

## Introduction

The Passport bridging activity is intended to show a clear progression from the Year 6 targets to the Year 7 targets opposite. 'Environment' is one part of the Science Passport unit. It is an investigation activity that fills pages 8, 9, 10, and 11 of the Science Passport. This activity should be accessible to a wide range of abilities.

This topic was chosen because:

- There is clear continuity in content between the two key stages.
- It is a fun, practical activity for the summer term.
- It stimulates student enthusiasm and interest.
- It results in high quality work relevant to secondary science.
- There is flexibility in the level of fieldwork required.
- An alternative activity could easily be produced for those children not in the designated primaries.

## Running the activity

Students observe and then describe a particular habitat. They could also examine the different regions within it. Possible options include:

**Woodland** – Students could examine leaf litter (using a Tullgren funnel), ground layer (using pitfall traps), herb layer (using sweep nets), leaves and branches (by tree beating)

**A tree** – Students could study the following areas: the base of the tree, the trunk, branches, twigs and leaves, leaf litter.

**Pond/water** – Students could examine the surface of the water, the middle layer of the water and the roots of plants (these can all be sampled using pond dipping nets). Kick samples could be used to collect bottom-living organisms. Key pollution indicator species may be identified and an assessment of water quality could also be made.

## Year 6

- Children identify one of the organisms they found using a key.
- They draw their organism.
- They describe the organism's habitat. The description should include some environmental factors e.g. temperature, light intensity, etc.
- They label adaptations, which have helped the organism live in its habitat.
- They discuss daily or seasonal changes in the organism's habitat and suggest how the organism has adapted to these changes.

## Year 7

Students work in small groups to analyse their organisms, adaptations and habitats. They complete a card activity to apply their understanding to new organisms.

Students who have not completed a Passport in Year 6 can complete the group work and card activities. The *Jabberwocky* activity is also provided for use with these pupils.

## Safety

Handling small animals, washing hands after fieldwork.  
Mammals must not be collected.

## Learning outcomes

### Year 6

- Identify different invertebrates from different layers/areas of a habitat.
- Identify, describe and measure different physical factors of a habitat.
- Correlate environmental factors with the distribution of organisms (type and abundance).
- Link the structure and adaptations of an organism to its habitat.
- Link the structures of organisms to their function.
- Use scientific vocabulary, keys and ICT where appropriate.
- Draw and annotate scientific pictures.

### Year 7

- Identify adaptations for a particular habitat.
- Organise, sequence and link their ideas in discussion and written work.
- Work co-operatively in a group.
- Summarise and make connections between key ideas of adaptation and habitat.
- Appreciate that organisms experience stresses in their habitats.

## Prior learning

KS2 fieldwork techniques.

## Where the activity fits in

This activity is an extension of QCA Unit 6A and leads into QCA Unit 7C.

## Skills

Communication, literacy.

## Describing the Habitat

Organisms that live in different habitats are affected by environmental factors. These affect the number and type of organisms. Most organisms will be found in warm, moist and sheltered areas, as the greatest problem that invertebrates have to overcome is water loss. A variety of physical factors can be measured:

- Light (using a light meter)
- Temperature (using a thermometer)
- Sound (using a sound meter)
- Moisture content (using a dry and wet bulb thermometer for air, and measuring the change in fresh and dry weight for soil)
- pH – (using pH paper)
- Oxygen (using an oxygen meter for water)
- Visibility – (using a Secchi disc - a simple one can be made)

## Examples of adaptations

- Strong mouth parts to kill prey
- Piercing mouthparts to help organism suck sap from plants
- Green colour to camouflage organism from predators
- Dark colour to camouflage organism from its prey
- Many segments so that organism is flexible and can move over objects easily
- Many legs to help organism move quickly and catch its prey/run away from predators
- Antennae to sense objects around organism
- Poor eye sight since low light levels mean good sight is not an advantage.
- Staying in damp areas to prevent water loss
- Wings so that organism can fly from plant to plant
- Shiny waxy body to prevent heat loss
- Flat shape so organism can hide underneath logs to prevent heat loss
- Long stems to reach surface water for light
- Able to float to reach the surface for light
- Streamlined shape to help organism swim
- Flat paddle-like legs to help organism swim

## Extension

The children may wish to research their chosen organism and find out more about its lifestyle. For example: life cycle, how it breathes, excretes and reproduces. They can then link this to the organism's structure.

## Vocabulary List

Environment, habitat, physical factors, adaptation, function, invertebrate, light intensity, organism, consumer, producer, herbivore, food chain, predator, prey, carnivore, hibernation, migration, insulation.

## Keys

Exact identification is not important as the main objective of the activity is for the children to link the design of an organism to its habitat. The Collins photo guides are very comprehensive keys recommended for adult use. ASE has made available a '**Minibeasts**' CDROM. This has a variety of fun activities, aids identification to group level and has additional information on the groups.

## Alternatives

It is not necessary to do field work. You may wish to do a research project. The children could choose their own animal, find out about its habitat and adaptations.

**For an interactive field trip QCA recommends [www.field-guides.com](http://www.field-guides.com)**

### To make a Secchi Disc

You need:

A piece of rope/string

A circular disc (made from waterproof material)

A weight (heavy enough to ensure that the disc sinks)

1. Mark off 10cm intervals on the rope.
2. Mark a large cross over most of the disc.
3. Punch a hole in the centre of the disc.
4. Attach a weight to the disc to ensure it sinks.
5. Thread the rope through the disc and knot it at one end.

To use:

Put the disc into the water. Using the markings on the rope measure how far the disc has to sink into the water until the cross is no longer visible.

## Collecting invertebrates from the ground layer

Certain invertebrates are found in the ground layer. To observe these organisms you can use a pitfall trap.

A pitfall trap can be made by using two small containers such as plastic cups. One container needs to be slightly larger than the other. To make the trap:

1. Dig a hole which is slightly larger than the larger of the two containers.
2. Put the larger container in the hole so that the top is level with the ground.
3. Put the second container inside the first container (this will be the one which will be removed daily). Fill in any gaps round the first container.
4. Place some leaf litter in the trap and cover the top lightly with a few leaves. Alternatively support a piece of wood on stones to make a lid.

## Possible activity

- Set up a **range of pitfall traps** around the school grounds
- Students **draw a map** of the habitat showing where the traps are. They should include other features, which they think may affect the distribution of animals, e.g. paths, trees, hedges, leaf litter, etc. Supply outline maps for the less able, and possibly extend numeracy co-ordinate work with some pupils.
- **Discussion** - What sort of organisms do you think you might find? Will there be any difference in the organisms found in the different traps? Why would there be any differences?
- **Collection** – Collect contents of traps in the morning (possibly afternoon as well). Do not leave things for too long as a hungry carnivore may eat the rest!
- **Observation** – The children look through the leaf litter carefully to see if they can find anything.
- **Discussion** – What do the organisms have in common? (colour, number of legs, shape). Why do you think they have these features? How does it help them in their habitat? Are they herbivores or carnivores? (Herbivores tend to have long piercing mouth parts e.g. bugs, and carnivores tend to have strong powerful mouth parts e.g. beetles. Animals found the leaf litter tend to be detritovores (animals that live on decaying organisms e.g. woodlice.) Most of the organisms should be carnivores, as they tend to live on the animals in the herbaceous layers.

## Scientific drawings

- These should be drawn in 2D.
- They should always be drawn in pencil.
- They should be clear definite lines without shading.
- Label lines should be ruled.

## Collecting invertebrates from the leaf litter

Decaying leaves provide a rich source of food for herbivores or detritivores. You may also find carnivores that prey on the other organisms. Organisms that live in leaf litter like dark moist conditions.

Children can look through leaf litter in the class or field and use a pooter to pick up any the animals they see. The pooter tubes should be dipped in disinfectant to ensure the use of them is hygienic.

Organisms can also be removed using a Tullgren funnel. You can make your own as directed below.

1. Remove some moist leaf litter and soil from a suitable place.
2. Fill a funnel with the leaf litter and place over a jar. The jar should be lined with damp kitchen towel and the outside of it covered with black paper.
3. Shine a desk lamp down onto the funnel.
4. The creatures living in the leaf litter will move away from the heat and light and fall into the jar.

## Possible Activity

- **Discussion** - In what sort of leaf litter do you think you would find the most animals? What sort of animals do you think you would find in the soil? What sort of conditions do you think they prefer to live in? Why?
- **Collection** – Collect leaf litter and look for organisms using a pooter and leave the light on it for a day or two. A number of the organisms may be dead.
- **Observation** - Look through the jar and try to classify the different organisms.
- **Discussion** – What do the organisms have in common? (colour, shape, and what they feed on) Which animals were found in the largest numbers in your sample? Do you think they were herbivores or carnivores?

## Collecting organisms from ponds

Animals found in ponds tend to live in one of three zones. Animals on the surface are virtually all air breathing. Pond skaters can quickly move around using the surface tension of the water.

Around the roots of plants are numerous herbivores. Many are larvae e.g. mayfly and damsel fly larvae. These support carnivores such as water beetles. Water boatmen belong to the bug family and are herbivores.

Burrowing in the mud at the bottom are animals living on decaying plant matter e.g. water lice, freshwater shrimps, and worms. You may also find some frogs, which children have great fun trying to catch with their nets!

Certain species are pollution indicators. This means that their presence gives an indication of how polluted the water is. Water pollution is measured by the amount of dissolved oxygen in the water. Certain species are very sensitive to the amount of dissolved oxygen. Examples include: stonefly larvae, mayfly larvae (clean water) freshwater shrimp, caddis fly larvae (mildly polluted), blood worm, water louse (polluted) sludge worm and rat tailed larvae (badly polluted). These are not always easy to find!

## Collection

- Have a number of large trays ready with some pond water in them
- Use the net to catch animals. Have a good dip around the roots of plants, but take care not to damage them!
- To catch some of the smaller animals you may wish to use a jam jar on its own, or you could place it in a net and carefully swirl it around.
- Carefully empty the net into the trays and observe what has been found.
- Use a spoon to transfer animals into a smaller dish to examine them more closely.
- Take care that all animals have enough water!

## Possible Activity

- **Discussion** – What do you think the different zones are in a pond? What do you think different animals in the zone feed on? What sort of adaptations do you think animals need to live in water? Do animals in water need oxygen to live? What is the advantage of living in water compared to land?
- **Describing the habitat** – Are there many plants living in the pond for animals to live on? What is in the bottom of the pond? How clear is the water? What is the pH of the water? Is there much movement in the water? (The amount of movement has an effect on the amount of dissolved oxygen) How deep is the pond?
- **Collection** – Collection as above.
- **Observation** - Look through the jar and try to classify the different organisms.
- **Discussion** – What do the organisms have in common? (colour, shape, and what they feed on) Which animals were found in the largest numbers in your sample? Do you think they were herbivores or carnivores? Do you think the water was polluted? What do you think limits the number of organisms in the pond?

## Lesson One

### Key Vocabulary

Habitat, adaptation, structure, function, survive, organism

### Possible Activities

#### Recap/discussion

What is a habitat? How many different habitats can you name? What sort of habitats did you look at in primary school? Do you think you find different organisms in different habitats? Would you find more organisms in certain habitats? Why do you think this is? Do you think a cow could live in a desert? Why not? Do you think a camel could live in the arctic? Why not? Why can certain organisms live in certain habitats and not others? (*Link to idea of adaptations*)

#### Group Work

1. Students get in to groups (max. 5) according to the habitat they have looked at. The teacher assigns a secretary who is to collate information and a speaker who is to feed back information to the class.
2. Taking turns, the students show the group the work they completed in the Year 6 section of the project, describing the organism they studied and the habitat.
3. On large sheets of sugar paper the secretary collates information on the features of the habitat and the adaptations that organisms in the habitat possess.
4. The group identifies features that the organisms in their habitat have in common.
5. The group, through discussion choose the three adaptations which they think are the most important for survival in their habitat.
6. The group speaker feeds back to the class.

Students who have not completed the task in primaries can still get involved as they can work within a group and analyse other students' work.

#### Written Work

Listening to group feedback students complete *W/S Problems with Habitats*.

#### Questions

Why are adaptations important?

Rabbits have long ears. These are adaptations against predators. Can you list different types of adaptations?

Giraffes did not always have long necks – why do you think they have evolved to have long necks?

#### Recap

What are adaptations? Why do organisms have adaptations? Why do organisms need to be adapted to a habitat? What have been the key words for the lesson today? What have you learnt today?

#### Homework

Do you think that humans have adaptations? Draw a human and label their adaptations. *W/S Human adaptations* if required.

## Lesson 2

### Key Vocabulary

Climatic stress, migration, hibernation, insulation, adaptations, predators

### Possible Activities

#### Recap/Discussion

Recap on previous lesson – What habitats did we look at? What adaptations can anyone remember? Why are these adaptations an advantage? (You may wish to go through the key vocabulary at this stage.)

#### Activity

Using *W/S Adaptations* students work in groups of 2/3 (mixed ability groups would support weaker students with vocabulary). Provide students with access to dictionaries to look up key words.

Through discussion the children need to work out what the stresses are that each organism may experience in its environment.

They should decide how the adaptation gives the organism an advantage for survival in its habitat.

#### Discussion

Teachers go through the adaptations and students feedback their answers

#### Extended writing

Students chose three (or more) adaptations (directing the students to write about certain adaptations can be used for differentiation). The students describe how the adaptations help an organism to succeed in its habitat.