



B-Lines

Education Pack for Primary Schools



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Large Scabious Mining Bee © Will Hawkes, *Pantaloone Bee* © Will Hawkes, *Hairy-footed Flower Bee* © Will Hawkes.

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B-Lines - Creating Pathways for Pollinators

Welcome to your education pack!

This pack contains all the necessary resources and information you will need to learn more about pollinating insects and B-Lines during your lessons.

B-Lines are an imaginative and beautiful solution to the problem of the loss of wildflowers and pollinators. They are a series of 'insect pathways' running through our countryside and towns, along which we are restoring and creating wildflower-rich habitat stepping stones. These stepping stones will link existing wildlife areas together benefitting a host of wildlife, especially our precious pollinators.

B-Lines are helping many pollinating insects, like butterflies, moths, beetles, wasps and flies. They also help protect our beloved bees, including rare and threatened species of bumblebees and solitary bees.

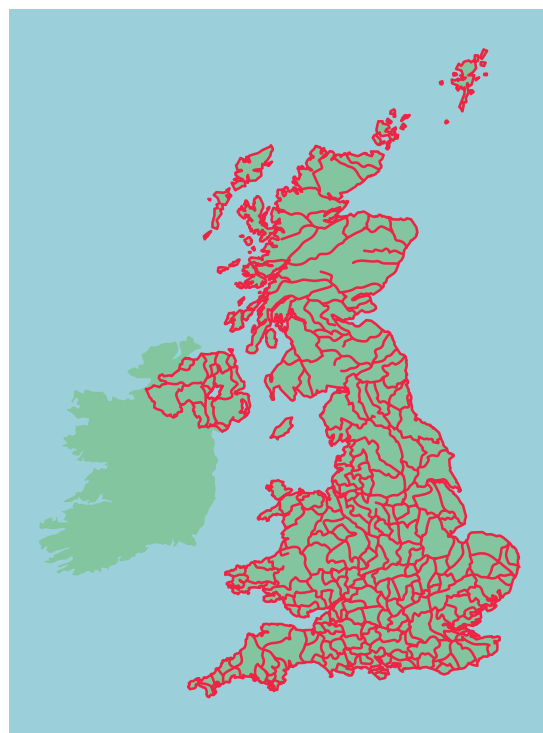
By working through this pack, you are helping us to champion pollinating insects as well as raising awareness of bees and the importance of connecting their wildflower-rich habitats.

What's included?

Throughout this pack you will find information and discussion topics, alongside activities for the themes including the biodiversity of bees, wonderful wildflowers, pollination and B-Lines. There is also a section aimed at outdoor learning of the above topics.

This pack is broken down into sections with resources for both Key Stage One and Key Stage Two. The contents page below provides a brief overview of each activity. Activities can be combined, or elements taken from each, to create a lesson plan to suit your needs.

The accompanying 'Resource Pack for Primary Schools' is where you will find all the resources for your lesson plans. Some activities might require additional resources, other than those included in the pack, these are clearly highlighted where this is the case.



B-Lines Network spanning the U.K



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See the Resource Pack for Primary Schools

All activity sheets and enlarged photos



Biodiversity of Bees

Learning Objectives:

- Understand that a bee is an insect, learning its basic anatomy.
- Appreciate that there are many different species of bees.
- Learn the life cycle of a bee, and compare between a bumblebee and a solitary bee (KS2).
- Understand that different bees have different habitat requirements for nesting.

Learning Objectives:

- Bee Drive
- Build a Bee
- Colour by Numbers
- Nicest Nest

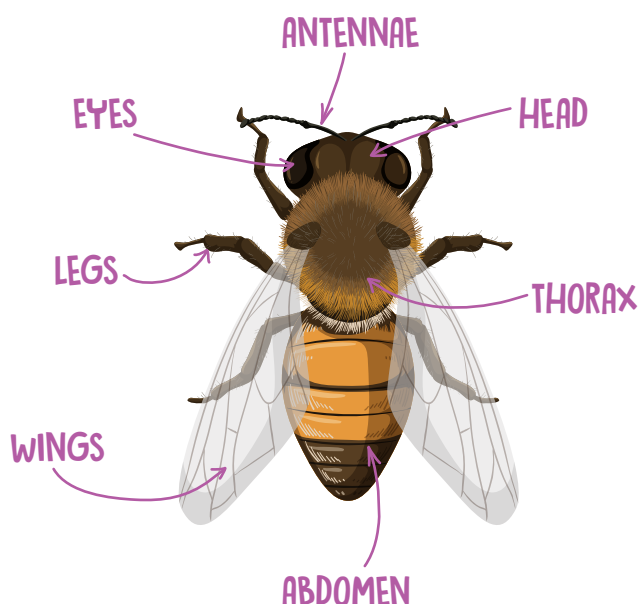
Resources Required:

- Dice
- Clay
- Coloured pencils: black, orange, yellow, red, brown

What is a bee?

Bees are invertebrates so, unlike humans, they do not have a backbone. 95% of all animals on Earth are invertebrates.

More specifically, bees are a type of insect which all have a hard outer shell called an exoskeleton, six jointed legs, three body parts (the head, thorax and abdomen), eyes and antennae. Bees are winged insects that actually have four wings but they will hook the two wings on each side together to form one pair when flying. They are closely related to wasps and ants.



Note: Most insects share these common anatomical features.

Activity: Build a Bee (Needs clay)

Pupils can use clay to build their bee ensuring they have all the correct body parts: a head, thorax, abdomen, six legs, two pairs of wings, eyes and antennae.

Activity: Bee Drive (Needs dice)

Page 4 in Resource Pack

Pupils can use this activity sheet to “build a bee”, consolidating their learning about the basic anatomy of a bee. Pupils must first roll a 6 on the dice to draw the ‘body’, choosing either the thorax or abdomen.

Afterwards, the additional body parts can be drawn after rolling the corresponding number, as long as there is something to attach it to. E.g. pupils must roll a 5 for the head before the eyes or antennae can be drawn. The winner is the pupil who builds their bee the fastest.



Fun facts about bees:

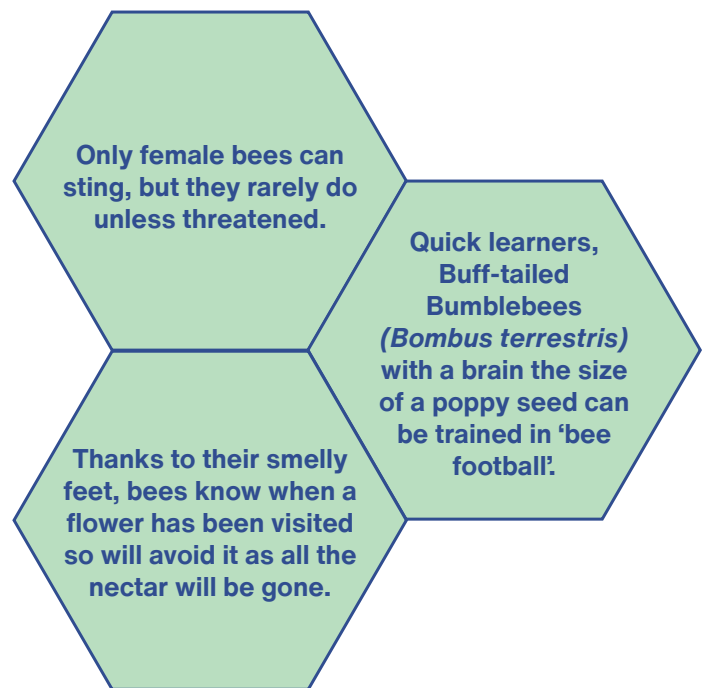
Bumblebees:

Bumblebees are a familiar sight in our gardens and countryside that many pupils may recall seeing. These large, hairy bees are typically thought of with black and yellow banding, but pupils may have noticed bumblebees with a red, white or yellow tail.

Different coloured bumblebees can actually be different species of bumblebees.

There are 24 species of bumblebee in the UK, whereas there is only one species of honeybee.

You may want to search videos of 'bumblebees playing football' to show pupils.



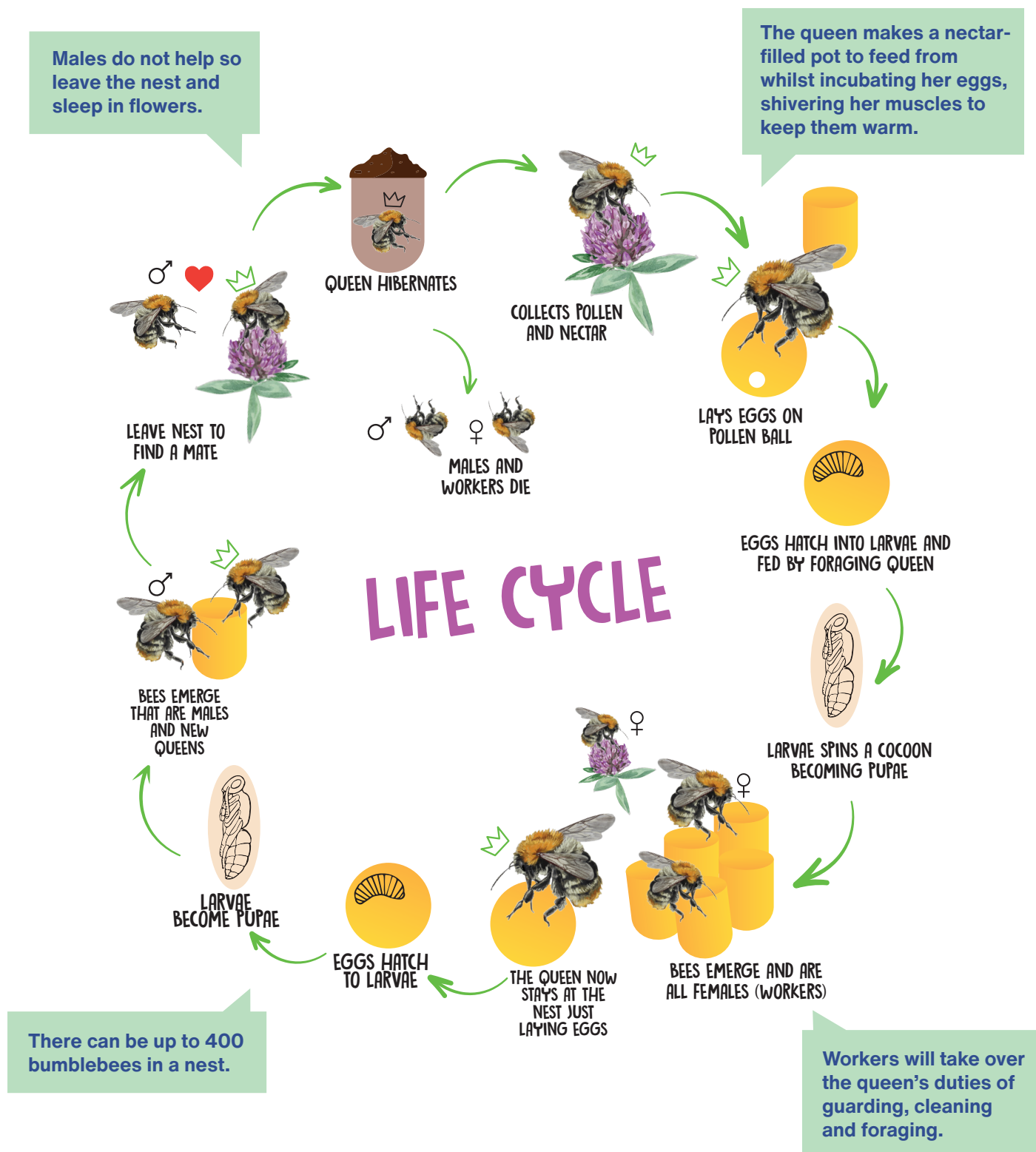
Who has seen a bee before?	What type of bee was it? (e.g. honeybee, bumblebee)	Has anyone seen different coloured bumblebees? (e.g. red, white or yellow tail)
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Activity: Colour by Numbers (Needs colouring pens or pencils) - Page 5 in Resource Pack
Pupils can use this colour by numbers activity to accurately depict different species of bumblebees. This activity is designed to draw the pupils' attention to the fact that different species of bumblebee have different colour bands. Please note that all the bumblebees depicted in the colouring sheet are queen bees and the bands vary slightly between workers and males of the same species.

Common Carder Bee (*Bombus pascuorum*):
This gingery bumblebee depicted in the life cycle is one of the UK's three Carder Bee species. The Carder bumblebees are special because they comb or 'card' soft materials, like moss, for their nests. They feed from many flowers, including Red Clover, Birds-foot Trefoil and Scabiouses.

Bumblebees live together in a colony with the mother (queen), her daughters (workers) and sons (males). A queen will find a place to nest; some nest underground using old rodent holes, some above ground in piles of leaves or tussocky grass. The Tree Bumblebee, as their name suggests, nest high up in trees, often using old bird boxes.

Life cycle of a bumblebee: KS2 - Page 6 in Resource Pack



Keywords:

- **Hibernation** is when an extended period over winter is spent in a dormant state.
- **Metamorphosis** is the process of transformation from an immature form to an adult form.
- **Larva** (plural: larvae) is the active immature form of an insect that differs greatly from the adult, e.g. caterpillar.
- **Pupa** (plural: pupae) is the inactive immature form of an insect, e.g. a chrysalis.

Solitary bees: Page 7 in Resource Pack

We also have over 240 species of solitary bees. As their name suggests, solitary bees live by themselves, unlike bumblebees and honeybees which live socially in colonies. A female solitary bee will build and provision her nest without any help from her offspring or a male. Many people have not heard of solitary bees so you may want to show pupils the photos of these species. Some are common, whereas others are rare or threatened. Pupils will notice how different bees can look.

In total, there are over 270 species of bees in the UK.



Hairy-footed Flower Bee
(*Anthophora plumipes*)
©Will Hawkes



Ashy Mining Bee
(*Andrena cineraria*)
©Scarlett Weston



Wool Carder Bee
(*Anthidium manicatum*)
©Will Hawkes



Tawny Mining Bee
(*Andrena fulva*)
©Will Hawkes



Willughby's Leafcutter Bee
(*Megachile willughbiella*)
©Nigel Jones



Pantaloon Bee
(*Dasypoda hirtipes*)
©Will Hawkes

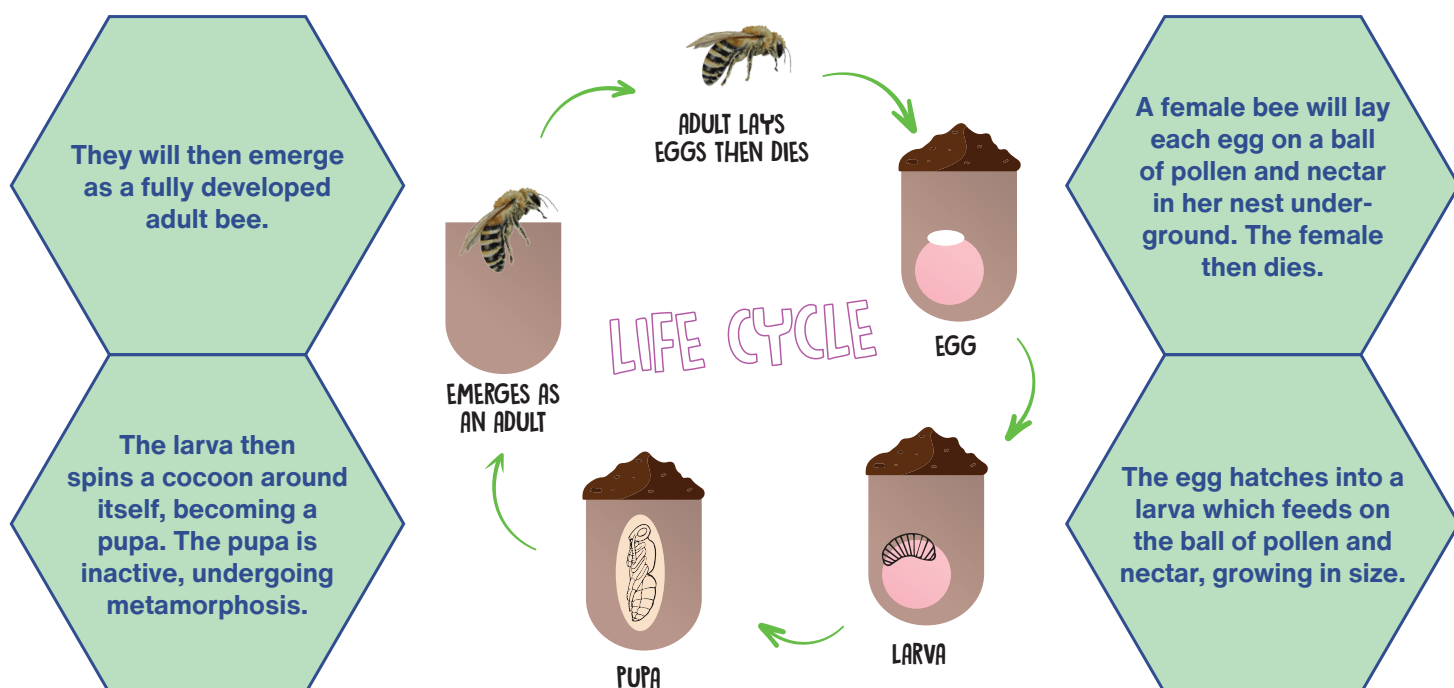


Gooden's Nomad Bee
(*Nomada goodeniana*)
©Scarlett Weston

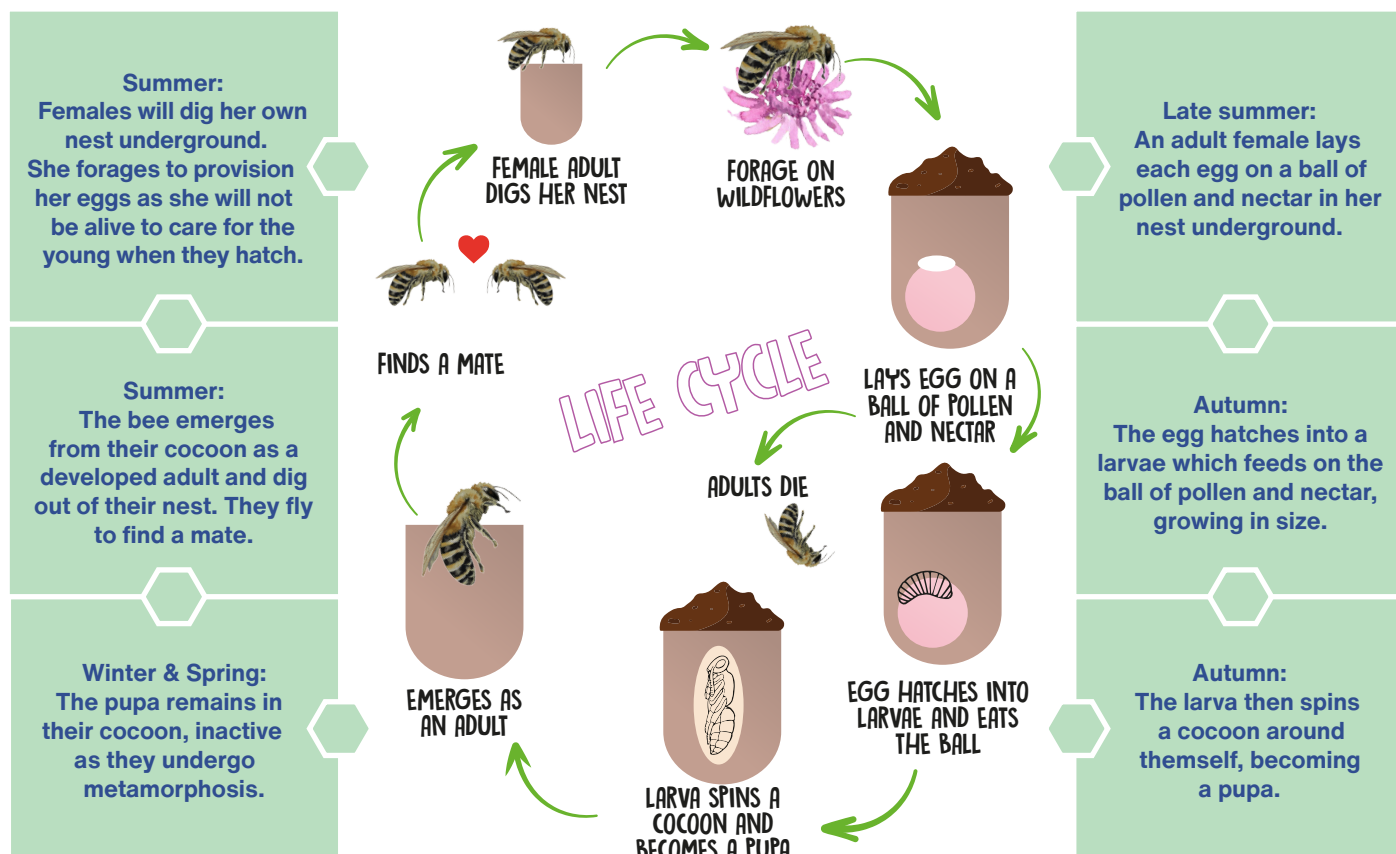


Gold-fringed Mason Bee
(*Osmia aurulenta*)
©Will Hawkes

Life cycle of a solitary bee: (KS1) Page 8 in Resource Pack



Life cycle of a solitary bee: (KS2) - Page 9 in Resource Pack



Large Scabious Mining Bee: (*Andrena hattorfiana*)

An example of a solitary bee which digs her nest underground is the Large Scabious Mining Bee, which can be found in southern England and southern Wales. The Large Scabious Mining Bee is the UK's largest mining bee. They are 'fussy eaters' and only feed from Field Scabious – you may see a female adorned with the pink Field Scabious pollen on her legs which she is collecting for her young.



©Will Hawkes

Activity: Blank Life Cycle Pages 10 – 12 in Resource Pack

Pupils can complete the blank life cycle sheets provided after the teaching session to have as a memory aid. You may want to ask pupils to draw prompts around the life cycle to highlight the changes through the seasons, or ask them to recreate this as a timeline.



Ask KS2 pupils to think about the similarities and differences between bumblebee life cycles, compared to the solitary bee life cycle. For example: bumblebees live socially in a nest with up to 400 bees, whereas solitary bees live on their own. Bumblebees care for their young, feeding them and keeping them warm, whereas solitary bees provide everything the larvae needs to develop independently. Bumblebees have more young with older daughters helping to raise later batches, whereas solitary bees have one small batch of eggs.

Nests of solitary bees: Pages 13 and 14 in Resource Pack

Different species of solitary bees nest in different places and use different nesting materials. Solitary bees tend to be either ground nesting or aerial nesting and most like to nest in sunny, sheltered spots. Ground nesting bees often nest in places such as loose soil, short grass, in compacted ground or in tussocky grasses. Aerial nesting bees nest above ground and use places such as dead trees, old walls and hollow stemmed plants.

Below are some of the bees that the B-Lines project are helping and some information about the variety of different places they like to nest.

Ground nesting:

Some solitary bees are mining bees that use their legs to dig tunnels and nest underground:



Ashy Mining Bees

(*Andrena cineraria*) are an example of ground nesting mining bees with striking black and white colouration. Here is one poking her head out of her underground nest.

©Steven Falk



Pantaloen Bees

(*Dasypoda hirtipes*) are another example, the females look like they're wearing "pantaloons" with their extra hairy legs which help them to dig.

©Will Hawkes



Some solitary bees nest dispersed, away from their neighbours.

©Scarlett Weston



Other solitary bees nest in aggregations, close to their neighbours, such as the Tawny Mining Bee (*Andrena fulva*).

©Scarlett Weston

Aerial nesting:

Some solitary bees are aerial nesters, preferring to nest above ground:

Wool Carder Bees (*Anthidium manicatum*) are an example who nest utilising pre-existing cavities in hollow stems, deadwood or various man-made objects. Although they share the name 'carder' with the Common Carder Bee, they are not closely related and instead share the behaviour of combing or 'carding' soft materials to line their nests. You can watch them here:

www.vimeo.com/443854112

You can also watch them carding the soft hairs from Lamb's Ear plants which is white and fluffy, like wool, here: www.youtube.com/watch?v=hPVRw04nvqk



©Will Hawkes

Some solitary bees are leafcutter bees that use their large mandibles to cut parts of plants to make their nests:

Willughby's Leafcutter Bees (*Megachile willughbiella*) are an aerial nesting leafcutter bee that nest in bee hotels, deadwood or artificial cavities. They use leaves, as their name suggests, to create rooms in their nest for each egg which they provision with nutritious pollen. You can watch an educational video on leafcutter bees here: www.youtube.com/watch?v=n09xE5SGq9M



©Nigel Jones

Nests of solitary bees: Continued...

Hairy-footed Flower Bees (*Anthophora plumipes*) are also aerial nesters that often use walls. Here is a male with his yellow moustache looking out from a hole in a brick wall. Hairy-footed Flower Bees also like to nest in cliff faces. The females construct the nest for their young and are black with orange hind legs, often mistaken for a bumblebee.

Special nesting:

Some solitary bees have special nesting habits that are different from ground and aerial nesters:

Gold-fringed Mason Bees (*Osmia aurulenta*) nest in empty snail shells.

They are one of three UK species which do this.

They will construct cells inside the empty snail shell using leaf mastic (chewed up leaves) before enclosing an egg with a nourishing pollen ball inside each cell. Watch them also plaster leaf mastic on the outside of the snail shell here:

www.youtube.com/watch?v=5tSvPcSKHMk

Gooden's Nomad Bees (*Nomada goodeniana*) are cuckoo bees. Much like the bird, the Cuckoo, they will lay their eggs in the nests of other species – the Gooden's Nomad Bee uses nests of Buffish Mining Bees (*Andrena nigroaenea*). They do not build a nest for themselves and are dependent on the underground nests of Buffish Mining Bees. There are lots of different types of cuckoo bees. Watch an interaction between a cuckoo bee and its host here: www.youtube.com/watch?v=JiTjRv7sJkg&t=34s

©Steven Falk



©Scarlett Weston



Activity: Nicest nest

After showing pupils some of the weird and wonderful nesting habits of solitary bees, ask them to draw their favourite bee and its nest. Perhaps they will want to draw a Pantaloon Bee using her hairy legs to tunnel underground, or a Wool Carder Bee lining her aerial nest with fluffy white plant material in a hollow stem.

Activity: Biodiversity of bees

Discuss with pupils that there are lots of different species of bees. As well as the well-known Honeybee, there are our beloved bumblebees and lesser-known solitary bees. Bees all share common body features but they can look very different from each other. They behave differently and nest in different places. All the different species of bees are important and we should protect them all.



Wonderful Wildflowers

Learning Objectives:

- Understand that bees depend on wildflowers to survive.
- Understand that different species of bees have different length tongues, corresponding with different flowers.
- Appreciate the need for a diversity of wildflowers.
- Understand that we are losing our wildflowers, and this impacts the survival of our bees.

Activities Included:

- Stick out your tongue
- Tongue twister
- Wildflower wordsearch
- Where the wildflowers are
- Save the bees

Resources Required:

- Ruler

What do bees eat?

Bees feed from flowers. They drink the sweet juice from flowers called nectar which gives them energy to move. Bees also collect the powdery pollen from flowers to feed to their young/larvae which need the energy to grow. If there were no wildflowers, bees would not be able to survive.

This is one of the reasons it is important to have a diversity of wildflowers. All bees have adapted to feed from certain species of flowers of different shapes, smells and colours. Different flowers will bloom at different times and it is very important to have food

across the seasons. Some bees, like the Large Scabious Mining Bee, can only feed from one flower. They are specialists, or 'fussy-eaters', that are dependent on Field Scabious flowers to survive.

It is important to have lots of wildflowers, but if we only had lots of one type of wildflower our bees would still struggle. We need to have lots of different types of wildflowers to support all the different species of bees.

What do we need to survive?
(e.g. food, water, shelter, warmth)

What do bees need to survive?

Where can they find these in their environment?
(e.g. flowers, ponds, log piles, sunny spots)

A Long-horned Bee sticking its tongue out. ©Will Hawkes



Activity: Stick out your tongue

Ask pupils to stick out their tongue to see how long their tongue is compared to those sat next to them. Our tongues are mostly the same lengths. Different species of bees have different lengths tongues. As bees use their tongues to drink the sugary nectar from inside flowers, the length of their tongue limits which flowers the bees can drink from.

Activity: Tongue twister (Needs ruler)

Page 15 in Resource Pack

This activity sheet is designed to highlight that different species of bees have different length tongues, and this influences which flowers they

feed from. Pupils should measure the lengths of the bees' tongues and the depth of the flower's cross-section. Explain that the nectar is at the bottom of the flower and ask pupils to match the bee whose tongue reaches the nectar.

Where have all the wildflowers gone?

We used to have lots of wonderful wildflowers across our countryside for many different species of bees to feed from. Tragically, most of our wildflowers are now gone. Without wildflowers for bees to feed from, the bees will starve and die.

Over 97% of England's wildflowers have been lost since 1940.

We used to have lots of wildflowers...



Now, we only have a small fraction (3%) of this habitat left.

Activity: Wildflower wordsearch – Page 16 in Resource Pack

This comprehension activity summarises the importance of wildflowers for the survival of bees. Pupils should read through the information carefully and then find the words highlighted in bold in the wordsearch.

Activity: Where the wildflowers are

Photos of the flowers to label the chairs can be found on Page 17 in the Resource Pack (Needs Chairs)

Wildflowers are a vital habitat for lots of wildlife, including bees. This game is designed to get children up out of their seats and thinking about the impact of habitat loss. It is to be played either in the classroom or outdoors. An example of how to play with 30 students in a classroom:

Round 1

Clear the centre of the classroom and have 10 chairs dotted in this space. Explain that each chair is a Field Scabious flower. All the children are Large Scabious Mining Bees.

Get them to run around the classroom in between all the “scabious flowers”, buzzing as they fly. Teacher calls to STOP and the children race to land on a flower. Each flower can feed 3

Large Scabious Mining Bees. In the first round, everyone has enough food. Everyone buzzes around again, teacher removes one Field Scabious flower, then calls STOP. The children race to feed from a flower but the last 3 bees to touch a flower will starve and won't survive to the next round. Repeat until 1 chair left. Discuss the impact of habitat loss.

Round 2

Repeat, but this time starting with the 1 remaining Field Scabious flower and adding a flower each time until all the Large Scabious Mining Bees have enough flowers to survive. Discuss the importance of conservation and creating habitat.

Keywords:

- **Habitat** is the natural home or environment of an animal, plant, or other organism.
- **Habitat** is lost when it has been damaged or destroyed to the point where it can no longer support the species living there. Habitat loss is the primary threat to wildlife.
- **Rare species** is a group of organisms which are very uncommon, or scarce.

Where have all the wildflowers gone?

Continued...

Round 3 - an optional addition to the game.

This time split the children so 15 are Common Carder Bees, and 15 are Large Scabious Mining Bees. Label 5 chairs as Field Scabious and the other 5 as Bird's-foot Trefoil. The children who are Large Scabious Mining Bees can only feed from Field Scabious flowers, but Common Carder Bees can feed from both.

Play again removing Field Scabious and Bird's-foot Trefoil alternately. Notice that Large Scabious Mining Bees are at greater risk of starving and dying because they can only feed from one type of flower. Even though both are rare, discuss the particular importance of protecting Large Scabious Mining Bees because they only feed from one flower.



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Why have all the wildflowers gone? (KS2) - Page 18 in Resource Pack

As a class, brainstorm reasons why there has been such a dramatic decline in wildflowers across England. These reasons may include:

Urbanisation – as more houses and roads are being built, towns and cities are expanding. Perhaps, you could ask pupils what they can see in this photo of London. Then, ask them to think about what a bee can see in this photo – to a bee, this is a concrete desert.

Intensification of agriculture – more wild spaces are being converted to farmland with lots of fields of grass for livestock. Although this green space might look natural, it is not and there are no flowers for bees.

Neat and tidy greenspaces – wildlife loves wild areas. With gardens being mowed regularly to keep lawns neat, flowers cannot grow.

All the above reasons are direct causes of habitat loss. There are other reasons you may want to discuss with pupils, including:

Wide-spread pesticide use has indirectly impacted wildflowers. Pesticides are chemicals which destroy insects on crops. They are intended for harmful insects that damage crops but also destroy helpful pollinating insects. Wildflowers are dependent on pollinating insects (see 'Why pollination is the bee's knees' section).

Climate change also impacts wildflowers which are adapted to the climate they live in. With increasingly unpredictable conditions, they may not be able to adapt and survive to their new climate.

©Matt Shardlow



©Scarlett Weston



Why have all the wildflowers gone: (KS2) Continued...

How to help:

Mowing the lawn less often is the easiest thing that can be done to help local pollinators. Encourage pupils to talk to family and friends with gardens about the importance of letting their gardens grow wild and only mowing late in autumn.

Creating mini meadows, whether converting a lawn, flower bed or planting out a large container, this would create habitat for bees. Some wildflowers are better for pollinators than others, so encourage pupils to select bee-friendly seeds.

Going chemical free for bees by avoiding using chemicals like pesticides and fertilisers in gardens. Instead, encourage beneficial insects like ladybirds which eat pests or use home-made compost as a natural fertiliser.

Becoming a citizen scientist, pupils can collect data on their favourite pollinators by taking photos and gathering information. They can also undertake Flower-Insect-Timed counts (see 'Get outdoors' section).

Fundraising for Buglife, pupils could raise money through bake sales, sponsored runs, guess the sweets, etc.

Bee-friendly by creating nesting sites, including bee hotels and sunny banks of loose soil, or places for bees to shelter in, including log piles and tussocky grasses. Pupils could ensure bees have something to drink by providing bee baths, a pond or water butt. Bees also love herb gardens.

Raising awareness, encourage pupils to tell others everything they've learned about bees and B-Lines.



Activity: Save the bees poster (needs colouring pens or pencils)

After going through the different ways pupils can help save the bees, ask them to decide which ways they would like to help most. Get them to create an eye-catching and informative poster about the things they want to do for their local pollinators. Encourage pupils to think of a catchy title, perhaps with alliteration, a pun or question and to include illustrations.

Why Pollination is the Bee's Knees

Learning Objectives:

- Define pollination and explore the part that flowers play in the life cycle of flowering plants.
- Understand the role of pollinating animals, such as bees, in pollination.
- Realise the importance of pollinators for our crops.

Activities Included:

- Pipe cleaner pollination
- Favourite meal

Resources Required:

- Pipe cleaners
- Powder paints
- Egg cartons
- Coloured card
- Scissors

What is pollination? (KS2)

Pollination is essential for plant reproduction. It occurs when the pollen from the male part of a flower is transferred to another flower's (of the same species) female part, which leads to fertilisation and the production of seeds.

What role do pollinators play?

Animals can actively find a mate, but as plants are rooted to the ground in one place, they need to find a different way to transfer their pollen. When pollinators visit flowers to drink nectar and collect the pollen for their larvae, some of it

inevitably gets in their hair. If the pollinator then lands on another flower of the same species, the pollen from its hair can transfer to this flower.

Flowers make themselves attractive to pollinators with bright colours, sweet smells and tasty nectar to encourage them to visit. You could ask pupils what animals act as pollinators (e.g. bees, butterflies, beetles, moths, hoverflies and other flies but in other countries, also some mammal, bird and even lizard species pollinate).

Activity: Pipe cleaner pollination

(Needs pipe cleaners, egg cartons, coloured card and scissors) First, ask pupils to create flowers by cutting out petal shapes from coloured card, using a single egg carton in the middle to hold the "pollen". Fill each centre of the flower with coloured powder paint (one colour per flower) and place the flowers around the classroom. Second, pupils will need to create their pipe cleaner bees,

ensuring they have 6 legs and wings to fly around the classroom. Each pupil should have a bee and be encouraged to visit as many flowers as possible, dipping the pipe-cleaner legs in the flowers. Let them do this for 5 minutes or so. At the end, check the pollen baskets in the centre of each flower and see how the bees have transferred pollen between them. The purpose of this activity is to enable pupils to visualise the process of pollination.

The importance of pollination:

Fertilisation occurs and a seed is produced in the flower's ovary. The ovary will then swell becoming the flesh of a fruit. This is a way plants encourage animals to disperse their seeds for them, hoping the animals will eat the sweet fruit and scatter the seeds. Without pollination we would not have many

of our fruits (e.g. strawberries, apples, grapes, pears, plums), vegetables (e.g. carrots, potatoes, pumpkins, peas, broccoli), seeds and nuts (e.g. pea -nuts), beans (e.g. baked beans) or chocolate.

**1 in 3 mouthfuls
of our food depends
on pollinators!**

Activity: Favourite meal (p20 Resource Pack)

Using the activity sheet, ask pupils to draw a balanced meal that they love to eat, along with three snacks: healthy, savoury and sweet. Ask them to write a shopping list for all the ingredients that go into making their meal. Then, reveal ingredients that

would not be available without insect pollination and get pupils to cross these ingredients off of their list. They can then redraw their favourite meal as it would be in a pollinator-free world. The purpose of this activity is to highlight how much of our food depends on pollinators.

The Buzz about B-Lines

Learning Objectives:

- Understand the impact of habitat fragmentation.
- Understand the importance of habitat creation.
- Appreciate the habitat features that can support a great diversity of bees.
- Develop persuasive writing skills.

Activities Included:

- B-Lines colouring maze
- Habitat connectivity
- Persuasive writing
- Best for biodiversity

Resources Required:

- Colouring pencils
- Paints

B-Lines - Creating Pathways for Pollinators

Bees need the sugary nectar from flowers for energy. Without enough food or energy, they can't travel far. The huge loss of wildflowers fragments their habitat so there are only small patches of wildflowers left across the countryside. These are too far apart for the bees to travel between.

Keywords:

- Habitat fragmentation is when a large area of habitat gets broken into a number of smaller, isolated patches.
- Greater habitat connectivity is when animals are able to travel between these smaller, isolated patches.
- Conservation is the act of protecting Earth's natural resources for current and future generations.

Would you like it if you had to travel a really long way to find food?

How far do you think you could go without any food for energy?

Activity: B-Lines colouring maze p22 Resource Pack (Needs colouring pencils) Pupils need to help the bee travel through the maze to a patch of wildflowers. This activity is designed to highlight the need for wildflowers all along the bees route otherwise, the bee won't be able to travel the distance to get to the wonderful patch of wildflowers. By colouring in the flowers, they are creating habitat.

Activity: Habitat connectivity (KS2) (Needs colouring pencils)

Ask pupils to map out the area around their homes or school, drawing the houses, fences, and roads. They should include the animals, plants and water sources. Ask pupils to imagine where pollinators may move, eat or sleep in their local area and to think of how the habitat could be more connected. If your school has a subscription to Digimap you may want to utilise this resource:

www.digimapforschools.edina.ac.uk

Creating Pathways for Pollinators Continued...

Buglife is a wildlife charity dedicated to conserving invertebrates, the small things that run the planet. We have come up with a beautiful solution to the loss of wildflowers: B-Lines! We are creating a series of 'insect pathways' which go across the UK, like a rail network, connecting all the good wildflower patches together so that pollinators can travel freely across Britain. Watch our video here:

www.youtube.com/watch?v=SoCa7kpZEEY

We have carefully mapped out the B-Lines and are now creating and restoring wildflower-rich habitat along these insect pathways. In this way, we are reversing the habitat fragmentation caused by the loss of wildflowers.

"If we and the rest of the back-boned animals were to disappear overnight, the rest of the world would get on pretty well. But if the invertebrates were to disappear, the world's ecosystems would collapse."

Sir David Attenborough

B-Lines - Creating Pathways for Pollinators. Continued...

Pupils can help pollinators by planting flowers for them to feed from. There are special seed mixes, perfect for bees, that pupils can use to sow their own mini meadow in their garden, or a garden of a friend or relative. Please encourage pupils to get help from their guardians to add their projects to our B-Lines map here: www.buglife.org.uk/our-work/b-lines

This will highlight to pupils that their habitat creation is part of a UK-wide project that will have a huge impact.

Activity: Best for biodiversity (Needs paints)

Pupils should be split into teams to paint the best habitat to support the greatest biodiversity of bees. The purpose of this activity is for pupils to apply everything they have learned about the different nesting and foraging requirements of bees. An ideal painting would have lots of different flowers growing for different species. They would include different types of nesting habitats and would feature drawings of different species of bees. You may want to display reference pictures.

Conservation champion:
Remind pupils without access to a garden that one of the most important things they can do is to spread awareness about how cool bees are and persuade other people to protect them.

Activity: Persuade a local landowner

As a class, you may want to brainstorm why wildflowers are wonderful.

You should ask pupils to think about how wildflowers benefit bees, and how bees benefit humans and their environment. Then, ask pupils to write a letter to a local landowner, for example a farmer, persuading them to grow some wildflowers on their land to help bees and other pollinators.

Activity: Persuade a pollinator

Alternatively, as a class, brainstorm a checklist of habitat features that would attract bees to a location. You may want to take students around the school grounds trying to find as many of these features as possible. Then, ask pupils to write a letter to a bee of their choice, which they have learned about in these sessions, persuading the bee to visit their school. Pupils could explain all of the existing habitat features the school has, and explain what they are doing to make it a wonderful habitat for them.

B-Lines and The Silly Giants:

You may want to show pupils this inspiring animation created by a primary school and local artist to raise awareness of how B-Lines can help to reverse the decline in bees, butterflies and other pollinating insects.

<https://youtu.be/wqg4NDx4T44>



Get Outdoors

Learning Objectives:

- Explore the natural world around them.
- Undertake a simple practical experiment.
- Make careful observations of animals and plants, identifying common species.

Activities Included:

- Flower-Insect-Timed (FIT) count
- Insects rock
- Go get it

Resources Required:

- Nature
- DIY 50cm x 50cm quadrat – can be made from twine
- Clay
- Sticks and things

Activity: Flower-Insect-Timed (FIT) count (Needs DIY 50cm x 50cm quadrat)

The aim of this activity is to get pupils excited about undertaking a simple citizen science activity and out in nature looking at many different pollinating insects. A FIT count takes just 10 minutes and can be done anytime from April to September on a warm, dry day. Ideally, pupils will monitor 1 flower type, such as Buttercups, Dandelions or White Clover. With pupils, mark out a 50cm x 50cm quadrat, count the number of your chosen flower within your patch, set the timer for 10 minutes and count all the insects which land on the target flower. Identify the insects into broad groups such as bumblebees, hoverflies or butterflies, but any you are unsure about can be recorded as others.

You can then send off the FIT counts to the Pollinator Monitoring Scheme.

Detailed instructions can be found here: www.ukpoms.org.uk/fit-counts

You may want to ask pupils why different patches had more insects e.g. more flowers, a greater variety of flowers, or more sun.

Activity: Insects rock (Needs clay, sticks and natural materials)

Ask children to bring a smooth rock, slightly smaller than their fist for homework (a good place to find rocks like these is next to the sea or a river) or find around school grounds. Encourage children to decorate these rocks using clay to stick additional small stones and sticks scavenged to create their favourite minibeast. Remind pupils that insects have 6 legs, spiders have 8 and centipedes have hundreds – so try to ensure they're accurate. They can additionally decorate with grass, leaves or petals to bring some colour to their minibeast.

Activity: Go get it – Page 24 in Resource Pack

As a class, make a mind map of different words that the pupils associate with bees:

e.g. buzz, yellow, black, stripy, small, hairy, smooth, antennae, 6 legs, wings, sting, flowers, etc.

Then, ask pupils to go and find as many different things which could fall into that category:

e.g. listening to other minibeasts that buzz or man-made objects, seeing other yellow things, feeling smooth rocks, finding other minibeasts with antennae, such as snails, or with 6 legs, such as ladybirds, seeing birds or a plane with wings, observe without touching other things which sting, such as nettles, or finding as many different types of flowers as possible. Pupils can use the activity sheet to record their findings. The winner is the pupil who finds the most.

Activity: Minibeast monitoring – Page 25 in Resource Pack

Pupils can use these sheets to keep a log of the minibeasts that they find. Ask them to record as much detail as possible, including the date, time, season, location, minibeast's name (ID), number of legs, wings, description of appearance, sounds, whether alone or in a group, behaviour (e.g. eating, resting, flying) and a drawing.



Growing Guidance

Learning Objectives:

- Observe and describe how seeds and bulbs grow into mature plants.
- Explore the requirements of plants for life and growth (air, light, water, nutrients and room to grow).
- Be familiar with plant structures.

Activities Included:

- Decorate pot
- Plant your seedling

Resources Required:

- Cardboard pot
- Peat-free compost
- Wildflower seed

The B-Lines project is designed to help all pollinators, including bees. Pupils can help save these pollinators by growing a seedling to later be planted out at home or school. As a class, you may first want to sow a tray of bee-friendly wildflowers and then later allow pupils to plant a seedling that has germinated.

As well as empowering pupils to be part of a conservation project to save bees, pupils will gain a greater understanding of what seeds require to be able to grow into plants.

Activity: Decorate your pot (Needs cardboard pot and colouring pens/ decorations) Pupils should first be encouraged to decorate the outside of their pot so they know which seedling is theirs. They could draw on the cardboard with felt tip, paint or glue decorations to the outside, however only use decorations that will biodegrade. Ensure the children take care to avoid decorating the inside of their pot.

Activity: Plant your seedling (Needs peat-free compost, wildflower seed and stick) Pupils should fill their pot up with the peat-free compost and lightly water it. When the compost is wet, use a small stick to make a hole in the middle of the pot. Then, use the same stick to gently remove a seedling from the seed tray. Hold the seedling by the leaves or the stem and be very careful not to damage the roots. Encourage pupils to look at the root system before they place their seedling gently in the hole in the compost. The compost should be gently pressed down to hold the seedling in place. The seedling will then need to be placed somewhere sheltered and have access to sunlight and water to help it to grow.

Activity: Sow your own mini meadow (Needs soil, wildflower seeds) – Page 26 in Resource Pack. Pupils will need to think about what plants need to grow including sunlight (avoid shady spots), shelter (avoid exposed areas), soil (sow on bare ground) and water (commit to watering regularly). More guidance on how to grow a mini meadow can be found in the resource pack.

What do plants need to grow?

Plants start their life cycle as a seed. A seed needs light, a warm temperature, soil and water to be able to grow into plants. You could ask pupils to draw a scientifically labelled diagram of a wildflower in its environment, also showing where it gets the things it needs to grow.

Ask pupils which part of their plant grew first, second, etc. (e.g. roots, leaf, flower, seed, fruit). You may want to encourage pupils to keep a record of how their plant has changed over time.





B-Lines

Thank you for being part of B-Lines

We would like to thank our funders for making this project possible:



For more information, and to find out about our other projects, visit: www.buglife.org.uk



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