



# Biodiversity

## Activity pack & information

Part of the British Science Association's National Science & Engineering Week activity pack series. [www.nsew.org.uk](http://www.nsew.org.uk)

**BIS** | Department for  
Business Innovation & Skills



# BIODIVERSITY INFORMATION & ACTIVITY PACK

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#### **Pg 3 Activity 1- Mini-beast news report**

Children take on the role of newspaper reporters and through investigation and a mini-beast hunt they write a report on the lives and habitat of a mini-beast. Through this they get an appreciation for the range of life in one small area and how many different things one mini-beast relies on.

#### **Pg 5 Activity 2 – How many trees can you find?**

Using the Woodland Trust activity packs children see how many different types of trees that they can find, and can then use the leaves to make leaf skeletons. This helps build an idea that even within one type of living thing (trees for example) there can be thousands of different species.

#### **Pg 6 Activity 3 – Make a bird mobile**

Through a bird watching activity and using the RSPB's bird identifier, children find and draw pictures of different birds, and then use these bird pictures to make a mobile. This activity also builds an appreciation of the range of species.

#### **Pg 7 Activity 4 – Food web**

A group of children build a physical food web using a ball of string. This physical demonstration can be used to explore how interconnected the species in the food web are and why they are all important to the balance of the web.

#### **Pg 9 THREAT – Foreign Species**

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The introduction of the effect of the introduction of a new species is investigated using the example of Japanese Knotweed in the UK. Children make a flick book to illustrate the story.

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Children see if they can find any lichen to find out the effect of pollution on what species can grow. This helps them to investigate why the changing environment can affect species.

#### **Pg 12 THREAT – Destroying Habitats**

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Children play a game to find out why people conserve habitats and think about why habitats are destroyed.

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#### **Pg 15 Find out more...**

##### **Activity 9 – See a collection**

Children visit a museum to see a natural history collection and get a further appreciation for the range of species.

#### **Pg 16 Save it for the future**

##### **Activity 10 – Your own Eden**

Children design their own biome for the Eden project. This should help inspire the idea that there local ecosystem is also interesting and in need of conservation and explore the range of species working together.

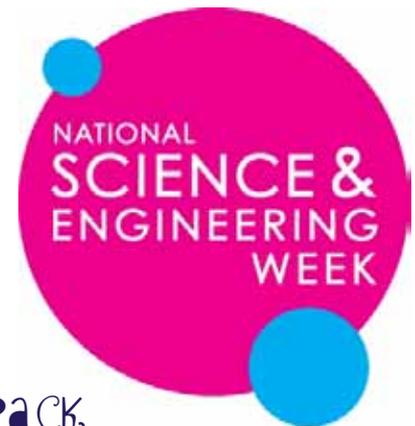
# BIODIVERSITY INFORMATION & ACTIVITY PACK

## WELCOME!

Welcome to the Biodiversity Information and Activity Pack for the What on Earth Project. This pack has been put together for National Science & Engineering Week and contains a variety of ideas and activities that you can do from school or at home.

National Science and Engineering Week takes place each year in March - it's the nation's largest celebration of science, engineering and technology. In 2010 theme of Earth was set to co-incide with International Year of Biodiversity, a UN initiative to raise the profile of the loss of biodiversity across the globe. This activity pack has been put together to inform and educate, with links to the curriculum and the British Science Association CREST Awards.

**For full information about National Science and Engineering Week please visit [www.nsew.org.uk](http://www.nsew.org.uk)**



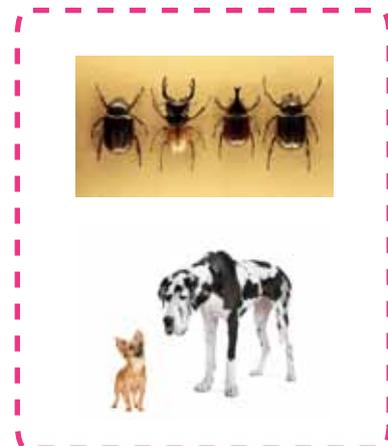
## SOME DEFINITIONS TO HELP YOU USE THIS PACK

### What is 'biodiversity'?

Biodiversity can be broadly defined as the variety of life on Earth. It can also be used as a measure of the variety of life found in one place. For this pack it is used to describe how many different species are in an ecosystem.

### What is a 'species'?

'Species' is the name used to describe a group of living things that can reproduce. An example of a species is 'humans' or 'lions'. Members of the same species tend to look and act similarly but it's not always that easy to tell; all dogs are one species but you would be forgiven for thinking that a Chihuahua and Great Dane were not that related. On the other hand there are 350,000 species of Beetle which we might find it very hard to tell apart. The ever expanding field of genetics is shedding more light on this difficult subject all the time.



### What is an 'ecosystem'?

An ecosystem is the way that living things work together in their surroundings. An example of an ecosystem is a rainforest; imagine all the bits working together, the trees and plants, the animals, the birds and the bugs. A system is the word used to describe a group of things that work together, in your computer system there is a motherboard and a monitor, the mouse and keyboard and they all come together to make the whole computer work. Eco is the word we use when we are talking about the living things in the environment. So an ecosystem is a collection of living things in one place that work together. The parts of an ecosystem might be water, soil, plants, animals etc. Like removing the keyboard from a computer an ecosystem is changed if you take one part away and won't work in the same way as it did before which is why we are concerned about extinction of animals and damage to their habitats.

## MINI-beasts

The average garden or park is home to a huge variety of mini-beasts. A mini beast, also known as creepy crawly, is a name that we give to all those little bugs crawling round the garden. They include spiders, insects and worms. Scientifically, mini-beasts are part of a family called invertebrates which means animals without a backbone. Some invertebrates like the insects have their skeleton on the outside; this is called an exoskeleton and gives them protection like a suit of armour. Other invertebrates, like worms, have no skeleton at all and are soft and squashy!

Mini-beasts are a really important part of the ecosystem of a garden, they provide food, they can help pollinate flowers and spread seeds and they can even help break down waste.

### Activity 1a – Mini-beast news report

Be a news reporter. Choose a mini-beast, like the Stag Beetle, and write a report on it and it's home. The report could be for a newspaper, a magazine or even for the radio.

What to do:

- Choose a mini-beast to write the report on. The mini-beast could either be found in a book or on the internet or found in the wild on a mini-beast hunt! (See Activity 1b).
- Find out as much as you can about the chosen mini-beast.
- Draw a picture of the mini-beast (or if you find it in the wild take a photo or video).
- Write answers to some of the interview questions and use these answers to write up the report.
- Design a newspaper or magazine layout for the story.

Check out [www.whatonearth.org.uk](http://www.whatonearth.org.uk) for mini-beast pictures you can draw!

### SOME QUESTIONS FOR THE MINI-BEAST INTERVIEW

Where do you live?

What is it like?

Is it warm and dark or bright and airy?  
What plants, trees, animals or other mini-beasts are about?

Is it somewhere that humans often go like a playing field or is it tucked away?

What do you eat?

What do you have to hide from because it eats you?

What would be the worst thing that could happen to you? Would a flood wipe away your home? What if it got really hot? Or if people decided to build a path?

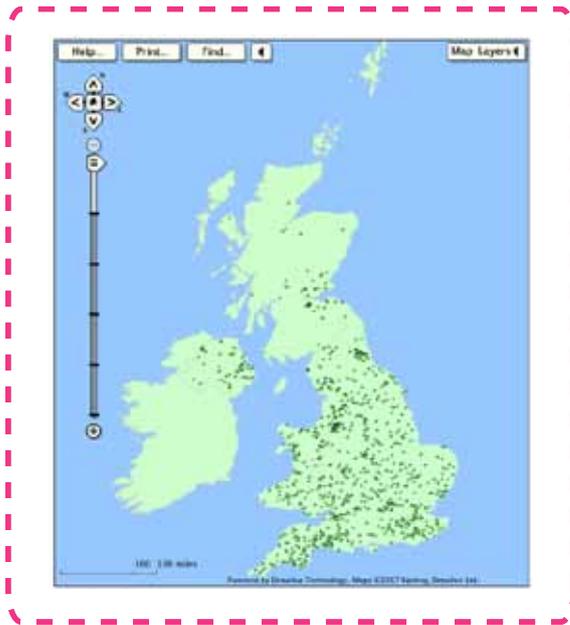




# BIODIVERSITY INFORMATION & ACTIVITY PACK

## TREES

There are 1,000 Woodland Trust sites across the UK. They are a great place to visit to find more about the range of trees that grow on the UK.



### DID YOU KNOW?

There are **100,000** different species of tree and **10,000** different species of bird in the whole world!

For a Woodland Trust site near you, visit [www.woodlandtrust.org.uk](http://www.woodlandtrust.org.uk)

### Activity 2 – How many trees can you find?

Go on a nature walk in your local woodland trust site. Sign up to be a Woodland Trust Nature Detective at <http://www.naturedetectives.org.uk/>

Download a leaf ID sheet to help identify the leaves that you find. A pouch to collect leaves in can also be downloaded and made up.



### OTHER THINGS TO DO WITH LEAVES

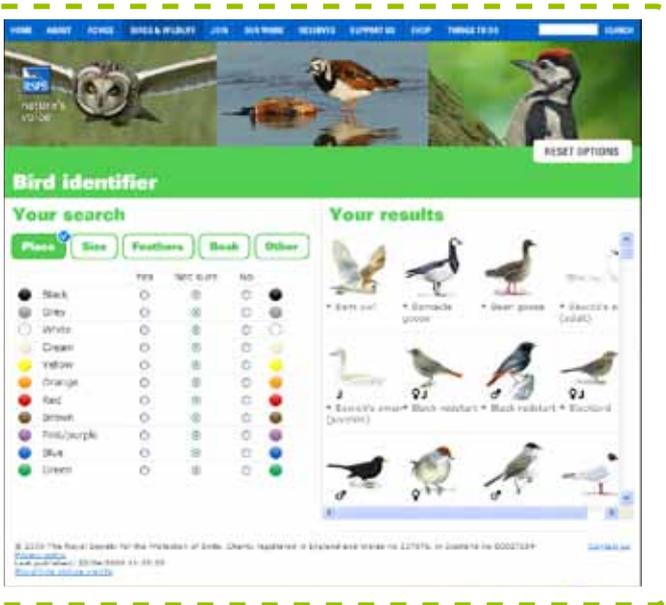
**Make a leaf collage** - stick leaves onto a sheet of sugar paper to make a design

**Make a leaf skeleton** - place your leaves on a newspaper and tap with an old shoe brush until the green material works away, then dry in an airing cupboard.

# BIODIVERSITY INFORMATION & ACTIVITY PACK

## BIRDWATCHING

There are over 500 species of birds recorded in the UK. Bird watching is a very popular hobby and a great way to identify lots of species in your local area. Bird watching can be done anywhere, as birds are found all over the UK, it can be done out of the window in a city garden or on a trip to a bird reserve.



There are lots of tools to help identify birds, with a whole host of books available. The RSPB (Royal Society for the Protection of Birds) even have a bird identifier on their website:

<http://www.rspb.org.uk/wildlife/birdidentifier>

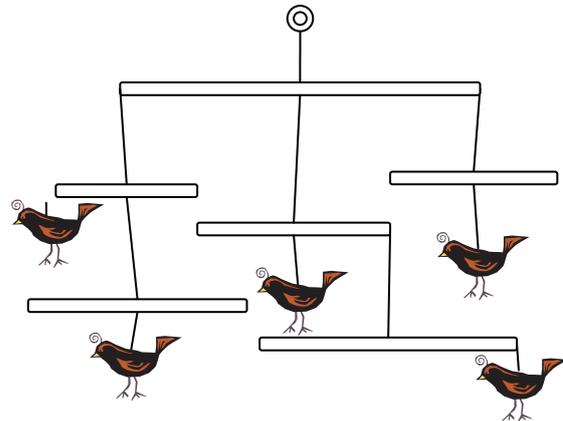
### Activity 3 – Make a bird mobile

You will need:

- White card
- Coloured pencils
- Scissors
- Glue
- Hole punch
- String
- Short twigs

What to do:

- Draw pictures of birds onto the card.
- Cut out the pictures, stick them back to back with the glue and then use the hole punch to punch a hole in the top of each one.
- Tie the twigs with the string so that they hang horizontally below one another (see picture)
- Tie string on to the birds through the holes and tie them onto the twigs so that they hang below them.
- Display the bird mobile near a window and the wind will make the birds move in the breeze!



## FOOD WEBS

A food web is a method of representing how all living things in a given ecosystem are interlinked. Food webs are more accurate than the more familiar food chains. A food chain is made up of living things that eat each other in order. An example is a producer (Grass) being eaten by a herbivore (Rabbit) being eaten by a carnivore (Fox). However this is not truly representative of how the world works, Rabbits are not the only things that eat grass, and lots of different things eat rabbits. If we start to include all the things that eat grass and that eat rabbits then the chains start to join up and we get something that looks more like a spider's web.

### Activity 4 – Duck pond food web

Students represent the various characters in the food web and use wool to represent the links between them.

You will need:

- Big group of people
- Ball of wool
- Character cards (printed from next page). (Enough for one each. Multiple cards can be assigned – apart from the sun)
- A space big enough for students to stand in a circle.

What you do:

- Each student takes a character card.
- Students make a circle.
- The sun starts with the ball of wool and using their character card, identifies which other characters they are linked to (in the case of the sun this is either the duck weed or the pond lily). The sun wraps the wool around their finger and then passes it on to one of the next character to represent their link. The next character reads their card and decides who to pass on to, wrapping the string around their finger before they pass it on.
- The group carry on going until all the living things are joined together multiple times.
- Once everyone is joined to someone else the importance of each character to the web can be investigated. One at a time characters can 'faint' and fall 'carefully' on the floor. This will pull on the strings and other characters will be able to feel the impact of this one character on the rest of the web.

### Some questions you can also ask:

Can you see how all the things in the pond rely on each other? Everything is important!

# BIODIVERSITY INFORMATION & ACTIVITY PACK

<b>The Sun</b>	<b>Duckweed</b>	<b>Small Fish ( e.g. Minnow)</b>
Gives energy to duckweed.	Gets energy from the sun	Gets energy from eating duckweed
Gives energy to pond lilies	Is eaten by small fish	Gets energy from eating pond lilies
	Is eaten by pond snails	Gets energy from eating pond snails
	Is eaten by crayfish	Are eaten by crayfish
	Is eaten by turtles	Are eaten by big fish
<b>Pond Lily</b>	<b>Big Fish (Bass)</b>	<b>Crayfish</b>
Gets energy from the sun	Are eaten by turtles	Get energy from eating pond lilies
Is eaten by small fish	Gets energy from eating small fish	Gets energy from eating duck weed
Is eaten by turtles	Gets energy from eating crayfish	Gets energy from eating small fish
Is eaten by Crayfish	Gets energy from eating catfish	Are eaten by big fish
Is eaten by pond snails		Are eaten by turtles
<b>Turtle</b>	<b>Catfish</b>	<b>Pond snail</b>
Gets energy from eating pond lilies	Gets energy from eating pond snails	Gets energy from eating pond lilies
Gets energy from eating big fish	Gets energy from eating dead matter from broken down small fish	Is eaten by small fish
Gets energy from eating crayfish	Gets energy from eating dead matter from broken down turtles	Is eaten by crayfish
Gets energy from eating pond snails	Are eaten by big fish	Is eaten by catfish
Gets energy from eating catfish	Are eaten by turtles	Is eaten by turtles

## THREAT - FOREIGN SPECIES

Ecosystems are finely balanced with each species finding their own niche. This balance can be easily disrupted by the introduction of a new species. There are many ways that this disruption can happen, directly, such as the new species killing the old species through fighting, predation or even bringing a new virus with it. The disruption could also be indirect, such as competing for food or changing the environment (a new tree could cause the areas under it to become too shady for other plants to grow).

In the UK, Japanese Knotweed was originally introduced as an ornamental garden plant in the 19th Century. Unfortunately when away from its natural habitat it grew out of control. This was because there were not the usual animals and insects that would feed on it and keep it under control. It also has some very interesting traits that help it colonise new areas, it can grow from a small piece of stem, this makes it really hard to control as even if it is cut down any small pieces left behind can regenerate.



Japanese Knotweed

### Activity 5 – Invasion!

Make a flick book showing what would happen to a garden that was invaded by weeds.

You will need:

- Copies of the flick-book layout (next page).
- Felt pens
- Scissors
- Staplers

What to do:

- Give each student a copy of the flick book layout.
- Explain that if the image changes slightly each time that the image will look like it moves when the pages are flicked through quickly. It might be sensible to do a practice sheet.
- Assist children to cut out their pages and place them on top of each other in the right order (It is sometimes easier to staple the pages in reverse order so the story starts from the end when flicking).
- Staple the pages together.
- Try animating the story by flicking the pages.

### What you can also do to help....

Ensure that new species are not allowed to run wild. This includes plants in the garden as well as pet animals.

Volunteer to help clear an invasive plant species in your area, keep an eye out in your local paper.

# BIODIVERSITY INFORMATION & ACTIVITY PACK

Flick book layout:

1		2		3	
4		5		6	
7		8		9	
10		11		12	
13		14		15	
16		17		18	

## THREAT - CHANGING ENVIRONMENT

The range of species living in an ecosystem depends not just on the other living things but also on the environment that it lives in. The environment basically means the surroundings; it could mean temperature, air quality, rainfall or amount of sunlight. If an ecosystem's environment changes then the range of living things that can exist in that ecosystem changes too. One way the environment can change is pollution, which changes the air quality.

### Activity 6 – We're all going on a Lichen Hunt

Lichen is an unusual living thing as it is actually two things living together; a fungus (a bit like a mushroom) and an algae (a simple type of plant). Together they form their own type of ecosystem and different lichens can grow in different levels of clean air. Searching for lichen is a good way to find out what the air pollution levels are like. Look on window sills, on the bark of trees, both living and dead, look on old walls and even old grave stones, if you have old schools buildings look on them too. Look at these pictures to see if they can help.



Here's lots of lichen growing on a window sill

There are two types of lichen to look for that really give you a good clue about the air quality.



This is a green globular lichen called Hypogymnia which will only grow in clean places away from pollution – we found this one in a woodland.



If you live in a city or town or by a road you might find this yellow Xanthoria, it really likes polluted air and will only grow where there is lots in the air!

Why not make a display from what you have found. Either for the school notice board or at home.

If you would like to find out more about lichen then have a look at:

<http://www.opalexplornature.org/?q=LichenGuide>

### What you can also do...

Reduce, Reuse, Recycle:

Try to use less energy as making energy in powerplants makes pollution and contributes to climate change. Make sure you get rid of your rubbish really carefully as if you leave it lying around it can hurt or kill animals.

# BIODIVERSITY INFORMATION & ACTIVITY PACK

## THREAT - DESTROYING HABITATS

A habitat means the place that the species lives and is vital to the survival of that species. As land use changes some habitats are destroyed to make room for roads or houses. The loss of a habitat can, without careful management result in the loss of a species. One way that this is combated is by leaving small areas of particular habitats, such as green belts or hedgerows.

### Activity 7 – Hedgerow Game

You will need:

- Mouse counters
- Dice
- Game board (next page)

What to do:

- Start the counters on the start square.
- Take turns to roll the dice and move the prescribed number of squares.
- Take note of the instructions.
- If you land on a hedgerow then use it to climb up to the adjoining square.
- If you fall into the river, go back ten spaces

Mouse counters:

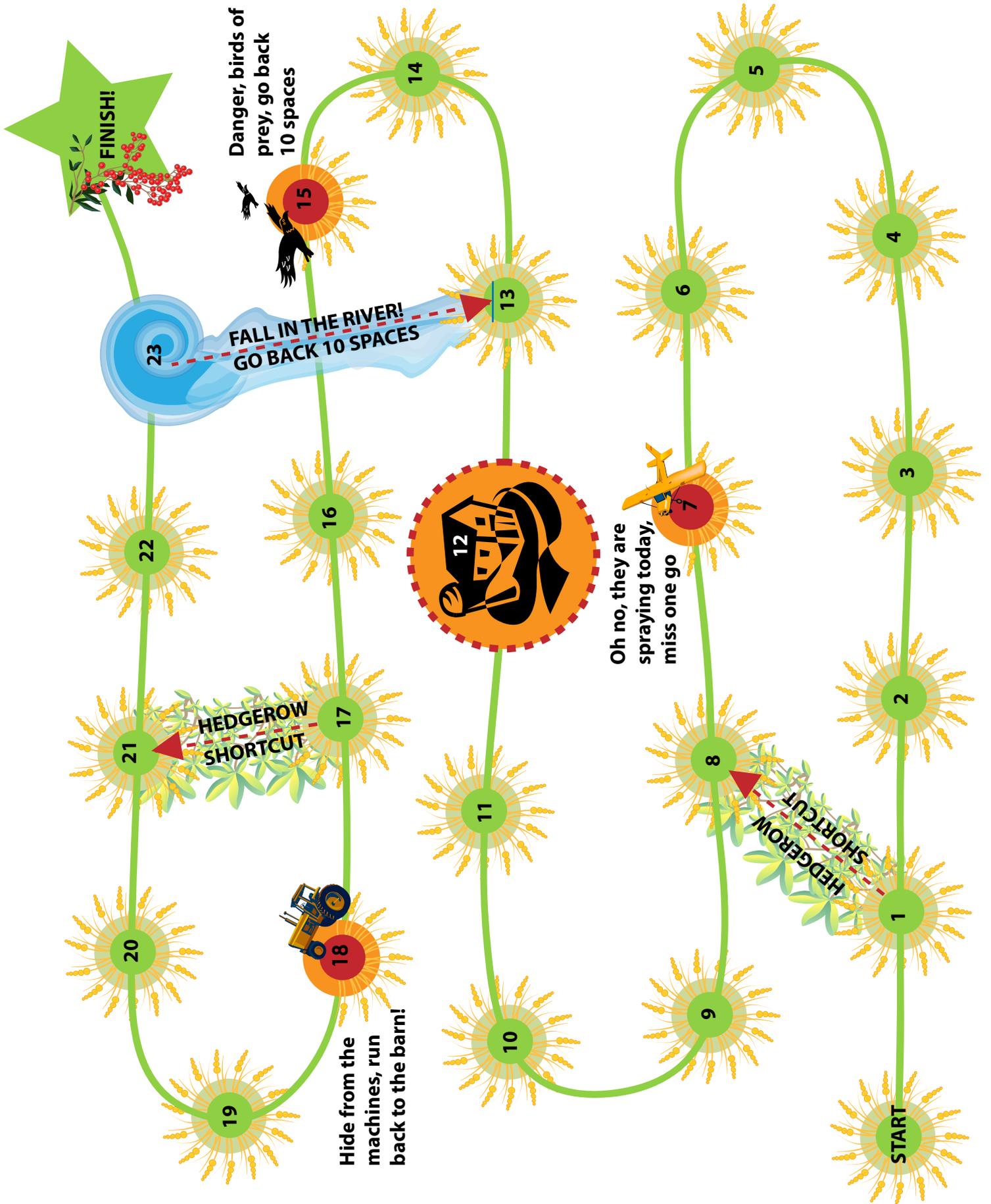


### What you can also do...

Keep an area of your garden wild!

# THE WHATON EARTH.ORG.UK BOARDGAME!

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## THREAT - HUNTING

Unfortunately one of the biggest threats to the number of species on this Earth is people. Sometimes we kill animals that we are scared of or that we don't like, we also kill for trophies or for things like handbags or medicines. Of course we also kill some species of animal to eat. People have been hunting for years, mainly for food, but now we are really good at it and we can wipe out whole species if we are not careful. We can also hurt species accidentally without realising when we are doing something else. Have you ever heard of dolphin-friendly tuna? It is called this because the old way of catching tuna used to sometimes catch Dolphins too, this was by accident but could be really bad for the number of dolphins. Now people have worked out new ways to catch tuna fish that don't catch dolphins as well.

### Activity 8 – Don't pick the flowers

When we go for a walk in the woods or in the park you might see beautiful flowers, like bluebells, and want to take them home but if you pick them it is a type of hunting. Those flowers might not have done their job yet and may not have made seeds. If too many people pick the flowers then that species could be lost from that ecosystem. Flowers are really important as they are the plants way of making seeds so that they can grow again the next year. If the flower is picked then the plant may not be able to make seeds.

You will need:

- Paper
- Paints or pens

What to do:

- Make a poster for your local park or woodland explaining why people shouldn't pick the flowers. You could take photographs or draw pictures. Imagine what it would look like if all the flowers were gone, maybe you could draw that.



### What you can also do...

When you are on holiday don't buy gifts or artifacts originated from endangered animals such as Seagrass, shells, seahorses, crocodile skin handbags.

Don't pick wild flowers.

# BIODIVERSITY INFORMATION & ACTIVITY PACK

## FIND OUT MORE...

### Activity 9 – See a collection

Do you have a hobby? Do you collect cards or stamps? About 150 years ago, in the Victorian times, lots of people collected species, a bit like stamp collecting. They collected hundreds of bugs or birds and they showed them in big cases or had them stuffed. Lots of these collections are still on show in museums and it is really interesting to go and see all the differences between the living things, imagine why they all look different, imagine where they would have lived when they were alive?

Here's a (non-exhaustive) list of some museums in the UK where you can see collections of species.

### ENGLAND

- The Natural History Museum, London
- The Horniman Museum & Gardens, London
- Oxford University Museum of Natural History
- The Natural History Centre, Isle of White
- The Kendal Museum, Lake District
- The Manchester Museum
- Museums Sheffield
- Yorkshire Museum, York (Closed until August 1, 2010)
- Wildfowl and Wetland Trust (WWT) Centres  
WWT is a leading conservation organisation saving wetlands for wildlife and people across the world. WWT is the only UK charity with a national network of specialist wetland visitor centres - [www.wwt.org.uk](http://www.wwt.org.uk)

### SCOTLAND

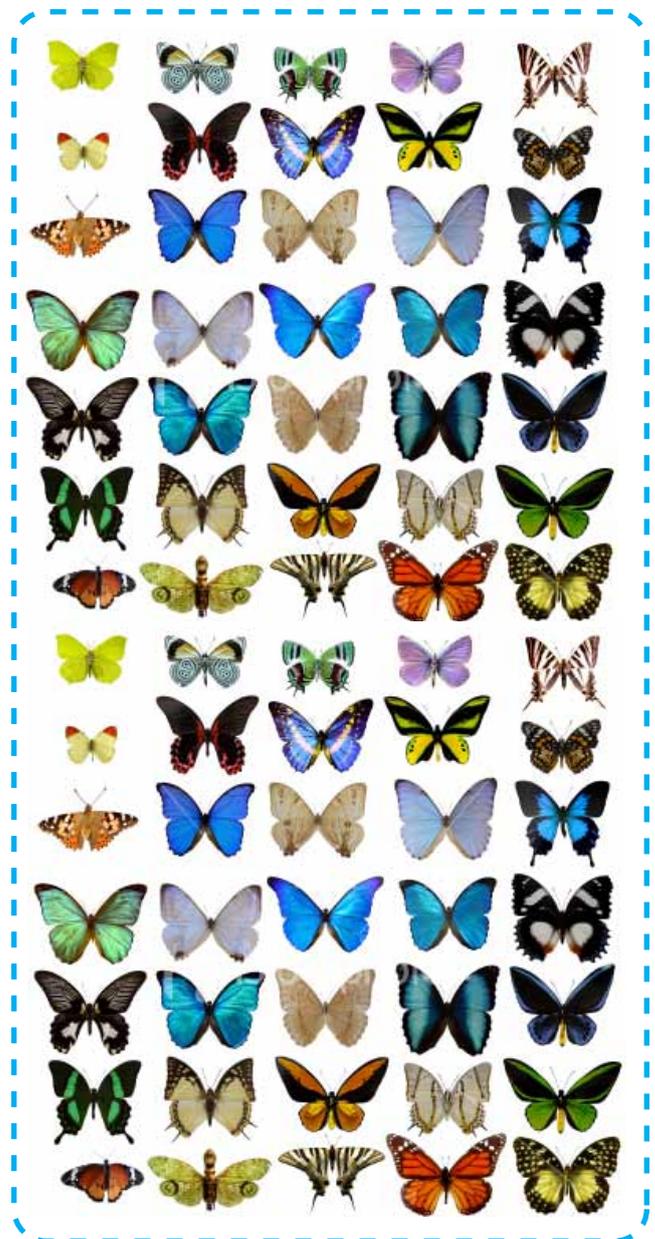
- National Museum of Scotland, Edinburgh
- The Elgin Museum, Moary

### WALES

- National Museums and Galleries of Wales, Cardiff

### NORTHERN IRELAND

- The Ulster Museum, Belfast



## SAVE IT FOR THE FUTURE

### Activity 10 – Your own Eden

Have you ever heard of the Eden Project, based in Cornwall?

The Eden Project is made of huge domes, called biomes, that house complete ecosystems. They have been designed to be just like where the species have come from, for example the rainforest biome is very hot and wet and contains hundreds of different plants and trees along with the birds and insects that would be there.



Imagine that the Eden project have asked you to help them design a new biome based on either your garden, your local park or woodland or the school garden.

Draw out the biome and think of all the things that you would need to live there in order for the visitors to really get a sense of how biodiverse your garden is. Draw a plan for your biome and write a clear description of the species that you would need to introduce. How hot would the dome need to be? How wet?

<http://www.edenproject.com/>

# BIODIVERSITY INFORMATION & ACTIVITY PACK

## NATIONAL CURRICULUM LINKS:

### KS1

- Sc1 Scientific Enquiry
  - Ideas & evidence in science
  - Considering evidence and evaluating
- Sc2 Life Processes
  - Green plants
  - Living things and their environment

### KS2

- Sc1 Scientific Enquiry
  - Links between cause and effect
- Sc2 Life Processes
  - Life processes common to humans and other animals
  - Make links between life processes in familiar animals, plants & environment
  - Plant reproduction
  - Living things and their environment, about ways in which living things & the environment needing protection

### KS3

- Sc1 Scientific Enquiry
  - How scientists work
- Sc2 Life Processes
  - Living things in their environment; adaptation and competition;
    - o protecting the environment,
    - o plant and animal diversity

### KS4

- Sc1 Scientific Enquiry
  - Ideas and evidence in Science
  - Investigative Skills, especially considering evidence and evaluating
- Sc2 Life processes & Living things
  - Living things and their environment; adaptation and competition.

## SCOTLAND'S CURRICULUM

- 5-14 outcomes
- LT-A2.3 - Give the conditions needed by animals and plants in order to remain healthy
  - LT-A3.1 - Recognise and name some common plants and animals found in the local environment
  - LT-B1.1 - Give some of the more obvious distinguishing features of the major invertebrate groups
  - LT-B1.2 - Name some common members of the invertebrate groups
  - LT-B3.1 - Give examples of feeding relationships found in the local environment
  - LT-C3.2 - Explain how living things and the environment can be protected, and give examples
  - LT-D2.5 - Describe the main stages in flowering-plant reproduction
  - LT-D3.1 - Describe examples of human impact on the environment that have brought about beneficial changes and examples that have detrimental effects
  - LT-E3.1 - Construct & interpret food webs, make predictions of the consequences of change

## NORTHERN IRELAND'S CURRICULUM

These activities could contribute to the knowledge, skills and understanding in the World around Us area of learning. They could also contribute to different teaching approaches and using a range of activities and contexts.

Using these activities will contribute to Education for Sustainable development and teachers should be able to help children throughout the primary stages to:

- appreciate the environment and their role in maintaining and improving it
- understand how actions can affect the environment.

## WALES' CURRICULUM

These activities could contribute to Scientific Enquiry and Life Processes and Living Things areas of Foundation Phase and KS2 curriculum.

# BIODIVERSITY INFORMATION & ACTIVITY PACK

THANK YOU FOR USING THE BIODIVERSITY INFORMATION AND ACTIVITY PACK!

We hope you enjoyed the activities within this pack. To help us to continue to provide new activity packs, we'd like to ask you to tell us a little about what you did for National Science & Engineering Week.

Please take a few minutes to fill in this form. If you used this challenge pack for NSEW, send in this completed form and we will send you a National Science and Engineering Week Certificate.

Organisation:

Address:

Postcode:

Tel:

Fax:

Email:

Which dates did you do National Science and Engineering Week activities on?

What did you do?

Please make any comments about this challenge pack, National Science & Engineering Week and/or other possible topics for future packs.

Tick this box to be added to our mailing list. This will keep you up to date with NSEW, including grants, resources and activities. Your contact details will not be passed onto third parties.

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