



Ham Street Woods National Nature Reserve

Environmental Education Pack

www.naturalengland.org.uk



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Great crested newt lifecycle worksheet: images and text captions

Welcome to Ham Street Woods National Nature Reserve (NNR)

About Natural England

Natural England is an independent public body that protects and improves England's natural environment, while encouraging people to enjoy and get involved in their surroundings. It is our responsibility to see that England's rich natural environment can adapt and survive intact for future generations to enjoy.

Working with children is an integral part of Natural England's work to secure a sustainable future. Through exciting educational opportunities, such as those offered by this education pack, Natural England hopes children will become better informed and more eager to care for their environment.

A visit to Ham Street Woods NNR will illustrate the wonders of nature, and how Natural England manages the reserve, giving children a deeper understanding of their natural environment.

We work with farmers and land managers; business and industry; planners and developers; national, regional and local government; interest groups and local communities to help them improve their local environment. This work and our educational opportunities help us tackle the increasing pressures of climate change, land demand and pollution.



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Entrance to Ham Street Woods NNR



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A ride leading into the reserve

About the Welcome to the Wildside project

The Welcome to the Wildside project aims to put people back in touch with nature on three National Nature Reserves (NNRs) in Kent – Ham Street Woods NNR (near Ashford), Wye NNR (near Ashford) and Stodmarsh NNR (near Canterbury). The three-year project is part-funded by the Heritage Lottery Fund.

NNRs are areas that receive special protection due to their unique habitats and wildlife. By helping communities learn more about the wildlife on the reserves and how they can help protect it, it is hoped that both the wildlife and community will benefit.

As part of the project, community groups and local residents are taking part in free guided walks and informal educational activities based on the reserves. There are also a number of events and practical hands-on activities to enable a wide range of people to reconnect with their natural heritage. This education pack forms part of the 'formal education' element of the project.



© Dave Rogers

Wood anemones at Ham Street Woods NNR

About Ham Street Woods National Nature Reserve (NNR)

Ham Street Woods NNR was one of the first NNRs in the country. Its 96.9 ha of ancient woodland is a remnant of a continuous deciduous post-Ice Age forest, which once covered the Weald. Pressures from development and agriculture make such richly wooded areas, like Ham Street Woods NNR, a rarity. Somewhat unusually, the area is still actively managed in the traditional way, helping it support an outstanding collection of birds and moths.

Archaeology

The oldest artefact found on Ham Street Woods NNR is a Neolithic flint tool, discovered in one of the ponds, which may have been a skinning implement. There are also many well preserved earthworks including a medieval ditch and bank system, and the remains of a staggered medieval dam.

History

Ham Street Woods are shown on the First Edition Ordnance Survey Maps of 1840. The current structure suggests that parts of the woods existed well before then and are ancient woodland. Other parts of the site appear to have been open grassland/heath, with some areas quarried for the iron industry.

In a manner typical of the Iron Age to late medieval times, many of the standard oaks would have been felled in the woods, causing the present day dominance of hornbeam.

From medieval times, coppice (cutting tree stems down to ground level) regimes were in operation on wooded parts of the reserve. Up until 1900, these coppice rotations would have been much shorter, producing products such as poles from sweet chestnut, or charcoal. Bark from oak coppice and standard trees were used by the tanning industry in nearby Ashford. Since then, coppice rotations have grown longer, producing mainly fire wood and chestnut for fencing and stiles.

During both world wars, there was considerable felling of mature standard trees and further heavy felling after 1945. The poorer quality timbers that remained are now about 120 to 150 years old.

Applications were made to fell and plough two areas of the reserve – Carters Wood and Barrow Wood, both of which resulted in the serving of a Tree Preservation Order in 1949. The site was acquired in 1952 and designated as a National Nature Reserve in 1953.

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Streams in Ham Street Woods NNR



Great tit

Wildlife importance

Ham Street Woods NNR sits on the escarpment of the old Saxon shoreline – now 10 km from the sea. It lies on the edge of a sandstone and clay plateau, which is cut into by a number of small valleys. On the higher parts of the site, trees such as oak, sweet chestnut, birch, aspen and hornbeam are common, with bluebells and wood anemones found amongst the ground flora. In the damper soil of the valleys, trees such as ash, hawthorn and hazel, with alder in the wettest parts, dominate. Here, the ground flora includes dog's mercury.



Primroses on the woodland floor at Ham Street Woods NNR

The complex structure of the wood, with different stages of coppice and areas of high forest provide many different habitats for wildlife. They support a large number of specialised and sometimes rare animals.

It is nationally designated as a Site of Special Scientific Interest (SSSI) because it includes a series of broadleaved woodlands supporting

outstanding bird and invertebrate communities. It is important because of the rare moths that live onsite, such as the triangle and silky wave moth and butterflies such as the Duke of Burgundy fritillary, which live on the dead wood.

Many birds can be seen on the reserve. Some, such as the green woodpecker, hawfinch, treecreeper and sparrowhawk, are resident all year round. Others are just visiting – such as the spotted flycatcher and nightingale (seen in summer) and the redpoll (seen in winter).

Two protected species also live in the woods: the great crested newt and the dormouse.



A hazel dormouse hibernating

Ongoing management

Although there are no longer any local paper mills or shipyards to be supplied with wood from Ham Street Woods NNR, there is still a need to manage the woods through coppicing. Willow warblers, whitethroat, nightingale and tree pipit all prefer different stages of coppice growth to breed in, before they migrate southwards for winter. It also allows more light to reach the ground, enabling a range of plant species to flourish. Other areas are managed as 'high forest' offering year-round homes for hole-nesting birds such as woodpeckers, treecreepers, great tits and the dead-wood insects on which they feed.

A network of permanently open rides and glades is managed on the reserve by cutting the vegetation every one or two years to prevent scrub from growing up and taking over. Sun-loving insects can therefore move more freely around the woods and plants which enjoy the open conditions can flourish, in turn providing a nectar source for insects living in the high forest areas.

Getting to the reserve and parking

Green travel

When visiting these precious wildlife reserves, it is important to think about the environmental impact of your travel choices. Please read our green travel information, which is available on the website, when you plan your school/group visit.

Parking

There is a small car park situated near the main entrance to the NNR and a larger car park a short walk away in the village of Hamstreet.

The reserve is almost immediately adjacent to the village of Hamstreet, 10 km south of Ashford on the B2067. The A2070 forms part of the reserve's

western boundary. Access to the reserve by car is via the B2067. The nearest train station is Hamstreet (just 500 metres from the reserve), served by Southern Railway.

On-site facilities

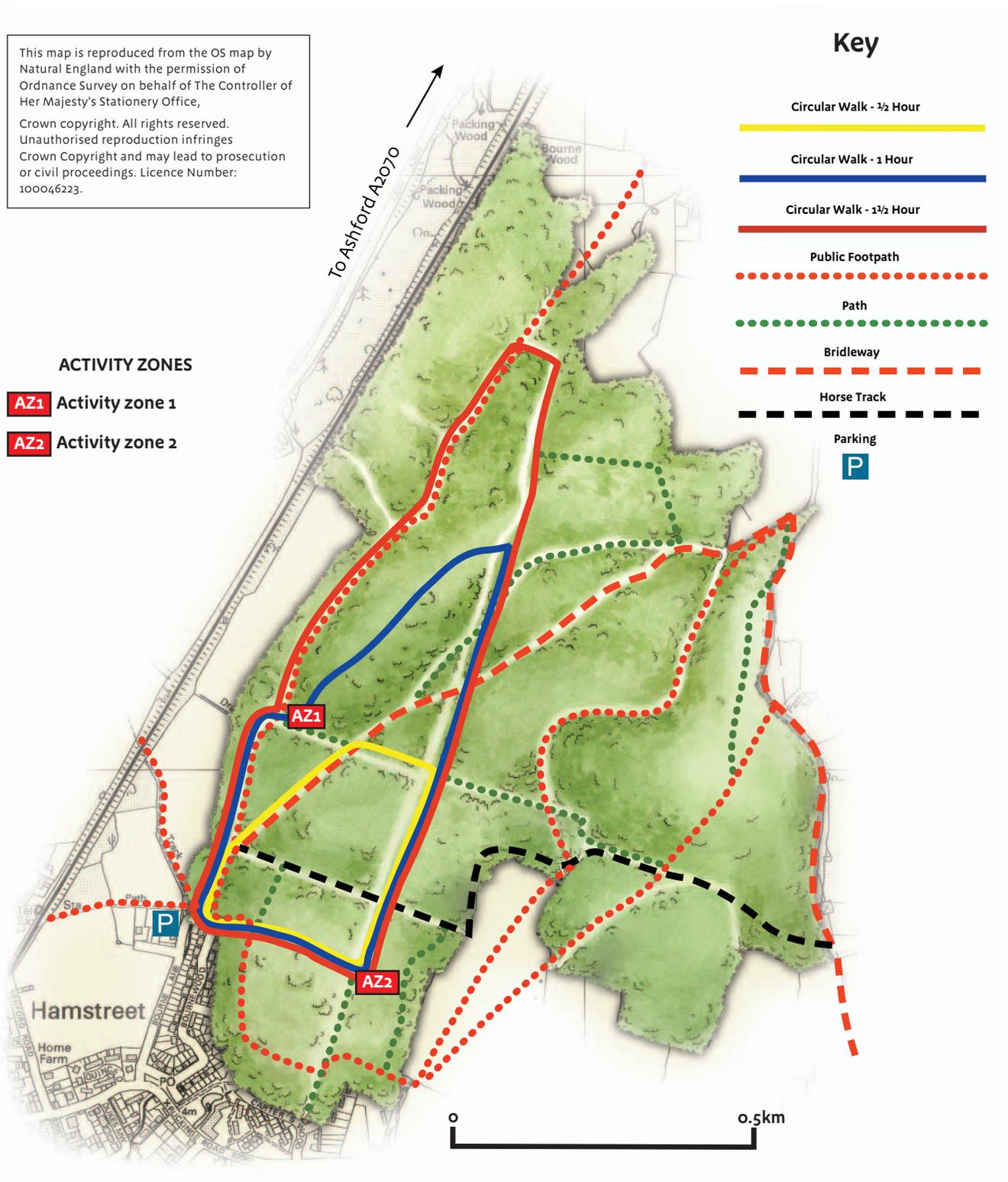
There are currently no toilet facilities at Ham Street Woods NNR.

At least one of the trails in the NNR is accessible for disabled visitors, but some paths and bridleways may not be accessible for those with disabilities.

Activity areas

Two activity zones have been identified as suggested areas for activities to take place. These areas have been selected because they offer a variety of environments for children to explore. They also allow teachers and

group leaders sufficient space to carry out whole class activities, while still providing the necessary protection for the rare species of the NNR. These zones are shown on the map below.



Map of Ham Street Woods National Nature Reserve

About the education pack

The aim of the education pack is to bring a more practical experience of the curriculum to pupils at Key Stage 2 and to increase their appreciation of wildlife and sites such as Ham Street Woods NNR. It is designed so that teachers in the local Hamstreet and Ashford area can take pupils out with just the pack as a 'guide'.

© Emma Griffiths



Learning about woodlands

The pack covers key topics in the curriculum and offers ideas on preparation, site visit and follow-up activities.

Pupil worksheets are available to print from the CD, but activities can just as easily be completed without worksheets via discussion and teacher-led questioning. Although aimed at Key Stage 2 children, activities can also be adapted for those in Key Stage 1.

Even though there is hazard guidance on the CD, it is recommended that teachers and support staff undertake a site visit beforehand to familiarise themselves with the reserve and to complete their own risk assessments.

Funding provided by the Heritage Lottery Fund means that the education pack is completely free.



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When visiting Ham Street Woods National Nature Reserve please follow the Countryside Code!

- Be safe – plan ahead and follow any signs.
- Protect plants and animals and take your litter home.
- Leave gates and property as you find them.
- Keep dogs under close control.
- Consider other people.



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For further information go to
www.countrysideaccess.gov.uk

Activity 1: Landscape and map-making

Aim of the landscape and map-making activities

To gain an overview of Ham Street Woods NNR and wider green space issues.

Preparation/classroom activities

- Look at maps showing where Ham Street Woods NNR is located in England.
- Identify the principal towns and villages nearby. Discuss the site as a green space and the importance of such spaces for people and wildlife, both now and in the past.
- Looking at old maps of the area (ideally as old as possible), encourage the children to think how the landscape, in particular the coastline, has changed over the centuries. Part of the 'Saxon Shore Way' (long distance path) runs through the woods, indicating that the village of Hamstreet was once a lot closer to the sea.

Curriculum links:

Geography – 1a, 2c, 2e, 3a, 3c, 3d, 3e, 4, 5

Art and design – 1a, 1c, 4a

Citizenship – 2a, 2j

English (En3) – 1a, 5b, 6a, 9

Site visit

Equipment: balls of different coloured wool.

Discuss with the class the landscape around them. Here are some suggested questions as a starting point.

- What is the area like?
- Is it open? (Can they see far into the distance?)
- Is it closed?
(Are views restricted by trees etc?)
- What colours can be seen?
- What do they like about the landscape?



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Paths leading from the bridge at the entrance to Ham Street Woods NNR



Open rides are found throughout Ham Street Woods NNR

Geography activity:

Route mapping using 'journey sticks'

Follow the circular yellow or blue walk or another route of your choice.

The objective of the next activity is to understand that maps can show a particular route taken during a journey and that such a map can be produced from information captured on a journey stick.

Explain to the children that they are going to walk through the woods and use their journey stick to help them remember their route for an activity later.

During their walk the children should collect small samples of materials they encounter, such as leaves, acorns, flowers, berries or feathers. These items should then be attached to their journey stick with string or wool. Different colours of wool could be used to indicate different sections of the walk or changes of direction.

The journey sticks could be supported by using digital cameras to capture specific moments or areas of interest during their journey, both in panoramic and close up fields of vision.

Note: Make sure the children only take material found on the ground. Children should also be reminded not to put any material in or near their mouths, and to make sure they wash their hands or use antibacterial wipes.

It is thought that journey sticks were used by Aborigines and Native Americans, to help them talk about their walkabout journeys in the wilderness, when they returned to camp. Storytelling and sharing information in this way is an important part of their culture.

Once the journey is completed, children should use their journey sticks to help them plot a linear route map, using the items on their sticks to help them recall their route. (See CD for printable worksheet).



A completed journey stick

As the 'Saxon Shore Way' footpath runs through part of the reserve, encourage the children to think about how their journey might have been different if they had been walking through this area during a period when they would have been alongside a sea shore.



© Anita Lockett

Coppiced areas are divided by broad rides in Ham Street Woods NNR

Back at school

The journey sticks created during the site visit can be used for artistic inspiration when back in school. Here are a few suggestions as to how they might be used:

- Make a collage of the landscape using both gathered and recycled items.
- Use the materials as reference sources for further observational drawing.

These activities could be repeated at different times of the year to obtain a view of the woodland across the changing seasons. It is a very diverse landscape with many colour changes through the year.



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Activity 2: Habitats

Aim of the habitat activities

To recognise the range of habitats present. Having had an overview of the site while looking at the landscape and making maps, it is time to take a closer look at some of the different habitats that make up the reserve. Children will be asked to consider how the habitats are being maintained at present and what the future may hold.

Although Ham Street Woods NNR is a deciduous (broadleaved) woodland dominated by trees, there are also other features. These include ponds, streams and open spaces, such as glades (open areas in woodland clear of mature trees) and rides (wide path or track clearings through woodlands). This, combined with the complex woodland structure (consisting of both high and coppiced woodland) provides a wealth of habitats that support a wide variety of birds, mammals, amphibians, reptiles, insects, plants and fungi.

Site Visit

Science activity: General habitat identification

Equipment: Notebooks, voice recorders and digital cameras.

The purpose of this activity is for the children to recognise that numerous habitats, other than trees, exist within Ham Street Woods NNR and to start identifying them. It is also an opportunity for the children to consider the variety of creatures living in such a diverse woodland.

Make sure the children fully understand the term habitat. A habitat is an area with a particular group of plants and animals which exists under certain conditions.

Ask the children to list which of the features they recorded on their journey stick and linear map in Activity 1, that they consider are habitats. In the event that this is the first visit to the site then the children should spend 10-15 minutes looking round to identify possible habitats.

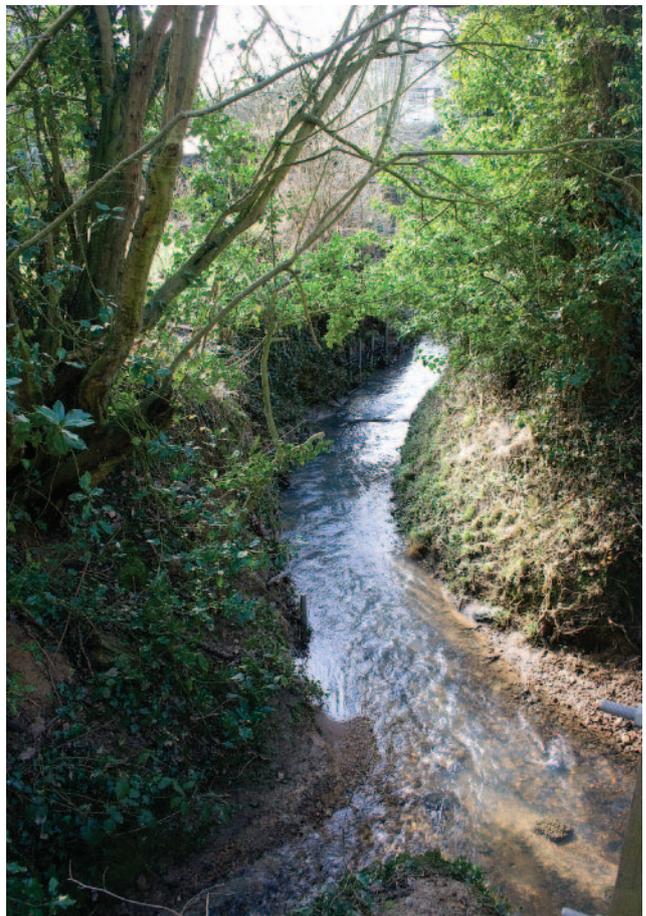
Curriculum links:

Science (Sc1) – 2e, 2h

Science (Sc2) – 1, 2f, 3, 4

ICT – 1, 3

English



Stream close to Ham Street Woods NNR entrance

As a class, draw together the identified habitats, making sure all of the following principal habitats have been noted:

- High/mature woodland
- Coppiced woodland
- Rides
- Glades
- Shrub layer (scrub and young trees)
- Streams
- Ponds (if found)



Ride through mature woodland in Ham Street Woods NNR

Ask the children to describe both the habitats and the type of creatures they believe may live there. Then take this a stage further by working in pairs and focusing on using interesting adjectives by encouraging the children to describe the habitats in detail to their partners. Once they have discussed this, ask the children to make notes, use voice recorders or cameras to help them remember their observations. (See habitat study worksheet on CD.)

As a starting point they could identify whether the habitat is:

- a) dark shaded light
- b) wet damp dry
- c) open semi-sheltered fully sheltered

They could then use other interesting adjectives that focus on capturing the atmosphere of the habitat and record these for further creative writing activities in school.

Woodland

A variety of trees exist in Ham Street Woods NNR, including hazel, oak, sweet chestnut, ash, birch, hornbeam, aspen and field maple. Depending upon their location in the woodland, some of these have been and still are traditionally 'coppiced'. Coppicing entails a tree being cut down to just above ground level, encouraging new growth of multiple shoots. After a few years, the wooden shoots (called rods) can be harvested.

Hazel coppice rods can be used to make wattle hurdles for fencing, tools, domestic utensils, firewood, charcoal and for many other purposes. Another tree coppiced in these woodlands is hornbeam; a very hard wood which was used for ship building and cog-making because of its durability. It was also used for making charcoal for the iron industry because it burnt hot enough to smelt iron.

Coppicing promotes biological diversity, because more light can reach the woodland floor, encouraging the growth of wildflowers. Also, because coppicing can be managed to produce wood of different ages, it can provide a variety of habitats and resources for wildlife.

Within the woods at the shrub layer, species such as bramble and bracken are easily visible. The ground vegetation is dominated by dog's mercury, wood anemone and bluebells, along with a rich variety of other woodland plants.

Science/Numeracy activity: Life-giving coppicing game

In this game, children will learn about coppicing and its benefits to both wildlife and humans. Use two groups of children to compare the life of a coppiced and non-coppiced hornbeam tree.

Life-giving coppicing game: uncoppiced trees

Fully grown hornbeam tree



Bird

Dead branch

Group 1: What happens to a non-coppiced hornbeam tree?

1. Six children pretend to be a young hornbeam tree, crouching together, back to back. They gradually grow by standing up slowly, outstretching their arms into the air.
2. Some children can be woodland birds flitting around the tree, happy to have somewhere to live.
3. The tree grows larger and heavier. Some of the branches break off and fall to the ground (one or two of the children should safely sink to the floor). The birds leave in search of an alternative home.
4. During stages 1 to 3 the remaining children count to 100 in multiples of five. At the count of 100 the tree is fully grown and those representing it should then safely sink to the floor as the tree's life is now over. This demonstrates that the normal lifespan of a hornbeam tree is 100 years.

Group 2: What happens to a coppiced hornbeam tree?

1. Six children pretend to be a young hornbeam tree, crouching together, back to back. They gradually grow by standing up slowly, outstretching their arms into the air. However, in this version of the game their arms are never fully outstretched, as full growth is never reached. Some children can be woodland birds flitting around the tree, happy to have somewhere to live.
2. Whilst this is happening the remaining children count up to 20 (each count representing one year).
3. Once the number 20 has been reached, one of the watching children should pretend to be a woodsman with a saw and coppice the hornbeam at the level of the children's ankles. As they are 'sawn', the children squat down to form a stool (meaning a stump) of coppiced hornbeam tree. The child playing the part of the woodsman pretends to go home, carrying the wood over his or her shoulder, leaving the coppiced hornbeam to grow back.
4. Explain to the children that as the hornbeam has been coppiced it will no longer grow from one stem (trunk) but will instead grow multi-stemmed. Therefore, the six children will now grow as separate rods (tall straight vertical stems) and once again never reach full height. Meanwhile, the children watching count from 21 to 40. On 40, the child playing the woodsman reappears to coppice the hornbeam, this time pretending to carry the rods home over his or her shoulder.
5. This continues in multiples of 20 until the 100th year is reached. Pause the game and ask the children what had happened to the non-coppiced hornbeam (game 1) after 100 years.
6. Restart the game, only this time ask the children to leap into the future by starting their counting at 480 and ending at 500. The hornbeam tree now collapses. Its life is over after 500 years.

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Newly coppiced woodland

Life-giving coppicing game: coppiced trees

Growing hornbeam rods



Illustration: Anita Lockett

To ensure the children fully understand coppicing ask them the following questions:

In the second version of the game, how many times would the woodsman be able to coppice the tree before it finally died?

Answer:– 25

Can you calculate how much wood a real woodsman and his descendants could harvest over 500 years? The tree is cut every 20 years and each time he cuts the tree he takes 10 rods away.

Answer:– 250.

Shrub layer/woodland edge

Below the tree level is the shrub layer where saplings and plants such as bramble, honeysuckle, bracken and broom can be found. This area has both light and shade and, consequently, a greater diversity of plants. Such diversity is important because it provides homes and food sources for many different birds and insects.

Observation activity: Out of the darkness into the light

During this next activity, the children will be encouraged to use all of their senses when walking through the woods.

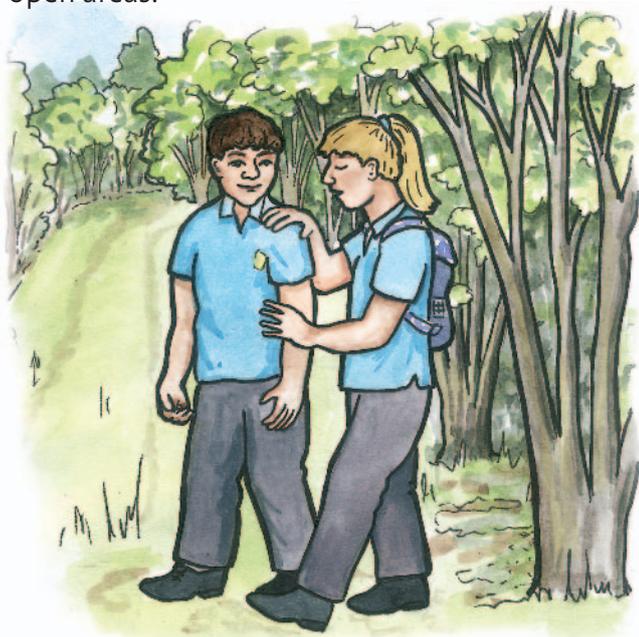
Starting in an area of woodland and working in pairs, one child should close their eyes, whilst the other acts as a guide. The guide's role is to lead or direct their partner from the shade of the woodland into a more open area, such as a glade or ride. The child with eyes closed should describe to their partner the changes sensed when making this transition from a sheltered area into one which is more open and light.

Here are some questions the child with closed eyes should consider (listed on CD worksheet):

- Light – can the change in light be detected through closed eyes?
- Temperature – can a change in temperature be felt?
- Sound – can different sounds be heard?

Each pair then makes the same journey with eyes open, observing in detail the different plants and animals seen in the shade, partial shade and open areas.

Illustration: Anita Lockett



Out of the darkness, into the light activity

Observation/Numeracy activity: More or less?

The purpose of this activity is to encourage more detailed observation and numeracy skills.

Equipment: measuring tape or string (5–10 metres long), quadrats/hoops.

Ask the children to lay a length of tape or string along the ground, positioning approximately half of it in a shaded area and the remaining half in a lighter area (such as a glade or ride). Next, hoops or quadrats should be placed along this line at regular intervals (specified by the teacher/group leader). Recording in the table below how many different types of living plants they see growing inside the hoops or quadrats, the children should discuss their findings. Encourage them to consider which elements plants need to grow and why there may be a greater variety of plants in the lighter area.

More or less activity recording table (available on CD worksheet)

Location of hoop/quadrat	Plant name or description	Frequency

Ask the children to explore the food sources for birds in this shrub layer of the woodland, such as berries and seeds, or minibeasts hiding underneath bark.

Forest floor

The forest floor is another very important part of the woods. In autumn, this is where the fallen leaves gather, providing nutrients for many minibeasts and fungi. These in turn provide food for other animals higher up the food-chain.

Encourage the children to explore the forest floor, using fallen twigs (or gloves) to push aside the top layers of leaf litter. Underneath, they should spot minibeasts such as woodlouse, spiders, beetles and centipedes scurrying away.

Ask the class to look for winter fuel stores, such as acorns, forgotten by the squirrels and jays.

They could also look for holes in the ground that might be homes to underground creatures like rabbits and badgers.

Children could build a bird's nest or a squirrel's drey using twigs and other materials found on the woodland floor. During this activity, they will need to consider how birds would carry their chosen materials (but should not copy) and how the nest needs to be constructed to stop it falling apart.

Ask the children to look at fallen leaves and try to match them to their parent tree. Using the tree identification sheet included on the CD, children should collect from the ground examples of different types of leaves, such as those that are simple/compound or linear/lobed. The children could then use these back at school to create a key. This could also become an ICT activity using a branching database application, such as Flexitree.

Note: Children should be reminded not to touch the berries as they may be a treat for birds but many are poisonous to humans.

Whose house?

Comparing the different layers of a woodland to floors in a house could help the children understand woodland structure and habitat diversity. For, just as each floor of a house has a varying use, so do the different layers of a woodland have varying uses and species present.

Cellars were often used as coal stores when coal was the main household fuel. In the woodland, the basement is where the roots of the trees and shrubs draw in water and food from the soil, pumping vital resources up and through the trunk into the branches at the upper levels. Cellars in houses are also sometimes used as refuges from storms or even as bomb shelters during the First and Second World Wars. In a similar way, some animals burrow underground to hibernate or escape from predators.

The ground floor of our houses is a place we spend most of our time – living, eating, working or playing, and this level is where most of the woodland animals live. Although many animals need fresh food and green plants to eat, there are many more that depend on fallen branches and leaf litter.



The first floor of our homes is where we usually find the bedrooms, bathrooms and perhaps playrooms. In the forest, this is the shrub or sapling level, where many species are to be found. Small birds and insects rely on these plants for food and protection.

The roof or attic of our homes protects us from the weather, keeping out both sun and rain. The woodland canopy acts in a similar way, filtering the amount of sun and rain falling to the lower levels. Even at this height, several animals still make it their homes, such as birds and squirrels, building their nests with twigs lined with feathers or other soft materials.

Ask the children to try and spot which animals are occupying which floors in the house of Ham Street Woods NNR.

Back at School

Science activity: leaf identification

- Using printed guides and online resources, children should try to identify tree species from materials gathered while on the reserve such as leaves, twigs or seeds. Be sure to include the hazel tree as it is easily identified by its leaves and nuts.

Literacy/Art activity: which mouse?

- As the dormouse likes to live in hazel trees, ask the children to read the fact sheet about dormice and complete the worksheet (see CD).
- Make a dormouse nest out of shredded newspaper or other craft materials.

Activity 3: Adaptation and biodiversity

Aim of the adaptation and biodiversity activities

This section shows how plants and animals have adapted in form and behaviour in order to survive.

Curriculum links:

Geography – 2a, 2b 7c

Science (Sc2) – 4a, 4b, 4c, 52, 5b, 5c

© Tony Morris



Sparrowhawk

Preparation/classroom activities

There are many different types of birds living at Ham Street Woods NNR. If they all ate the same type of food, there would be a lot more competition and fewer birds would survive. To avoid this problem, over a long period of time,

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Willow warbler

© Tony Morris



Treecreeper

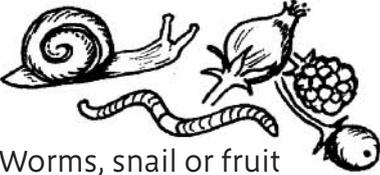
birds' beaks have evolved to help them eat different types of food. For example, birds that eat big seeds have thick, strong beaks, which can crack open seeds (eg a hawfinch that eats hornbeam seeds). Birds that hunt animals, have curved, sharp beaks, suited to grabbing and ripping off meat (eg sparrowhawks that eat small birds). Birds that eat worms need a straight beak, so they can probe the soil.

In the following exercise (see CD for worksheet version) the bird and its food source could be separated from the beaks (cut out and shuffle them). The children can then try to rematch the bird and its food source with the correct beak, discussing with a partner why and how each beak is suited for its purpose.

Activity tasks

See CD for pupils' printable version

Bird beak matching worksheet:

What they eat	Bird	Bill/Beak
 <p>Seeds (such as hornbeam), shoots and fruits</p>	<p>Hawfinch</p> 	 <p>Large, strong bill</p>
 <p>Insects under tree bark</p>	<p>Treecreeper</p> 	 <p>Small, curved and pointed</p>
 <p>Small birds</p>	<p>Sparrowhawk</p> 	 <p>Large, sharp and pointed</p>
 <p>Worms, snail or fruit</p>	<p>Thrush</p> 	 <p>Medium, generalised shape</p>
 <p>Insects</p>	<p>Nightingale</p> 	 <p>Small, pointed bill</p>
 <p>Birch and alder seeds</p>	<p>Lesser redpoll</p> 	 <p>Small, strong bill</p>
 <p>Small mammals and rodents, small birds, frogs, fish, insects and worms.</p>	<p>Tawny owl</p> 	 <p>Large, pointed strong bill</p>



Diversity-bingo table

Find 4 of the life-forms below and shout "diversity-bingo!"

Tree	Flower
Fungi (such as mushroom, mould, toadstools)	Mammal (such as squirrel, dormouse, fox)
Bird	Minibeast

Site visit

Equipment: three pieces of material – green, brown and brightly coloured.

Observation activity: Diversity bingo

This game demonstrates the diversity of life found at Ham Street Woods NNR.

Each child or pair of children should be given a diversity-bingo worksheet and asked to try and find at least four of the life forms found at Ham Street Woods NNR listed in the table below. Each time one is found, it should be marked off in the diversity-bingo table. When four are found and marked off, the observer should call out "diversity bingo"!

Extra activity: to make it more challenging try to find two or three different types of each group.

Observation activity: Listening to birdsong

Children should stand as still as possible and listen for 1-2 minutes to see how many different birdsongs they can hear. Ask the children to think about why birds make noises.

Notes: In brief, birds vocalise for the same reasons that humans do, to communicate with one another, whether this be for attracting a mate or for sharing information, such as alarm calls.

One of the most easily recognised calls is that of the tawny owl. People often think that this owl makes the noise 'twit twoo'. In reality, this sound is made by two owls, the 'twit' sound is the contact sound made by both sexes and the 'twoo-hoo-oo' sound is the

male's territorial call. So when we hear the 'twit-twoo-hoo-oo' sound, it is probably a male answering a female.

Next, ask the children to try and spot some of the birds they have just heard.

- How many times was each bird spotted?
- Were there any other birds noted?

On the CD you will find 8 bird identification cards. These could be printed and cut out then hidden amongst trees on the reserve for the children to find, or used for extension work in the classroom.



Tawny owl

© Clifton Beard



Song thrush

Camouflage and colours game

This game demonstrates how camouflage is a useful adaptation to help animals hide. Many animals including birds, minibeasts and mammals try to disguise themselves to look like their surroundings, so that they can hide from predators or creep up on their prey. Examples include sparrows hiding from sparrowhawks, snails hiding from song thrushes and stick insects hiding from willow warblers.

- Choose one child to represent a predator, such as a song thrush looking for a snail supper.
- Give one piece of brown, green and brightly coloured material to three children. (An alternative would be to choose three children with differing coat or hat colours).
- Ask the predator to close their eyes and for the three children to crouch in front of three different brown tree trunks approximately 30 paces away.
- The predator should then open their eyes and see in which order they spot the three children. The child that is spotted first becomes the thrush's supper and should leave the game, swapping with one of the children outside the game for the next round.
- Repeat the game with the children crouching in a grassy area and compare the findings.



Empty snail shells are often found in leaf litter

Note: Studies of the land snail in the South East of England suggest that snails in shady woods tended to have dark brown and dark pink shells, whereas those in grassland had stripy lighter coloured shells.

Adaptation observation

The following 'adaptation discovery' exercises can either be completed via two worksheets available on the CD, or by discussion and teacher-led questioning.

The children should explore Ham Street Woods NNR to discover and make sketches of the following:

Plant adaptation observation sheet

Plant adaptation	Sketch
Parts of plants that defend it against hungry animals (such as prickly holly, thorny brambles and stinging nettles).	
Plants that can climb to reach the light, such as honeysuckle and clematis.	
Flowers which are brightly coloured or smell sweet to attract their insect pollinators.	
If you are visiting in the springtime, look for flowers on the forest floor that come out to catch the sunlight early in the year, before leaves have fully grown in the tree canopy (which would make it too shady for them to grow, such as bluebell, primrose and wood anemone).	



© Emma Griffiths

Springtime bluebells at Ham Street Woods NNR

Animal adaptation observation sheet

Animal adaptation	Sketch
Holes in the ground, as evidence of animals that have adapted to live underground for shelter and protection, such as badger and rabbit holes.	
Minibeasts that are camouflaged to hide from predators, such as a brown snail on the woodland floor, or a moth that looks like the plant on which it sits, in order to hide from hungry birds.	
A sparrow which is brown and well hidden amongst branches, to make it difficult for a sparrowhawk to spot it.	
A beetle, which has a hard outer case to protect its delicate wings when foraging and as protection against predators.	

Bats

A lot of old oak trees in Ham Street Woods NNR have holes in them that provide great shelter for bats. Several different species of bat have been seen here including pipistrelle, long-eared, noctule and serotine. The varied habitats on the reserve attract many types of insects, ensuring a plentiful food source for bats, such as moths, beetles, midges, caddis flies, mosquitoes, mayflies and lacewings. Bats use echolocation to find their food. This means they make a sound that is inaudible to the human ear (unless using special equipment). The way the sound is echoed enables the bat to tell the location and shape of objects around it, including the insects being hunted.

Illustration: Anita Lockett



Serotine bat

Science activity: Bat and moth

This game is best carried out in a level open space. The aim is for the bat to find the moth and 'eat' it.

All the children form a circle with arms stretched and holding hands.

- Three children are chosen – one bat and two moths. The bat should be blindfolded. The moths are not blindfolded.
- The children move (at walking pace) around the space created by the circle. As they move the moths call out 'moth' continuously to indicate where they are. The bat should listen carefully to where the sound is coming from and attempt to capture the moths.
- Once the moth has been caught he or she should leave the circle.

Variations on this game would include having more than one species of bat and a greater variety of insects. The different bat species could then hunt specific insects.

Activity 4: Minibeasts

Aim of the minibeast activities

To introduce habitats in terms of scale and to consider the type of animals that might live in smaller habitats.

Preparation/classroom activities

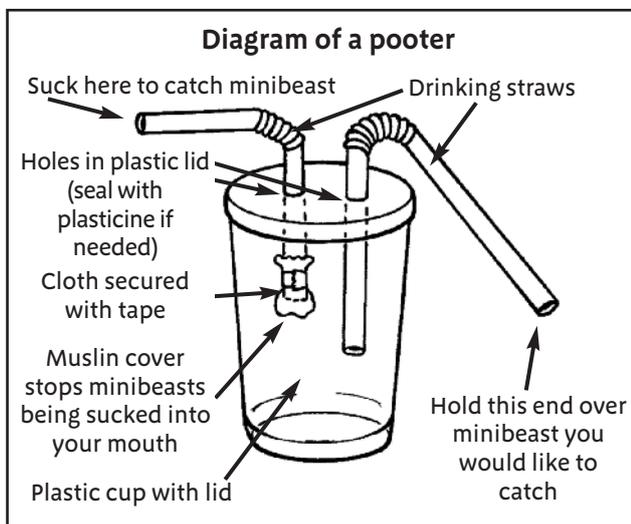
Make sure the children understand the terms habitat and micro-habitat.

Site visit

Equipment: magnification pots and a white sheet.

Optional equipment: pooters.

Find a plastic container and make two holes in the lid. Insert a straw into each of the two holes and put a piece of thin cloth around the end of one straw (the end which will sit inside the container), securing it with some tape (see diagram below) to create a pooter.



Science activity: What is a habitat?

ask the children which of the following is a habitat:

- a copse (a small wood)
- a tree
- a meadow
- a pile of leaf litter
- small patch of grassland
- a leaf
- a blade of grass

Curriculum links:

Science (Sc1) – 2h
 Science (Sc2) – 1a, 1b, 4, 5a, 5b, 5c, 5d
 ICT – 1, 3a
 Art – 1a

Explain that all of these are habitats, but on very different scales. For example, decaying wood is valuable for invertebrates – cardinal beetles live in dead wood and stag beetles will also move in to feed on rotting wood.

Children should then investigate a chosen micro-habitat (eg under a fallen leaf, on a blade of grass) to see what they can find.

Activity tasks

Numeracy/Science activity

Ask the children to carry out a minibeast hunt by laying a white sheet on the ground and shaking those branches that are positioned over the sheet. Gather round to see what has been found and complete a minibeast tally chart (see CD for printable version of the chart below).

An alternative method of finding minibeasts would be for the children to root around in the leaf litter using their pooters. Make sure the children avoid minibeasts that are too large or slimy to suck into the pooter.

Habitat description	Name or description of minibeast	Frequency



Looking at captured minibeasts

© Katrina Devonport

In preparation for making a minibeast passport back at school, ask the children to select one particular minibeast and answer the following questions:

- What is the name/description of the minibeast, or what family does it belong to?
- What habitat was it found in?
- What colour is it?
- How many legs does it have?
- How does it move?
- Does it have wings?
- What is its body shape?
- How many sections does its body have?
- What is its coat like? For example, is it smooth?
- How does it defend itself?
- What does it eat?
- Does it appear singly or in a group?
- Why does it live in this habitat?

Before returning all minibeasts to their original habitat, each child should produce a quick sketch of their minibeast.

Finally, ask the children to collect some natural materials from the site, such as feathers, fallen leaves, berries, grasses or seeds.

Back at school

Science activity: Minibeast passport

Ask the children to use the information collected in the last activity to produce a passport for their chosen minibeast (a passport style worksheet is available on the CD, with completed example on page 29).

Looking at its details, such as colour (eg camouflage), limbs (eg adapted for climbing or jumping) and body shape, ask the children how their minibeast is adapted to living in its chosen habitat.

The children could then make a model version of their chosen minibeast and the woodland, from gathered craft materials and create a display for the classroom.



© Andrew Denyer

Sunfly

Minibeast passport example

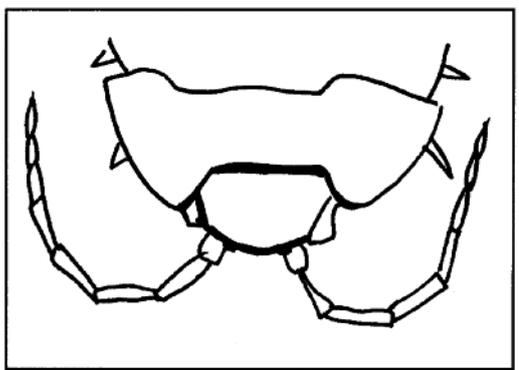


FOLD

FOLD

Colour: brown
 Coat: hard segments
 Number of Legs: 16
 Moves by: walking
 Body shape: oval
 Number of body sections: 14
 Wings: Yes / No
 This minibeast eats: decaying plant matter
 Found in a group: Yes / No
 Defends itself by: rolling up
 into a ball, hiding in daytime

Name: Wood louse
 Family: Oniscus
 Habitat: dark damp places
 Why is this habitat chosen:
 They dry out in sunshine

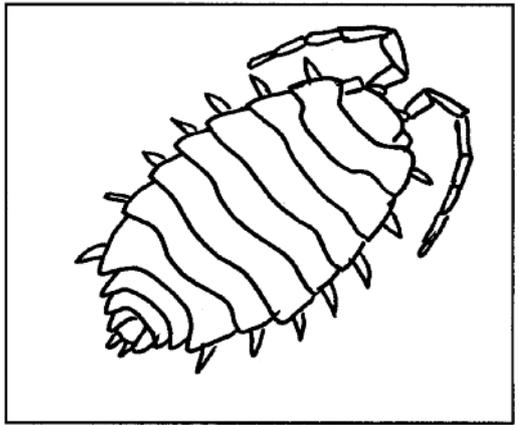


FOLD



Picture of Minibeast's habitat

HAM STREET WOODS
 NATIONAL NATURE RESERVE



MINIBEAST NAME:
 Wood louse

PASSPORT

Activity 5: Lifecycles of plants and animals

Aim of the plant and animal lifecycle activities

To introduce children to the lifecycles of different plants and animals found at Ham Street Woods NNR.

Classroom Activities

Introduce flowers to the children as the part of a plant where seeds are made through a process called pollination. Insects are attracted to the flower by its colour and smell, and transfer pollen from one flower to another. Flowering plants reproduce by making seeds. To grow into a new plant, the seed needs to be fertilised by this transferred pollen in a process called pollination. The fertilised seed is then dispersed and if it lands in a spot with the correct amount of air, water, sun and soil, the seed will germinate. It should then grow into a plant that flowers and the cycle will begin again.

Activity: Science/Art

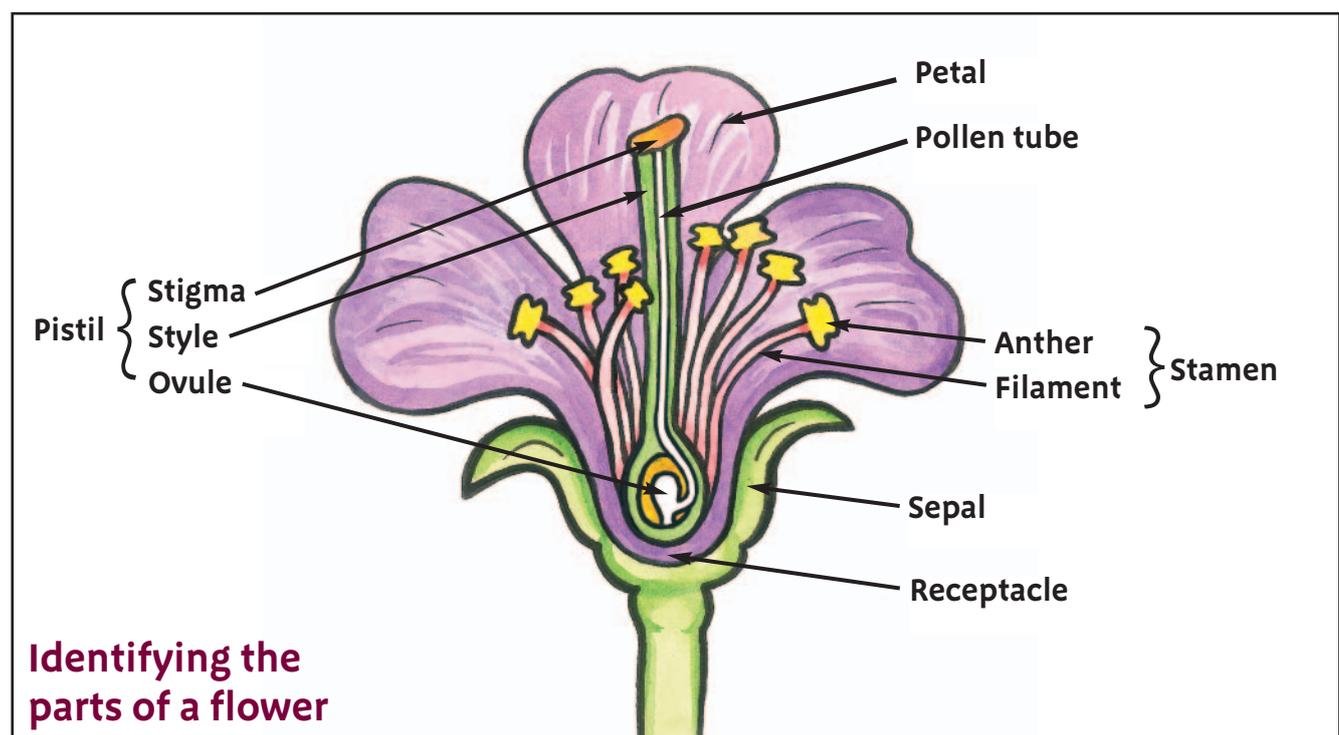
To better understand the parts of a flower, children are to make a flower out of art and craft

Curriculum links:

Science (Sc2) - 1, 3
Art & Design - 1a
P.E. - 6a, 6b
ICT - 1

materials such as pipe cleaners, tissue paper and coloured card, and label the different parts (see labelled flower below). The labels could include:

- Petals: brightly coloured and scented to attract insects.
- Sepals: green leaves around the outside of the flower used to protect it whilst still in bud.
- Stamen: the male part of the flower which has two parts – the filaments (a thin stalk) and the anther, where pollen is made.
- Carpel: the female part of the flower which has three parts. At the top are the stigmas, where pollen lands. The style is found below the stigmas and then the ovary where seeds are formed.
- Nectar: this is the food for the insects.



Plant dissecting activity

If possible, dissect a flower with the children and ask them to identify the different parts. Flowers such as buttercup have parts that are easy to identify. Please do not pick flowers from the wild.

Trees have flowers too, but these are not easily seen or recognised as flowers. Tree flowers are usually called catkins and look very different from flowers with petals. Male and female catkins can sometimes be found on the same tree but more usually are found on separate trees close to one another. Wind pollination is the most frequently used pollination method but some trees, such as hawthorn, depend on insects for pollination.



Oak catkins



Dandelions use the wind to disperse their seeds

Seed dispersal

There are seven different methods used by plants to disperse their seeds. Some plant species employ more than one method to ensure that their seeds are spread far and wide. See CD printable worksheet 17 for full descriptions of dispersal types and methods.

PE activity: Seed dispersal

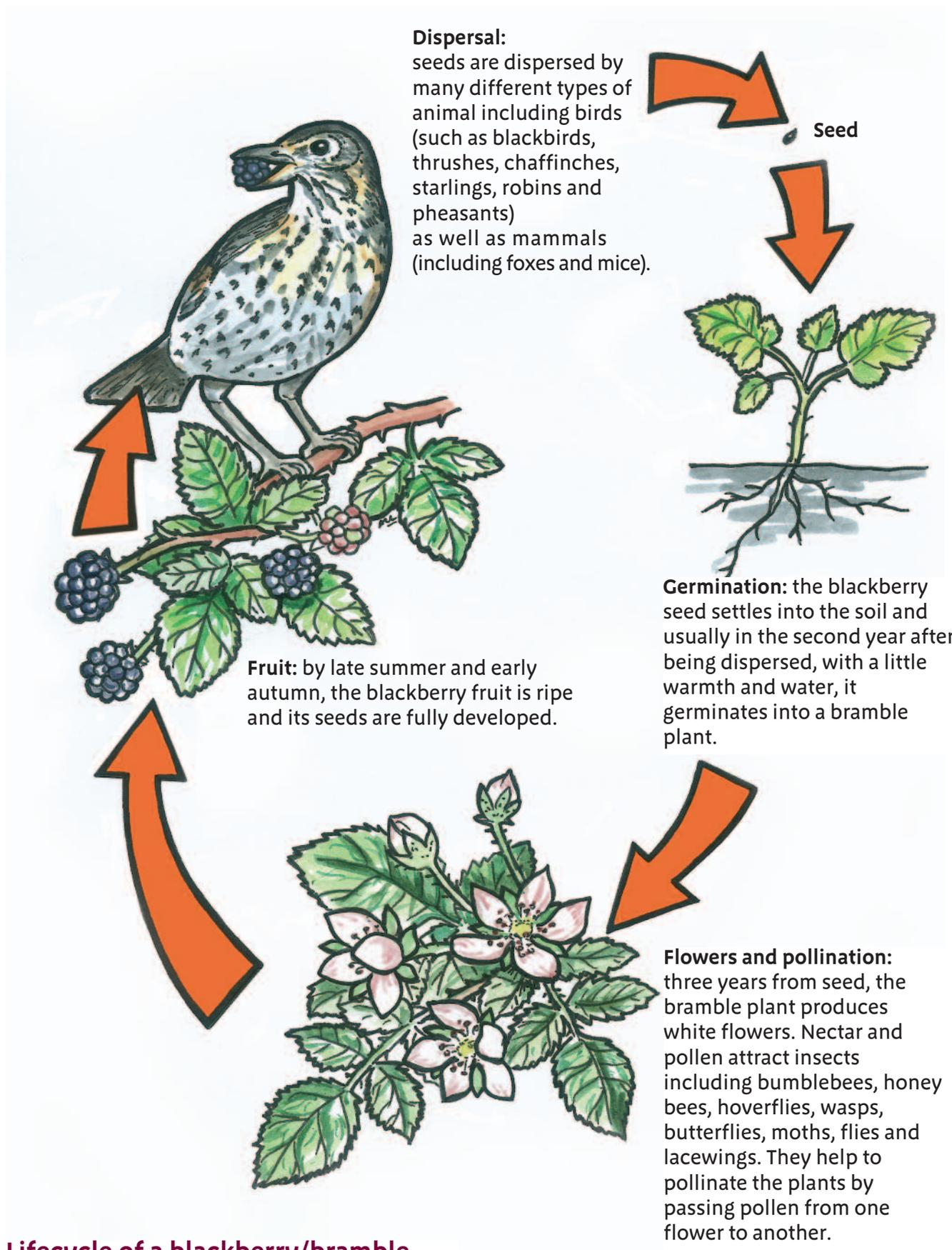
Each method of seed dispersal has a different action associated with it. Children should start the activity by standing alone in a space.

The actions are as follows:

Seed dispersal method	Action for children to carry out
Bursting	Star jump
Shaking	Stand still and wave arms from side to side
Hitchhiking	Find a partner, hold hands and jump around the playground
Drop and roll	Crouch on the floor
Wind	Move using giant strides trying to move as far from their last position as possible. Sudden changes of direction are permitted
Water	Run trying to move as far from their last position as possible. Sudden changes of direction are not permitted
Animal Food (b)	Get into groups of four, huddle together and sit down

Lifecycle of blackberry/bramble

The children should complete the lifecycle diagram of a blackberry/bramble plant (see CD for printable diagram).



Lifecycle of a blackberry/bramble

Site visit (or school playground)

Pollination game

The aim of the game is to bring the process of plant pollination to life by acting out the different parts of a flower and how they are involved. It also demonstrates the plant's dependency on insect pollinators and what pollinating insects get from a plant.

Equipment/roles needed:

1. Petals – two sets of four shaped and coloured petals made from stiff card (about 50 cm or more in length). Each petal should be tapered at the base, so that a child can hold it up.
2. Socks – four pairs (or more) of long socks. These are worn on the hands of the children representing the stamens (one pair of socks per child and at least two children per flower).
3. Ping pong balls – 8 or more ping-pong balls with Velcro strips on them (to stick to the socks).
4. Two woolly 'bobble' hats – worn by the two children who represent the stigmas.
5. Two small cartons of fruit juice – one for each flower, to represent the nectar.
6. Pollinator costume – a bee costume could be as simple as some wire for antennae attached to a bobble hat, a stripy sweater and some cardboard wings. You could also make a butterfly costume.
7. Drinking straws – each pollinator should have a drinking straw, representing the insect's mouthparts to be used to drink from the nectar source.

Some of the equipment listed is desirable rather than essential. However, visual learning appeals to many children who will become engaged and motivated to participate. Part of the exercise can be to ask children what parts they think may be necessary for the process and involve the class in designing and making the items needed (perhaps with reference to their earlier dissection activity).

How to play

1. Two sets of five children each hold up a petal and each group forms the outermost circle of a flower.
2. Children representing stamens should share out the 'pollen grains' evenly between them, sticking them onto their sock-covered hands.

They should then stand inside the petal ring and hold up their hands to present the 'pollen'.

3. Each child playing the role of a 'stigma' should stand in the centre of a flower and holds up his/her bobble-hat-covered head to receive pollen.
4. Drink cartons should be put by the feet of the 'petals', where the visiting pollinator might like to come and sip 'nectar' through their straw.
5. The children act out the process of pollination by playing the role of various flower parts, or by being the pollinating insect. One child takes the part of the pollinator and 'flies' between two 'flowers', removing pollen from the stamens of one and placing it on the stigma of the other.
6. The pollinator may then transport pollen from the second plant back to the stigma of the first plant, etc.
7. Encourage the children to discuss what they have just acted out. The process can be developed further by discussing the stages of fertilisation, seed growth and dispersal.

Modifications

1. Have more than two flowers, so the pollinator has to choose which to visit, based on how pretty the petals are or how tasty they find the carton of drink ('nectar').
2. Allow the 'petals' to call out encouragement, then discuss how plants attract the attention of pollinators without being able to shout (eg bright colours, sweet scents, and flowers that 'dance' in a breeze).

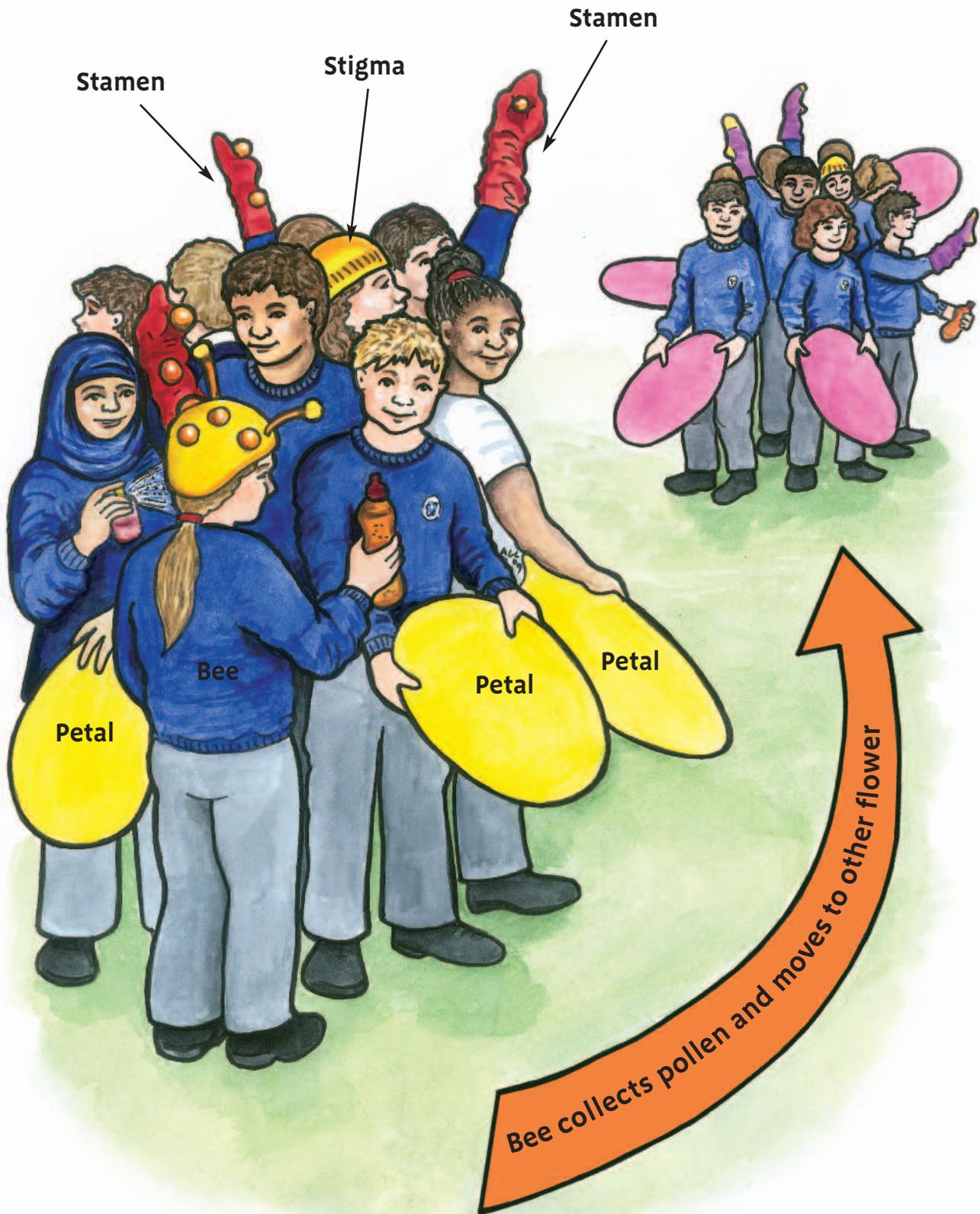


Bee gathering pollen

©Jonathan Hardy

Insect pollination game

Illustration: Anita Lockett



Activity: The circle of life

This activity will help the children to understand and recognise the different stages of a plant lifecycle. It can be carried out with the whole class working together or the class can be divided into four groups, with each group focusing on a different stage in a plant's lifecycle.

Each group can be allocated one of the five lifecycle stages below and search for plants on the reserve that match that particular stage. Identifying the species of plant is not necessary. Instead, group members should focus on discussing those signs that indicate which lifecycle stage is present. Sketches could even be made of the indicator signs they find.

1. The seedling group – germination

Find very green, young plants that look as though they have recently pushed their way out of soil.

2. The pollination group – flowering

Find flowers on flowering plants (including trees). Signs of pollination by insect pollinators may be present. If it is a tree pollinated by the wind, such as oak, hazel or hornbeam, watch how the catkins move in the breeze.

3. The seed and berry group – fertilised plants.

Find plants bearing berries, fruits and nuts. Consider the different colours.



Acorns

4. The moving group – dispersal

Find signs of seeds, nuts or berries that have been moved or are being moved. These could include nuts on the woodland floor that may have dropped from a tree, catkins blowing in the wind, a bird dropping seeds after eating a berry or an acorn that has been buried in the soil by an animal.

At the end of the activity, the groups should reassemble and arrange themselves in a circle in the correct plant lifecycle order and discuss their findings.

Teacher's note: children should be reminded not to touch the berries as many are poisonous to humans.



Animal lifecycles

Having looked at how plants create seeds, germinate and disperse those seeds, the lifecycle of animals will now be investigated. Generally, animals have simple lifecycles similar to the human being. Most fish, reptiles, birds and mammals are either born alive from their mother or they hatch from eggs and then they grow up. However, some creatures, like butterflies and moths, have a more complicated lifecycle that includes a period of metamorphosis.

The grassy areas of the open rides in Ham Street Woods NNR are rich in butterfly and moth

activity. In fact, the reserve is very well known for its moths, including the charismatic hummingbird hawk moth. This is a good species to study as the topic of migration can also be covered. This is a migratory species, and will have flown from Africa.

Back at school

PE/Dance activity:
Moth metamorphosis

Represent the hummingbird hawk moth lifecycle in dance or mime.

Eggs laid: up to 200 eggs are laid by each adult female on lady's bedstraw. Each egg is laid on a different plant.

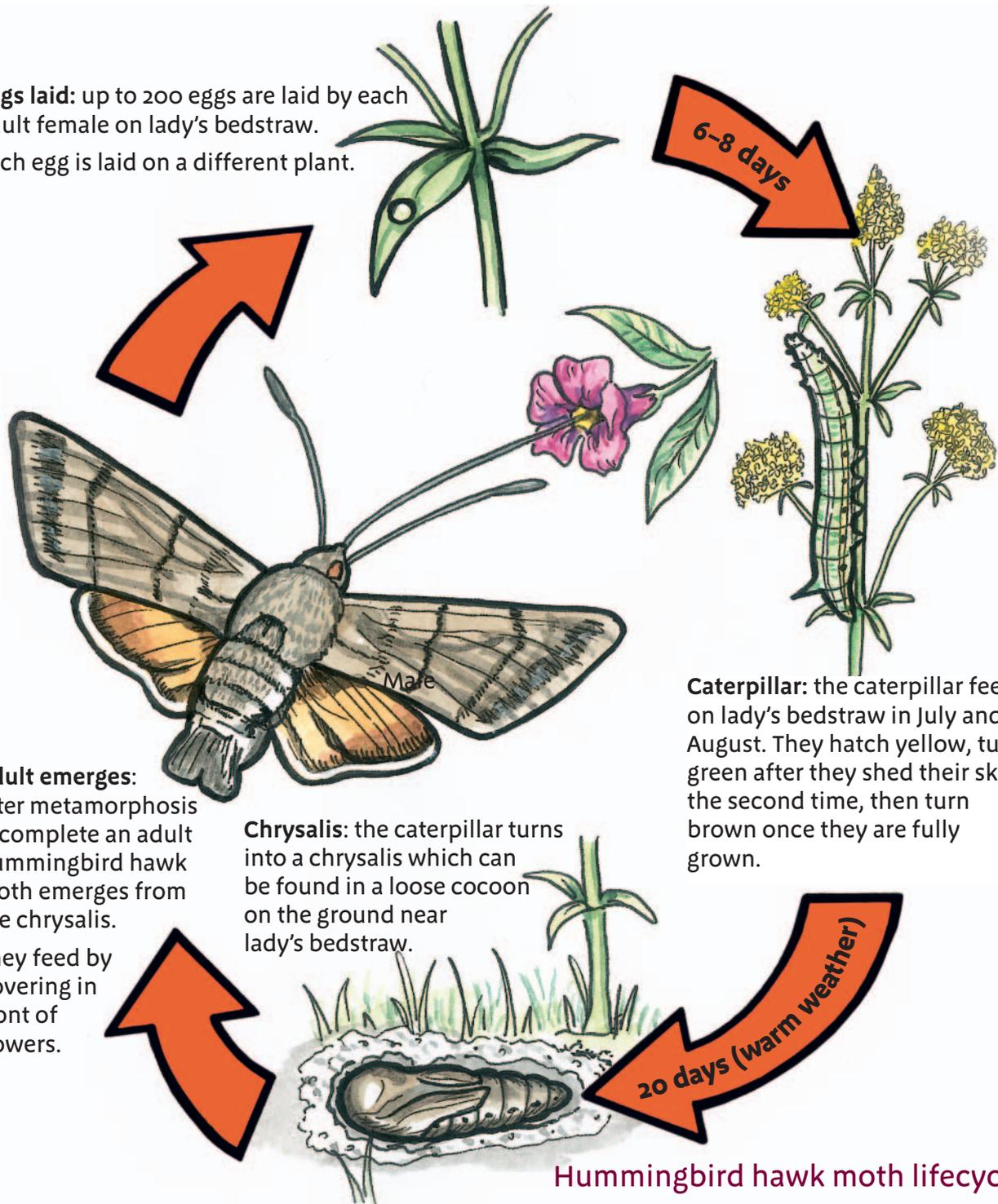


Illustration: Anita Lockett

Hummingbird hawk moth lifecycle

Activity: Science

Amphibians

The ponds at Ham Street Woods are home to three different species of newt: the great crested newt, the palmate newt and the common newt, also known as the smooth newt. It is possible to find a great deal of information on the internet about these fascinating creatures. In common with most other amphibians, the newt undergoes metamorphosis during its lifecycle.

Ask the children to research the lifecycle and legal protection of a great crested newt.

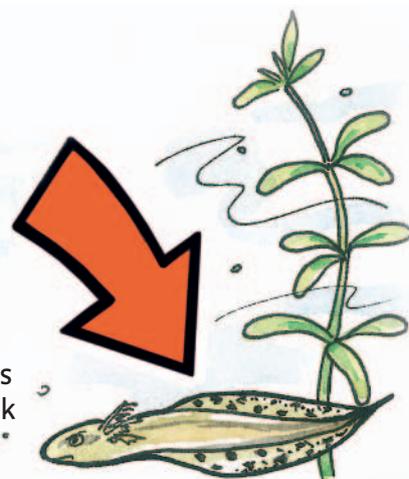
Discuss the lifecycle of the great crested newt with the class by asking them to consider the following questions.

- How is it similar to the moth lifecycle?
- How is it different from the human lifecycle?

Eggs: a female newt lays up to 300 eggs. Each egg is individually folded into a leaf and sealed with a fluid she makes.



Mating: newts return to ponds to mate. The male attracts the female with pheromones – special chemicals he sends to her by waving his tail. He leaves a sack of sperm on the pond floor and guides the female to take it into her body.

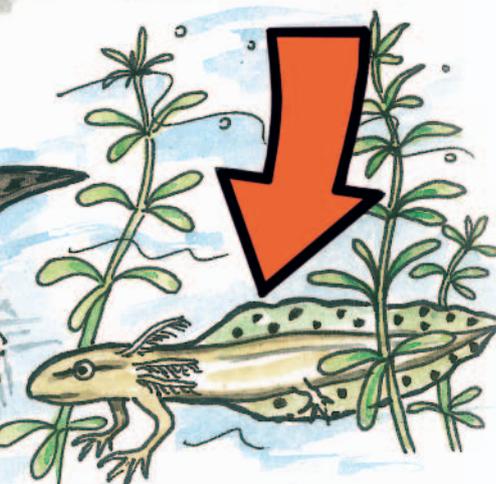
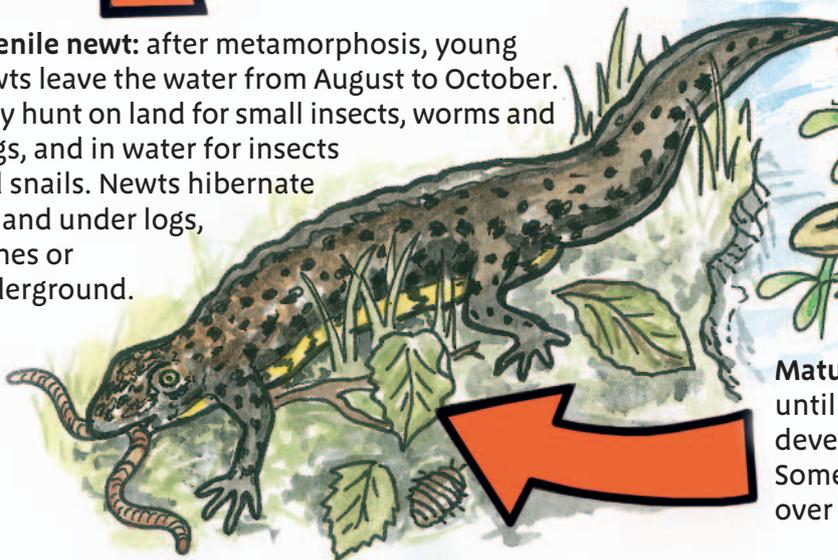


Larva: larvae hatch from the eggs. They have three pairs of feathery gills to breathe under water. They eat small water animals such as water flea.

Newts breed from February to June



Juvenile newt: after metamorphosis, young newts leave the water from August to October. They hunt on land for small insects, worms and slugs, and in water for insects and snails. Newts hibernate on land under logs, stones or underground.



Maturing larva: gills remain almost until metamorphosis. Front legs develop before back legs. Some newts remain as larvae over the winter.

Great crested newt lifecycle

Further learning opportunities

Aside from Ham Street Woods NNR, the Welcome to the Wildside project also focuses on two other reserves in east Kent – Stodmarsh NNR and Wye NNR.

Stodmarsh NNR is a marshland area on the bank of the Great Stour river, north-east of Canterbury, supporting important wetland bird populations. Wye NNR is a chalk grassland and woodland site with steep coombes, situated on the outskirts of the village of Wye, near Ashford.

Collectively, the three NNRs provide children with an enhanced opportunity for learning and a rich personal experience of nature.



© John Pieterse

Wye NNR

To obtain further information regarding the sites, please contact the project using the details provided on the back cover of this education pack.



Stodmarsh NNR

References

De Boo, M & Woodland Trust (2004) Nature Detectives – Environmental Science for Primary Children. Hatfield: Association for Science Education and Grantham: The Woodland Trust. Also online at:

<http://www.naturedetectives.org.uk>

Department for Education and Employment (1999) The National Curriculum Handbook for primary teachers in England. London: DfEE/QCA

Department for Children, Schools and Families (2009) Independent Review of the Primary Curriculum: Final Report. London: DCSF

Journey Sticks video can be found at:
<http://www.teachers.tv/video/23949>

Plants for Primary Pupils
Parts of a Plant and their Functions
by SAPS and FSC 2004

Games for the Outdoor Classroom
by FACE – Farming and Countryside Education

Image credits

p. 5, 21, 24 Bird photography: Tony Morris:
tonyandpam.morris@tiscali.co.uk

Cover Logs at Ham Street Woods NNR,
photo © Natural England

This pack contains a series of National Curriculum linked activities suitable for Key Stage 2 pupils. Some activities are adaptable for younger or older age groups, if necessary.

The pack is divided into a series of key topics, each with activities suitable for use in the classroom and on Ham Street Woods National Nature Reserve.

A detailed map of the site is included within the pack to help you find your way around. There is also a CD containing worksheets, useful images and any additional resources you might need for the activities.

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