

# Sustainable Development Teachers' guide



## Biodiversity: Background Information

Biodiversity is a word that summarises the wealth of wildlife - or biological diversity – all around us. It relates to habitats for wildlife, such as woodlands or wetlands, as well as to the species that live in them. Some habitats have a greater biodiversity than others – for example upland moorland in the UK supports only a small number of species, whereas grassland on limestone can have dozens of different wildflowers in only one square metre.

Measuring biodiversity of species can therefore be quite difficult, and may not tell you very much as a single measurement. In contrast it is quite easy to measure the amount of different natural habitats in an area – and generally the more that you have, the greater the biodiversity your location has.

## National Curriculum overview

### Activities 1 and 2

Is a geographical enquiry project and involves many skills from Key Stage 3 geography, including use of maps and a key, using evidence and undertaking geographical enquiry.

### Activity 3 to 7

Look at the creatures living in the different habitats in the school grounds and fit well into Key Stage 2 and 3 science. Also make good surveys for Maths.

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 1. My Place

This activity classifies a 3km x 3km area, with your school at the centre of it, and makes an assessment of the amounts of different habitats in it.

**Preparation:** You will need your GLOBE Landsat Image, If you do not have a GLOBE Landsat image of your area, you can use a detailed 1:25,000 Ordnance Survey 'Explorer' or 'Pathfinder' map instead.

GLOBE MUC system, used to classify the land.

Transparencies or tracing paper and marker pens

Set up the 3km x 3km square so that your school is in the centre of it.

Divide the 3km x 3km into equal areas so pupils can work in small groups.

Note that the results have to be presented in hectares (1 ha = 100m x 100m)

This exercise is easier if pupils are given a graduated transparency to mark each area.

#### The activity:

1. Pupils draw an outline of any major features such as coastline, rivers, towns etc.
2. They then use the code below to record what is present in each different area. This will take a whole lesson to complete.

- 0 Forest (trees at least 5m tall with the crowns interlocking)
- 1 Woodland (trees at least 5m tall with crowns not touching)

*(The difference between the above descriptions can not be discerned from an OS map. A visit or by yourself and/or the pupils will be required, in the UK most will be woodland.)*

- 2 Shrubland (woody plants 0.5-5m tall covering >40% of the ground)
- 3 Dwarf shrubland (woody plants up to 0.5m; heathland)
- 4 Grassland (including un-mown grasses, sedges, rushes and wildflowers)  
*(There is no category on the OS map for this. A knowledge of your area is necessary.)*
- 5 Bare rocks (thin soils, sands and rocks)
- 6 Wetland (marshes, swamps and bogs with over 40% vegetation)
- 7 Open water (sea, lakes, ponds and rivers with < 40% vegetation)
- 8 Cultivated land (including all farmland, crops and mown grassland)
- 9 Urban land (including towns, houses, roads and railways)

3. A final measurement is the amount of land within your 3km x 3km square that is protected in any way – as a nature reserve or other designated site.

**Follow up** Pupils could make a class visit to any area that are unclear on the OS map and decide for themselves what category should be used.

Add up all the 'natural' categories (from 0 - 7) and compare that total with the agricultural and urban total (8+9). What does that tell you about your place?

### National Curriculum

#### Geography

- Key Stage 2 2b use appropriate field work techniques (labelled field sketches)  
2e draw plans and maps at a range of scales

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 2. School Grounds

Pupils produce a map of the school grounds, identifying different habitats within the school grounds. They work out the rough area in m<sup>2</sup> of each type of habitat.

#### Preparation

You will need sheets of A3 plain paper  
You might want to produce a template for pupils to fill in showing the outline of the school grounds so all pupils work on the same size map.  
Talk about ways to estimate area.

#### The activity

1. Discuss the categories with the class – can they think of any more habitats that might be found in the school grounds.
2. Complete maps of the school showing as much detail as possible.
3. Estimate the average area that each habitat takes up within the school grounds.
4. Fill in results on the GLOBE database.
5. Choose the best map to send to GLOBE.

#### Further work

This can be done at different times to reflect any changes / improvements made to the school site.  
Pupils could produce maps of their gardens and compare them.  
Work can be displayed for the rest of the school and used to provoke discussion and action amongst other classes.

### National Curriculum

#### Mathematics

Key stage 2 3.4e calculate areas

Key stage 3 3.3d use and interpret scale drawings  
3.4f find areas

#### Geography

Key Stage 2 2b use appropriate field work techniques (labelled field sketches)  
2e draw plans and maps at a range of scales

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 3. Identifying trees

Pupils mark all trees on the school grounds map and identify them using an id key to find their Latin and common names.

**Preparation** You will need copies of the school grounds maps from Biodiversity activity 2 and tree identification keys / books.

#### The activity

1. Pupils survey the school grounds and mark that every tree is marked on the school grounds map.
2. They identify and name each tree and complete the data sheet to show how many of each type of tree they have in the school grounds.
3. Record results on the GLOBE database

**Further work** Use the GLOBE biometry protocols to carry out further measurements of the trees – height / circumference.  
Use GLOBE Biodiversity Activity 4 to study the life on the tree.  
Adopt a tree (or several trees) to monitor Green Up and Green Down.  
Produce drawings of the different trees at different times of year to show changes.  
Collect leaves from different trees and compare their shapes and sizes

### National Curriculum

#### Science

Key Stage 2 2.4a use keys  
2.4b assigning plants to groups  
2.4c the variety of plants make it important to identify them and assign them to groups.

Key Stage 3 2.4b How to classify living things

#### Geography

Key Stage 2 2b use appropriate field work techniques (labelled field sketches)  
2e draw plans and maps at a range of scales

Key Stage 3 2e draw maps and plans using symbols, keys and scales  
2f to communicate in different ways, including ICT

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 4. Tree Life

This task looks at one type of habitat (woodland) on a very small scale i.e. an individual tree and explores the diversity of animals that tree supports. One individual tree can support a surprising variety of animals and different trees will support different types and numbers. Native trees support more species than introduced varieties. Many of the exotic trees have only been in the UK for a relatively short time, and our native flora and fauna have not adapted to live with them. For example the native British oak has over 280 species of insect associated with it, whereas the introduced Holm oak has only two.

**Preparation** You will need to make a tree beater if you do not already have one. This can simply be a white sheet (visibility of creatures is best on a white background) held at the corners by the pupils whilst you shake branches above it.

#### The activity

1. Choose a tree to investigate. The tree should be a mature example so that it, and its associated community has had time to establish. Perhaps a tree that is common in your school grounds would be a good starting point.

**Further work** This can be done on a seasonal basis and a comparison of the data made. Include life cycles as one of the reasons for the changes. This can be done on another tree species e.g. a non-native such as the sycamore and a comparison made with a native species such as the oak

### National Curriculum

#### Science

Key Stage 2	Sc2.1c	To make links between life processes in plants and animals and the environments in which they are found.
	Sc2.4a	To make and use keys.
	Sc2.4b	local animals and plants can be identified and assigned to groups.
	Sc2.5a	how living things and the environment needs protection.
	Sc2.5b	how animals and plants are found in different habitats.
	Sc2.5c	how animals in different habitats are suited to their environment
Key Stage 3	Sc2.4b	How to classify living things
	Sc2.5a	about ways living things / environment can be protected and about Sustainable Development
	Sc2.5b	habitats support a diversity of life

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 5. Log piles

Log piles are a valuable habitat for invertebrates such as spiders, millipedes, centipedes and many insects. Logs should be placed in a pile in partial shade to prevent them drying out, as most invertebrates prefer damp conditions. Log piles are easy to create and require little, if any maintenance. You could have more than one pile in order to prevent over use for bug hunting. This activity asks pupils to carry out a bug hunt if there is a log pile in the school grounds

**Preparation** You will need identification keys or books, magnifying glasses, data sheets

### The activity

1. Discuss with the pupils the care and consideration they should use when turning over the logs to carry out their bug hunt. You will probably want to split the class so that only a few pupils work on the log pile at any one time.
2. Ask pupils to fill in the data sheet as accurately as possible.

**Further work** This can be done on a seasonal basis and a comparison of the data made. Include life cycles as one of the reasons for the changes. Create a new log pile in a contrasting area of the school grounds. Draw pictures of the animals found

## National Curriculum

### Science

Key Stage 2	Sc2.1c	To make links between life processes in plants and animals and the environments in which they are found.
	Sc2.4a	To make and use keys.
	Sc2.4b	Local animals and plants can be identified and assigned to groups.
	Sc2.5a	How living things and the environment needs protection.
	Sc2.5b	How animals and plants are found in different habitats.
	Sc2.5c	How animals in different habitats are suited to their environment
Key Stage 3	Sc2.4b	How to classify living things
	Sc2.5a	About ways living things / environment can be protected and about Sustainable Development
	Sc2.5b	Habitats support a diversity of life

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 6. Wet wet wet wildlife

Ponds provide a very different environment to the rest of a school site. They create a rich community of plants and animals that will be very useful for study.

**Preparation** You will need sheets of paper for maps, data sheets, dipping nets and bowls, and identification keys / books

#### The activity

1. Discuss with the pupils the care and consideration they should use when near the pond and handling animals.
2. Ask pupils to fill in the data sheet as accurately as possible.
3. Record results on the GLOBE database

**Further work** This can be done on a seasonal basis and a comparison of the data made. Include life cycles as one of the reasons for the changes. Compare ponds in contrasting areas – maybe gardens or parks. Draw pictures of the animals found.

### National Curriculum

#### Science

Key Stage 2	Sc2.1c	To make links between life processes in plants and animals and the environments in which they are found.
	Sc2.4a	To make and use keys.
	Sc2.4b	Local animals and plants can be identified and assigned to groups.
	Sc2.5a	How living things and the environment needs protection.
	Sc2.5b	How animals and plants are found in different habitats.
	Sc2.5c	How animals in different habitats are suited to their environment
Key Stage 3	Sc2.4b	How to classify living things
	Sc2.5a	About ways living things / environment can be protected and about Sustainable Development
	Sc2.5b	Habitats support a diversity of life

# Sustainable Development Teachers' guide



## GLOBE Biodiversity Activities

### Activity 7. Bird life

Pupils will take positions around the school and observe and identify the birds they see for half an hour.

**Preparation** You will need identification keys or books, magnifying glasses, data sheets.

#### The activity

1. Assign different observation points to different groups of students and provide each group with an id key / book.
2. Ask pupils to fill in the data sheet as accurately as possible.

**Further work** This can be done on a seasonal basis and a comparison of the data made. Include life cycles as one of the reasons for the changes. Place bird tables / feeders in the school grounds. Draw pictures of the birds seen.

### National Curriculum

#### Science

Key Stage 2	Sc2.1c	To make links between life processes in plants and animals and the environments in which they are found.
	Sc2.4a	To make and use keys.
	Sc2.4b	Local animals and plants can be identified and assigned to groups.
	Sc2.5a	How living things and the environment needs protection.
	Sc2.5b	How animals and plants are found in different habitats.
	Sc2.5c	How animals in different habitats are suited to their environment
Key Stage 3	Sc2.4b	How to classify living things
	Sc2.5a	About ways living things / environment can be protected and about Sustainable Development
	Sc2.5b	Habitats support a diversity of life

# Sustainable Development Teachers' guide



## Research links and project ideas

- Compare your school's habitat to another using the GLOBE database (try an urban school if you are in a rural setting or vice versa). Why not encourage the pupils to e-mail the other school's pupils and have a chat about the differences? What are their thoughts and opinions about where they go to school?
- Discuss biodiversity, what it is, how humans affect it, what can be done to improve it and about ways in which living things and the environment need protection
- Discuss the results on our lives if biodiversity is reduced. Make the topic a class discussion with speakers for and against retaining/ improving or even reducing biodiversity on the planet.
- What might be happening to global biodiversity in light of the use of fossil fuel usage?

## Useful contacts

### **Lifelong learning for a sustainable future – WWF**

Information and case studies from schools and topic briefs for environmental issues. There are also summaries of and access to the on-line debates run by our colleagues in WWF for schools: <http://www.wwflearning.co.uk>

### **Local biodiversity issues**

Check with your local Wildlife Trust about any local biodiversity issues. There may be a local Biodiversity Action Plan (BAP) which highlights priorities for conservation in your area. <http://www.wildlifetrusts.org>