on to ask about pupil's belongings or bring in an interesting container full of household products – clothes, CDs, skate boards, mobile phones. What raw materials are they made from? From plants, animals, or rocks/ minerals (include water)? Where in the world do these resources come from?

Make a large mind map of these natural resource/product connections coming from 'biodiversity benefits' at the centre. Use a world map to show where the food and natural resources come from originally. Ask the question, 'what if?' …… there is a flood, drought, oil reserves run out etc. Then lead on to ask 'what can we do locally, to make things better for the future?'

3 Planning a survey

With younger pupils, half of the class/school may go and explore the site and investigate as 'artists', and the other as 'scientists'. Give out appropriate props. They produce a map of their findings – annotated with field notes and recordings. They compare and share their findings (perhaps by taking a tour) and consider how they depend on each other's skills to appreciate and explain the biodiversity they find.[8]

Introduce a survey as a means of auditing the 'natural neighbours' they already have in the local area. Explain that the other purpose of the survey is to find out the 'housing and location preferences' these neighbours have, and what might be missing. This is because the overall purpose of the survey is an action plan to make the area a better place and hopefully to attract more 'natural neighbours' in.

Explain that they may have to look at their surroundings with 'fresh eyes' and from different perspectives (e.g. those of their natural neighbours); that they should explore the site thoroughly and at different levels (roof/treetop to basement/soil levels). This is especially if you think 'it's just tarmac'. You may have a surprise.

Consider the best time of day/ best season to carry the survey out. What kinds of things will affect the investigators seeing wildlife? Could there be other evidence of the wildlife present to look out for?

Consider how best to collect and record the evidence. Habitats can be mapped using different coloured shaded areas – tarmac, wall, fence, grass, trees/ shrubs, pond etc. Plants/birds/invertebrates/mammals can be marked on a map with coloured spots, counted at each habitat, or sampled using quadrats, transects or timed intervals whether you have an expanse of concrete/tarmac or an area with a variety of habitats/species.

If you are using equipment practice using it first before splitting into small groups to survey. Be sure that anything caught is carefully released in the same place and if wood or stones are turned over that they are replaced carefully. Leave no trace of disturbance.

4 Doing the survey

Wherever possible organise pupils into small working groups of not more than five with an adult/shared adult (1 per 10) outdoors. How you work it on the ground depends very much on the size, shape and complexity of the area you are surveying, how used pupils are to group working, the age, ability, capability and behaviour of pupils, and the availability of adults/senior pupils to help.

Before each group separates to conduct its own survey/part survey, make sure they have identified [9] and shared out the group's responsibilities, and each group can tell you what they are doing and where they are going. Create your own checklist to help pupils navigate their way through a survey. Or use the discovery approach - just send them out to find what they can and record it. Then collate their findings and identify gaps for further enquiry.

5 Evaluating the evidence: What does it tell us?

Gathering all the information together to make sense of it is an important part of the survey process, whether a baseline survey or a repeat survey feeding into a long term monitoring project. There are ICT software packages that can help with mapping (e.g. Green2school, MapIT, MapMate) and databases (Black Cat, Excel), or traditional solutions such as 3D models, 2D/3D maps, wall-sized tables and compilation charts/graphs can be used.

The evidence collected should reveal two kinds of information:

- **About the living things present** – plant and animal groups present/absent, lots or few of each.
- **About where they live** – habitat needs, level above/below ground, aspect, exposure, temperature.

What does the evidence show? What is there and why do they think it is there? Are there native and/or alien species – does it matter? Can they say what is missing? What was here before – is there any way of finding out? Are there experts out there who can show them what their area looks like 'in the wild' or can show them how to find out what it was or could be like? What can they do to improve on the biodiversity they have found, without too much intervention?

8 See in Sunship Earth, Institute for Earth Education, in Additional Activities

9 Data recorder/s, equipment caretaker/s, task monitor/s, time keeper/s etc.

6 Developing an Action Plan

A school composter and/or a wormery are key ingredients for this. Please don't use peat products, Scotland's peat bogs have been over-exploited – we are losing this valuable habitat worldwide.

A tree nursery is a useful addition to school grounds - the pupils collect their own seed and grow up with their trees.

To widen horizons about the possibilities and familiarise pupils with other aspects of biodiversity, invite back in or, if possible, ask for a visit to a local wildlife site with the local Countryside Ranger or LBAP officer in order to find the signs, sounds and homes of the local 'natives'.

Touchstone 1: Proper preparation provides a firm foundation for enhancing biodiversity and biological potential - **improve the soil/vegetation complex**. Improving a soil's texture and structure will improve the capacity for plant growth. This allows a balance of air and water in the soil and for plant roots to grow and absorb water and nutrients. The development of the rest depends on time and the growth of food chains and webs. As plant, fungi and animal species, which are adapted to each other move in, the area's climate and other environmental conditions will also improve.

Touchstone 2: Generally **local and native are best**. Local and native species have developed in an area over thousands of years and are better adapted to the local climate and soils. They are best for growing and supporting a larger variety of species (but not always the largest number of individuals). 'Aliens' or 'exotics' are generally introduced for a different purpose – ornamental, educational, or commercial uses e.g. attractive gardens, research, food or timber.

An enquiry into the favoured living conditions of different groups of Scottish native plants and animals leads on to identifying realistic changes that you can make within the area being investigated – from creating and caring for a bird box to creating a pond.

All those involved should take part in agreeing an action plan. Small, manageable steps and a long-term vision generally prove more sustainable than a 'Hit Squad' and quick fix approach. When all the ideas have been considered and the most effective and realistic agreed, write them down, share and publicise them.

Make a list of realistic goals and set targets for when to achieve them. Develop a list of tasks required to achieve each goal and identify who is responsible for carrying them out, and by when. Devise ways of involving as many of the school and local community as possible. Some goals can be achieved fairly quickly while others may require more time and collective effort in getting more advice, getting approval, or doing more planning and/or some fund raising.

Use pupils' presentations (Powerpoint, dramatic) to influence head teachers and the Local Authority, parent groups or potential funding partners – local Rotary Club, community development group and/or Scottish Natural Heritage Area staff.

Then the fun can begin, putting the plan into action and watching biodiversity benefit.

7 Monitoring Progress

To ensure their action plan is being carried out and effective, the Eco School committee (or other agreed group) needs to monitor and evaluate the success of the overall process. They also need to check regularly that tasks are going ahead and targets are being achieved on time.

Some schools have established long term, annual/seasonal survey monitoring in the school grounds or local areas they have adopted. They record their findings on a database so that the changes can be identified over a period of years, and the data can be also used for a variety of purposes in school (maths, ICT, biology, science). If climatic data are being recorded at your school, this can be combined to provide valuable historic records and scientific data at a local level, and lead to interesting comparisons. This reality of purpose may be a further motivation for pupils getting involved – see next section *Additional Activities – Learning for Life* below.

8 Celebrating and Making it Public

As developments reap rewards – as significant tasks are completed and showing results e.g. willow nursery, new species recorded, or habitats created, it is good to mark the occasion. Organise some form of celebration and associated media coverage in the local community, or even nationally, so everyone can feel good about the changes as they happen.

Additional Activities

The Eco Schools website contains further details and references to a variety of activities. These focus on other aspects relating to biodiversity that may be explored further. They include the following:

Home and Away

This area of the environmental review lends itself well to making national and/or international links with other schools. Use this as a way to share your information and data, as a meaningful way of exploring local and global dimensions of issues connected with biodiversity. On the website you will find guidance and contacts for setting up such school links and partnerships.

Hotspots and species

The Local Biodiversity Action Plans partly consist of individual habitat and species action plans, for those requiring special protection locally. A key part of the process includes involving schools and local communities in the conservation and enhancement of their local biodiversity. Guidance on how to get in touch with your Local Biodiversity Action Plan officer and what's happening locally is given on the website. There may be particular species or habitats needing attention locally or sites that need regular monitoring, which you may be well placed to help with.

Learning for Life

There are many nature conservation organisations out there. Their common aim is to motivate young people, schools and the general public to care for their natural heritage. They introduce experiences that may lead to a lifetime's leisure interest and/or occupation, by getting people involved. On the website you will find a selection of some tested practical projects, events and awards helping you get started and maintain momentum is just part of what they can provide.

Ways to Wonder

There are plenty of opportunities to explore the ways in which an aspect of 'biodiversity' has inspired writers and poets, artists, sculptors, musicians and other artisans today, and especially in the past 200 years. By taking pupils to experience, first hand, both our wild and natural areas and our Botanic Gardens or Zoos/ Highland Wildlife Parks we may provide that spark of inspiration and understanding for them. Look at this section of the website and you will find a variety of resources that may in turn give you ideas for designing your own activities.

Health and Well-being

Biodiversity applies as much to the care and conservation of our wildlife, as to ourselves, for example, in thinking about what we do and eat to keep healthy. There are links with plant and animal husbandry through organic gardening and farming, to protecting the continuation of rare breeds of animal (pigs, sheep, cows) and plants (apples, potatoes, cereals) and their genetic diversity. Gardening has many benefits in both conserving biodiversity and keeping us out of doors and physically healthy, it is also very therapeutic, bringing benefits to our mental health. Several schools have adopted gardening and gardening 'clubs', as a means of behavioural change and also as a means of encouraging parents without gardens into school for mutual benefit. Here are some ideas and resources.

Making connections

All things are connected and making the connections explicit for young people is a crucial teaching and learning outcome. Biodiversity offers an opportunity to explore a variety of ethical, social, economic, political and environmental issues, at all levels through discussion of genetic modification, climate change, consumerism, ecological footprints, land use, fishing and sustaining viable species populations etc. Such debates will help pupils to think critically about the world – the local and global community, the impacts of the way we live and the choices we make, and contribute to their becoming more informed and responsible citizens. On the website you will find a couple of ideas, resources and contacts.

Biodiversity: case studies

Biodiversity can be used in various ways - as a focus for school ground improvements, or for extension into the local community. It may be taking positive action for a site in the local area, or a campaign across the community promoting wildlife gardening. Our case studies show a variety of ways schools have been caring for and conserving biodiversity. They hold in common creative ways of helping effective learning and enjoyment through concern and positive action for biodiversity.















BioBanks

Chatelherault Primary School, South Lanarkshire, is one of seven schools involved with the Biodiversity Banks (BioBanks) project. The project involves South Lanarkshire Ranger Service, LBAP officer, and its Greenspace and Land Services departments, working with local people. BioBanks is about seed 'banks' - collecting wildflower seeds from local meadows to create new meadows. The pupils and teachers are taught how to collect seed; to sow them and grow the plants on as 'plugs', and then to plant them out. At Chatelherault, organised through the Eco Schools Committee, the planting out was done in the school grounds. Other schools used meadow sites near their school. Planted in 2004, the children will monitor their flowers as they grow, learn how and when to cut the meadow for hay, and use their meadow for all kinds of learning and enjoyment. The grassy bank will be a colourful meadow, and with time, attract a rich variety of other wildlife.

Roley's Wood

At **Currie Community High School**, Edinburgh, management of a neighbouring woodland strip along the eastern edge of the campus has been going on since 1989. A group of sixth year pupils originally proposed action to restore the neglected woodland as part of a local community initiative – their teacher was rather sceptical of their idea, but they did it! The woodland (of ancient origin) was dying from Dutch Elm disease, and was being used by locals as a rubbish dump. The original project was to clear the woodland and stream running through it of the rubbish. Since then native trees have been planted to replace the dead elms and, the paths have been upgraded. The dead elms have been felled, or have fallen, and been allowed to rot, providing habitats for other wildlife. Over 600 trees have been planted around the campus margins to provide shelter for pupils and act as a wildlife corridor link. See the School Grounds Unit case studies (p120) to find out other developments. Have a look at **www.currieecology.org.uk**.

Braes Woodland - A vision realised!

Rousay Primary School is located on a largish island off the north-east coast of the Orkney Mainland. As such it is not well-known for its woodland - salt wind exposure and rabbits are major constraints. In 1991, a local youth leader on Rousay had a vision for an area of her ground adjacent to the school (where the Youth Club met). The field would enable a youth club woodland initiative and provide a living resource for the school. The aim was to enhance the biodiversity of the island, and by involving local children and adults, encourage an understanding of the sanctity of nature, and how habitats sustain life. In addition to planting and protecting trees and shrubs, a pond was developed to support an even wider variety of wildlife. The story has been recorded in a book - *Braes Woodland Diary - the first ten years* (2004). The enthusiasm of the staff and pupils has been essential in realizing what is now maturing woodland.

Backyard Biodiversity

At **Humbie Primary School**, the smallest school in East Lothian, the school grounds have been transformed over a period of 4 years. The school had neglected and uninviting school grounds. A project was set up involving pupils and the local




community. Today, the school has a number of habitats and features encouraging its use and enjoyment as an outdoor classroom and recreational area. Areas have been reserved for the benefit of wildlife, thus increasing the biodiversity value of the school grounds, as well as providing a valuable teaching and learning resource. There is a bird and insect area, a composting bin and rain collecting butt, raised flower/vegetable beds accessible to those less able and/or confined to a wheel chair, a mini pond, a woodland area and a small orchard. This 'improving school grounds' project shows clearly how well developing areas for wildlife contribute, also linking well with developing a school ethos focused on 'looking after ourselves and others'.