



Year 2 Science lessons pack

What can we learn about the plants that grow in the UK?



Year 2

Science lessons pack

ENQUIRY QUESTION

What can we learn about the plants that grow in the UK?

LINKED HARMONY PRINCIPLE

The principle of Diversity

The six lesson plans in this pack can be used to deliver the science content for the Year 2 enquiry of learning *What can we learn about the plants that grow in the UK?*, linked to the principle of Diversity. This science learning builds on the foundations of the National Curriculum statutory requirements relating to plants.

‘Healthy habitats have lots of different plants growing in them.’

Each lesson plan includes opportunities to refer to the children’s prior learning, as well as questions to use to reflect on current learning and to assess the children’s developing knowledge and understanding. In addition, lessons feature key elements that are distinctive to the Harmony approach to teaching and learning, for example: opportunities to **learn about Nature**, to **learn in Nature** and to **learn from Nature**.

A summary of each of these elements in relation to the six lesson plans in this pack is set out on the next pages.



01 - Learning about Nature

The statutory requirements of the National Curriculum set out what children need to learn about Nature – although, of course, their wider learning about Nature will extend beyond this.

As children progress through their primary education, we can map the journey that their science learning about plants and living things and their habitats will take.

By understanding their prior learning about plants in the EYFS and Year 1, and by looking ahead to the path their learning about plants and living things and their habitats will take in Years 3 to 6, we are better able to plan for progression.

The table below shows where the science learning about plants covered in the lesson plans in this pack sits within this journey.

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
ENQUIRY	Understanding the world	Which is my favourite wildflower and why?	What can we learn about the plants that grow in the UK?	How can we identify native trees in autumn?	Why should we protect the biodiversity of the rainforest?	How can we restore our UK habitats back to health?	Where do we find awe and wonder in Nature?
SUMMARY OF LEARNING	Children are guided to increase their knowledge of the plants that live within the ecologically diverse world around them. They engage in hands-on activities, such as planting seeds and bulbs, observing growth, growing food and identifying the parts of plants. They begin to understand the effects of changing seasons	Children learn to identify a variety of common flowering plants, including local wildflowers and trees. They begin to identify and describe the structure of a flowering plant. They observe the changes that occur across different seasons	Children learn about the needs of a plant, including water, light and temperature. They begin to describe how seeds and bulbs grow into mature plants and start to recognise some of the plants that provide us and other animals with food. They identify how some plants are suited to the habitats in which they live	Children develop their knowledge of the needs of plants to include healthy soil and nutrients. They recap the structure of a plant and learn the function of each part of the plant. Children investigate how water travels within the plant	Children explore and use classification keys to help group, identify and name a variety of plants and animals. They learn about potential dangers to living things when environments change and about the role of plants as producers within a food chain	Children learn to describe differences in the life cycles of different living things within a variety of UK habitats. They build on their knowledge of how plants reproduce, including seed dispersal and pollination, and learn about photosynthesis	Children continue to develop their understanding of classification in relation to plants using common observable characteristics and based on similarities and differences
KEY VOCABULARY	flower, tree, seed, bulb, leaf, fruit, seasons, blossom, petal	deciduous, evergreen, wildflower, roots, branches, stem, trunk, nectar, pollen	germinate, seedling, shoot, emerge, sprouts, root hairs, mature, root vegetables, absorb, drought-resistant, suited	flowering plant, nutrients, bark, twig, trunk, seed dispersal	food chain, producer, environment, ecosystem	moorland, heathland, wetland, reproduction, carpel, stamen, anther, filament, stigma, style, ovary, ovule, indicator species, endangered	classification, characteristics, adaptation, evolution

The table below sets out what the children’s learning about plants looks like over the course of the six lessons.

Week 1	Week 2	Week 3
How does a plant begin?	Do all plants begin in the same way?	Do plants need water to grow well?
Observe and describe how seeds and bulbs grow into mature plants.	Observe and describe how seeds and bulbs grow into mature plants.	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
Week 4	Week 5	Week 6
Can plants grow in the dark?	How does temperature affect plants?	How are plants suited to UK habitats?
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Identify and name a variety of plants and animals in their habitats, including microhabitats; identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.

02 - Learning in Nature

In addition to learning about Nature, a Harmony approach also provides suggestions for rich opportunities to learn in or alongside Nature, as the six science lessons in this pack demonstrate.

For example, the children will gather and record data about the diversity of plants growing in local habitats and explore what happens when they grow their own plants from seeds or bulbs. They will continue to make connections between the plants we grow and the food we eat as they prepare for the celebration salads that they will make linked to the Great Work for this learning enquiry. .

As they learn in Nature, the children will also experience opportunities to develop their skills in working scientifically. Although these skills will be developed incrementally over time (as shown in Appendix A), the coverage of these skills within the sequence of these six lessons is set out below.

Week 1	Week 2	Week 3
How does a plant begin?	Do all plants begin in the same way?	Do plants need water to grow well?
Observing closely, using simple equipment	Observing closely, using simple equipment	Observing closely, using simple equipment
Performing simple tests	Performing simple tests	Performing simple tests
Scientific enquiry type: Observing over time	Scientific enquiry type: Observing over time	Scientific enquiry type: Comparative and fair testing
Week 4	Week 5	Week 6
Can plants grow in the dark?	How does temperature affect plants?	How are plants suited to UK habitats?
Observing closely, using simple equipment	Gathering and recording data to help in answering questions	Identifying and classifying
Performing simple tests		Gathering and recording data to help in answering questions
Scientific enquiry type: Comparative and fair testing	Scientific enquiry type: Pattern seeking	Scientific enquiry type: Identifying, classifying and grouping

Working scientifically vocabulary

- predict
- observe
- conditions
- gather
- record

03 - Learning from Nature

The third key element of a Harmony approach is learning from Nature, which is linked to progression in understanding of Harmony principles. This aspect of learning supports the development of children’s understanding of what it means to think and live sustainably.

The six lessons in this pack and the wider enquiry they are part of are underpinned by the principle of Diversity; they build on children’s prior learning in the EYFS and Year 1 and prepare them for their learning in Years 3 to 6.

The children’s progression in their understanding of the principle of Diversity, through enquiries of learning that help us to think and live more sustainably is shown below.

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
ENQUIRY	Children are introduced to opportunities to explore and develop their initial knowledge and understanding about diversity (exploring different species of flowers, trees, birds, fish, animals or dinosaurs, our strengths, different languages spoken)	What kind of superhero do I want to be?	What can we learn about the plants that grow in the UK?	What’s the story of our planet and how can we care for it?	Why should we protect the biodiversity of the rainforest?	How can I be a sustainability champion?	How would I like to make history?
PROGRESSION: CONCEPT OF DIVERSITY		How are we all different and how are we the same?	How are plants different from each other?	Where do we find diversity on planet Earth?	What does diversity look like in a rainforest?	How did the Industrial Revolution change people’s lives?	Who do I most admire in history?
THINKING SUSTAINABLY		What can you do to be a superhero?	Why are there so many different species of plants in Nature?	What does the principle of Diversity mean for us and our planet?	Why should we value the rainforest?	What could we consume less of?	Why should we value diversity when creating change?
THINKING SUSTAINABLY VOCABULARY		same different natural made by people outside inside	unique strength resilience ecosystem value differences	diversity biodiversity variety species teamwork	richness enrich preserve conserve abundance	heritage traditions culture wisdom indigenous	myriad simplicity changemaker agency fossil fuels climate change

Plants

Observe and describe how seeds and bulbs grow into mature plants.

Working scientifically:
Observing closely, using simple equipment;
performing simple tests

Scientific enquiry type:
Observing over time

Vocabulary relating to plants, working scientifically and thinking sustainably is highlighted within the unit introduction.

A selection of the seeds on Resource 1B, for handling (include some fresh or defrosted peas and drained tinned chickpeas and beans)

Copies of Resource 1B (for children requiring additional support)

Magnifiers

Baby spinach, lettuce, cress or mustard seeds, to sow

Dried peas, mung beans or whole sunflower seeds (soaked overnight) to sow

Plastic trays

Kitchen towel

Optional: A copy of *The Amazing Life Cycle Of Plants* by Kay Barnham and Maddie Frost

Optional: Plant pots and compost

Optional: Clean transparent plastic containers (e.g. yogurt pots or a cut-down bottle)

Children requiring additional support may benefit from the word bank on Resource 1B, on which they can draw each seed as it is explored

Challenge the children to predict what could prevent the seeds from germinating (e.g. if they get too hot or too cold; if they dry out)

CLIMATE ACTION PLAN:
Biodiversity and Nature

How does a plant begin?

What do we already know?

Start the lesson by retrieving the children’s prior **learning about Nature** by sharing with them the images of plants on Resource 1A and asking: *What is a plant?* Share ideas as a class and address any misconceptions.

Once the children have had the opportunity to share their prior learning about plants, if this hasn’t been shared already, ask: *Where do plants come from?*

Depending on the children’s responses, you may wish to use questioning to elicit from the children what they have remembered from the enquiry *Which is my favourite wildflower and why?* Ask: *Where do seeds come from? How do pollinators such as bees and butterflies help plants to make seeds?*

What are we learning today?

Move the children’s **learning about Nature** on by sharing with them a selection of seeds of different shapes and sizes (see ‘You will need’, left). Establish that most plants grow from seeds (the children will be exploring the fact that some plants grow from bulbs in lesson 2). In small groups, the children handle the seeds and use close observation to explore *How are they the same? How are they different?* before sharing their ideas with the class. Draw their attention to the diversity they have discovered in these seeds.

Challenge the children to identify any common features. This will be harder to identify using dried seeds, so you may need to direct them to the fresh or defrosted peas, or drained tinned chickpeas or beans, to identify that seeds have an outer covering (seed case). Demonstrate how this can be removed from (fresh, defrosted or drained tinned) peas, chickpeas and beans using a visualiser.

Allow the children time to explore this feature in groups.

TEACHER TIP:

Keep some of these seeds for the children to refer to in the next lesson.

Explain that each seed has a store of food inside it to sustain the young plant that grows from it until the plant can make its own food.

Ask the children: *What makes a seed start to grow? What happens when a seed starts to grow?* The children discuss their ideas in pairs before sharing them with the class.

Watch the BBC Bitesize film clip [The life cycle of a plant](#) and encourage the children to watch out for information that would help to answer these questions e.g. seeds need water and the right temperature to start to grow.

Ensure that the children have understood the term germination (the point at which a seed starts to grow) and that the first stage of growth is when the root emerges and starts to grow down, and the young shoot emerges and starts to grow up.

How are we learning today?

Continue the children’s **learning about Nature** by explaining that they will be using what they have learned to plant seeds, to make predictions about how they will grow and to observe what happens to them over time.

TEACHER TIP:

The children will be able to use the ingredients they grow as part of their science learning in this sequence for the celebration salad that is the Great Work associated with the overarching learning enquiry.

Cress, mustard and sunflower seeds, mung beans and peas can all be germinated on wet kitchen towel on trays in the classroom so that the children can easily observe the young roots and shoots when they appear.

The cress and mustard seedlings, and the bean, pea and sunflower sprouts, could all be used as ingredients in the children’s celebration salad.

Either in this lesson or at another point in the week, take groups of children outdoors to **learn in Nature** and sow baby spinach and lettuce seeds directly into the school’s growing area or in pots filled with compost.

Planting some seeds in compost around the edge of a transparent plastic container and keeping this in the classroom provides a good opportunity for children to observe roots growing in soil.

Encourage the children to identify what the seeds will need to start growing (e.g. water, warmth) and what they can do to

provide this for them (e.g. water the seeds sown outdoors and in clear containers in the classroom regularly; add water to the kitchen towel underneath the seeds in the classroom; place the seeds in the classroom somewhere warm).

Ask them to think like a scientist, predicting when the first seeds will start to grow and what they will see when they do.

TIME TO EXPLAIN:
In their Nature journals, the children draw and label seeds they have sown or set up with the right conditions to germinate. They record their predictions about which will start to grow first, then observe the seeds daily, adding their observations over time.

STEM SENTENCES:
Seeds start to grow when they have _____

When the seeds start to grow, I predict we will see _____

What have we learned today?

Reflect on the children’s **learning about Nature** by asking them the learning question: *How does a plant begin?* Discuss their ideas in light of their learning. Assess their understanding with a ‘true or false’ quiz:

Seeds need water, light and the right temperature to start growing. (T)

When seeds start growing, they grow leaves first. (F)

Seeds have a store of food inside them. (T)

When a seed starts growing, we say that it has germinated. (T)

When seeds start growing, the root grows up and the shoot grows down. (F)

Draw out the **learning from Nature** and the link between this learning and the **principle of Diversity** by asking: *Did all the seeds you explored look the same? Do they all need the same things to start to grow? Do they all start to grow in the same way?*

Explore the idea that while the seeds look very different, there are similarities in the conditions they need for germination and in what happens when germination occurs.

TEACHER TIP:
Either in this lesson, or at another point in the school day, you could share with the children the book *The Amazing Life Cycle Of Plants* by Kay Barnham and Maddie Frost, which works well to support this learning. You could draw the children’s attention to the parts of the story that explore the fact that seeds need the right conditions to start growing and that, when a seed starts to grow, a shoot and a root appear.

Resource 1A



Resource 1B

Draw the seeds in the boxes:

cress seed	
poppy seed	
sesame seed	
sunflower seed	
pumpkin seed	
pea	
chickpea	
bean	

Plants

Observe and describe how seeds and bulbs grow into mature plants.

Working scientifically:

Observing closely, using simple equipment; performing simple tests

Scientific enquiry type:

Observing over time

Vocabulary relating to plants, working scientifically and thinking sustainably is highlighted within the unit introduction.

A selection of red and brown onions, heads of garlic and shallots

A selection of seeds from the previous lesson

Magnifiers

Hand trowels

Optional: A vegetable knife (for adult use)

Optional: Plant pots and compost

Optional: Clean, empty transparent plastic containers (e.g. yogurt pots or a cut-down bottle) and toothpicks

Children requiring additional support may benefit from the word bank on Resource 2B – illustrations of bulbs could be added as each bulb is explored

Challenge the children to make comparisons between seeds and bulbs and record these in their Nature journals to share in the final section of the lesson

CLIMATE ACTION PLAN:
Biodiversity and Nature

Do all plants begin in the same way?

What do we already know?

Start the lesson by retrieving the children’s prior **learning about Nature** by playing a game of ‘elaborative interrogation’.

Share some examples of seeds that have germinated since Lesson 1. Children work in pairs; Child A is asked to describe what they can see and Child B then asks them a ‘How ...?’ and a ‘Why ...?’ question. (For example, Child A: *‘I can see a seed and it has a shoot’*; Child B: *‘How do you know that this is a shoot?’*, *‘Why has a shoot appeared?’*)

Share some examples of seeds that haven’t germinated and play the game again, with each child taking on the opposite role. You may wish to remind the children of the term ‘germinate’ if the children have not used this in the retrieval so far and encourage them to use this in their second explanation or interrogation.

Encourage the children to share some of their questions and answers with the rest of the class and address any misconceptions.

What are we learning today?

Move the children’s **learning about Nature** on by sharing with them a selection of bulbs (see ‘You will need’, left). Establish that most plants grow from seeds, as the children found out in the previous lesson, but some grow from bulbs. Introduce the selection of bulbs available to the children and a selection of the seeds explored in the previous lesson to use as reference.

In small groups, the children handle the bulbs and use close observation to explore *How are these bulbs the same? How are they different? How are they different from seeds?* before sharing their ideas with the class.

Challenge the children to identify any common features that help us to identify the bulbs as bulbs, not seeds. Establish that bulbs have a papery skin that you can peel off; they have a rounded, bulging shape with a pointed tip at the top and a woody base underneath, possibly with some root hairs showing.

Explore these features using a visualiser. Allow the children time to explore these features in their groups.

Explain that, just like seeds, each bulb has a store of food inside it to sustain the young plant that grows from it until the plant can make its own food. And, just like seeds, bulbs need the same things to start growing. Ask the children to draw on their learning from the previous lesson to identify that both seeds and bulbs need water and the right temperature to start growing.

Ask them: *What do you think happens when a bulb starts to grow?* (e.g. the root emerges and starts to grow down and the young shoot grows up, just as they do when a seed starts to grow)

TEACHER TIP:

You can extend the children’s learning about bulbs by introducing the idea that they are different to seeds because they have a tiny version of the plant inside them that will grow into a mature plant in the right conditions. You can sometimes see this tiny plant in the very centre of an onion or a clove of garlic. Using a visualiser, you could show an onion sliced in half from tip to base and explore with the children where this tiny plant develops.

Continue the children’s **learning about Nature** by explaining that they will be using what they have learned to plant bulbs, to make predictions about how they will grow and to observe how they grow into plants over time.

Model how to push three to four toothpicks into an onion bulb or a garlic clove so they are evenly spaced around its middle. Rest the toothpicks on the rim of a glass filled with water so that the base is submerged.

In groups, the children set up their own onion bulb or garlic clove in the same way. After a few days, the children should be able to see roots and a shoot emerging from the bulb. They will need to change the

water in the glass every couple of days to discourage mould.

Either in this lesson or at another point in the week, take groups of children outdoors to **learn in Nature** and plant onions directly into the school’s growing area or in pots filled with compost (deep enough that the point of the bulb is level with the surface of the soil).

While you won’t be able to harvest onions to eat, you can harvest the shoots and use these in the children’s celebration salad at the end of the half term – just as you would use spring onions or chives.

Explain that onions, garlic and shallots are examples of edible bulbs. Reinforce the fact that many other bulbs aren't safe to eat.

Encourage the children to identify what the bulbs will need to start growing (e.g. water, warmth) what they can do to provide this for them (e.g. water the bulbs planted outdoors regularly; top up the water under the bulbs in the classroom; place the bulbs in the classroom somewhere warm). Ask them to think like a scientist, predicting when the first bulbs will start to grow and what they will see when they do.

TIME TO EXPLAIN:
In their Nature journals, the children draw and label some of the bulbs they have set up with the right conditions to germinate. They record their predictions about which will start to grow first then observe the bulbs daily, adding their observations over time.

STEM SENTENCES:
Bulbs start to grow when they have _____

When the bulbs start to grow, I predict we will see _____

What have we learned today?

Reflect on the children's **learning about Nature** and assess their understanding by asking them the learning question: *Do all plants begin in the same way?* Discuss their ideas in light of their learning, reinforcing the fact that plants can grow from seeds or bulbs but that both seeds and bulbs need water and warmth to start growing and start growing in the same way (when a root and a shoot appear). Children who have completed the learning challenge could lead this discussion.

Draw out the **learning from Nature** and the link between this learning and the **principle of Diversity** by asking: *Are all plants the same? Why is it important there are lots of different types of plant?* (e.g. plants provide food for a range of different animals)

Resource 2A

Draw the bulbs in the boxes:

red onion	
brown onion	
garlic	
shallot	

Plants
Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Working scientifically:
Observing closely, using simple equipment; performing simple tests

Scientific enquiry type:
Comparative and fair testing

Vocabulary relating to plants, working scientifically and thinking sustainably is highlighted within the unit introduction.

Copies of Resource 3A (one per group)

Copies of Resource 3B (one per group)

Magnifiers

A selection of root vegetables with the leaves still attached (e.g. carrots, radishes, parsnips, beetroot and turnips)

Small plastic beakers

Plants or seedlings in pots (enough for two per group)

TEACHER TIP:
Pots of herbs from a supermarket often contain several plants that can be divided and repotted. The plants that survive the investigation can be grown on and used in the children's celebration salad.

Children requiring additional support may benefit from labelling a photograph or an image on a tablet, to describe the experiment they have set up.

Challenge the children to explain why we only change one thing when we set up an investigation.

CLIMATE ACTION PLAN:
Biodiversity and Nature

Do plants need water to grow well?

What do we already know?

Start the lesson by retrieving the children's prior **learning about Nature** by displaying the images of the dandelion and daisy plants on Resource 3A. The children previously encountered these images in the Year 1 learning enquiry *Which is my favourite wildflower and why?* In pairs, the children take it in turns to 'Talk like an expert' about everything they can remember about the parts of these plants. They take turns sharing one piece of information at a time so that each child adds to the information their partner has already shared.

Ask them: *Which parts of these plants can you name? Which parts of the plant are below the soil? Which parts are above the soil? What jobs do the different parts do?* (e.g. the roots anchor the plant in the soil and help the plant absorb water from the soil; the stem gives the plant support and helps carry water around the plant)

If possible, revisit the labelled diagrams and observations they recorded in their Nature journals in Year 1.

What are we learning today?

Begin the children's new **learning about Nature** by focusing their attention on roots and stems and their functions, as explored in the retrieval activity. If possible, give them some time to observe the young roots and stems that have emerged from the seeds and bulbs in the investigations they set up in Lessons 1 and 2. They could also revisit and discuss the drawings of these in their Nature journals.

Ask the children: *Do all roots look the same?* Share with the children the images of carrots and a radish on Resource 3B alongside the images they have already explored on Resource 3A. In pairs, the children observe and discuss what is the same and what is different before sharing their ideas with the class. They might like to use magnifiers to observe the roots in the images closely. If it's possible to provide

the children with real-life examples of root vegetables with the leaves still attached to explore in this part of the lesson, even better!

Explain that carrots and radishes are examples of edible roots and discuss what this means. Challenge the children to name three other roots that we eat (e.g. parsnips, beetroot, swede, celeriac). Reinforce the fact that some roots are safe to eat and some aren't.

Establish that all the roots the children have been observing do the same job of absorbing water for the plant and that stems do the job of helping transport water around the plant.

How are we learning today?

Move the children's **learning about Nature** on by reminding them of the learning question: *Do plants need water to grow well?* Explain that they will be thinking like scientists to help answer this question.

Share with the children two plants in pots and one of the small plastic beakers. In small groups, they discuss how they could use this equipment to carry out an investigation to answer the learning question. Discuss their ideas as a class, using questions to guide their thinking, for example: *What will we change?* (e.g. we will water one plant but not the other) *What will we keep the same?* (e.g. we will put both plants in the same place)

Agree on a simple method as a class, ensuring that the plants are placed somewhere where there is plenty of light, for example, on the classroom windowsill. In groups, the children set up their investigation.

TIME TO EXPLAIN:

The children draw and label the investigation they have set up. In pairs, the children think like scientists to predict what they think will happen to each plant, giving reasons for their thinking. They record their prediction alongside their labelled diagram. Discuss their predictions as a class.

STEM SENTENCES:

I think the plant we water will _____ because _____
I think the plant we don't water will _____ because _____

Introduce the idea that the water the plant absorbs from the soil also contains nutrients. These nutrients help to keep the plant healthy. There is a nice link to be made here to the children's learning about the importance to human health of nutrients in a balanced diet. The children explored this at the start of Year 2 in their science learning linked to the learning enquiry *What do I need to be healthy?*

The children will need to observe the plants regularly over a week or so. Once the investigation is complete, they will need time to reflect on what the results of their investigation have shown and how they can use these results to answer the learning question.

TEACHER TIP:
Either during this part of the lesson or at another time, the children could taste the carrots, radishes or beetroot, where real-life examples have been shared, if appropriate food hygiene measures are followed.

What have we learned today?

Reflect on the children’s **learning about Nature** and assess their understanding, by asking: *Why do plants have roots? How do the roots help meet the needs of the plant?*

Draw out the **learning from Nature** and the link to the **principle of Diversity** by establishing that some plants need more water than others. Some gardeners are

already planting more drought-resistant plants, such as thyme, rosemary, sea holly and euphorbia, which will be better able to survive periods of low rainfall as our climate changes. Many drought-resistant plants that are suited to survive in hot habitats have silvery, grey-green leaves to reflect the heat from sunlight.

Resource 3A



dandelion



daisy

Resource 3B



radish



carrots

Plants

Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Working scientifically:

Observing closely, using simple equipment; performing simple tests

Scientific enquiry type:

Comparative or fair testing

Vocabulary relating to plants, working scientifically and thinking sustainably is highlighted within the unit introduction.

Nature journals

Optional: laptops or tablets

Plants or seedlings in pots (enough for two per group)

Small cardboard boxes (enough for one per group)

TEACHER TIP:

Pots of herbs from a supermarket often contain several plants that can be divided and repotted. The plants that survive the investigation can be grown on and used in the children's celebration salad.

Children requiring additional support may benefit from labelling a photograph or an image on a tablet, to describe the experiment they have set up.

Challenge the children to name three places in the school grounds where they think plants would grow well and three places where they think plants would not grow well, giving their reasons why.

CLIMATE ACTION PLAN:

Biodiversity and Nature

Can plants grow in the dark?

What do we already know?

Start the lesson by retrieving the children's prior **learning about Nature**. Share the image on Resource 4A (mature onions with roots and shoots still attached) and explain that these onions have been grown by a local market gardener. Ask the children to describe what they can see.

Ask the children to imagine that they are the market gardener and that they are going to describe what they had to do at the beginning of their onion-growing process (*How did they begin?*) and then

what they had to do to ensure that they created a healthy crop of onions (*What did the bulbs need in order to grow into healthy mature plants?*).

Invite children to take on the role of market gardener with a partner and to share their onion-growing experiences. Encourage partners to ask 'How ...?' and 'Why ...?' questions before sharing examples of explanations and questions with the class and addressing any misconceptions.

What are we learning today?

Begin **learning about Nature** by displaying the images on Resource 4B of a beetroot plant and a celeriac plant growing in the soil. Ask the children: *Which part of the plants can't we see very well? Why?* (e.g. the root because it's in the soil) *Which parts of the plants can we see? Why?* (e.g. the stem and the leaves because they are above the ground).

Draw the children's attention to the plant's leaves. Ask them: *What job do the plant's leaves do? Why do a plant's leaves need to be above the ground?* Discuss their initial thoughts and either reinforce or introduce the concept that a plant's leaves are above the ground because they need sunlight. The plant's leaves use sunlight to make food for the plant. Ask the children: *Are all plants' leaves the same? What would a scientist do to prove it?* If you have easy access to a green space or growing area, take the children outside to **learn in Nature**. If you don't have easy access to a green space, the children could use laptops or tablets to complete this activity.

Challenge them either to find as many examples of different types of leaf in five minutes or give them specific challenges suited to the green space you are in – for example: a leaf that is long and thin (e.g. a blade of grass); a leaf that has a smooth/jagged edge (daisy/dandelion); a leaf that is bigger than your hand (e.g. sycamore or horse chestnut). They could draw the leaves they find in their Nature journals.

Regroup to compare the children's observations about the diversity of leaves. Draw their attention to any examples of leaves they can see that are very high up (e.g. on the crown of a tree) and explain that this helps the plant get as much sunlight as possible. Discuss whether the children think they have enough evidence to answer the question: *Are all plants' leaves the same?*

Establish that although plants' leaves are all very different, they all do the same job: they use sunlight to make food for the plant.

How are we learning today?

Move the children's **learning about Nature** on by reminding them of the learning question: *Can plants grow in the dark?* Explain that they will be thinking like scientists to help answer this question.

Share with the children two of the plants in pots. If you are using shop-bought herbs such as parsley or basil for this investigation, draw the children's attention to the fact that these plants have edible leaves. Challenge the children to name three other leaves that we eat (e.g. lettuce, spinach, cabbage, curry leaves, pak choi). Reinforce the fact that some leaves are safe to eat and some aren't.

Ask the children to help recap what they did in the previous lesson to investigate whether plants need water to grow well.

Draw their attention to what they changed (one variable, water) and what they kept the same (all other variables, including light and temperature, by putting the plants in the same place).

In small groups, they discuss how they could carry out an investigation to answer the new learning question: *Can plants grow in the dark?* Establish that they can request additional equipment if they need it.

Discuss their ideas as a class, using questions to guide their thinking, for example: *What will we change?* (e.g. we will keep one plant in the dark and one in the light) *What will we keep the same?* (e.g. we will water both of them and keep them both in the classroom)

Agree on a simple method as a class, for example, placing a small cardboard box over one of the plants to block the sunlight. In groups, the children set up their investigation.

TIME TO EXPLAIN:
The children draw and label the investigation they have set up. In pairs, the children think like scientists to predict what they think will happen to each plant, giving reasons for their thinking. They record their prediction alongside their labelled diagram. Discuss their predictions as a class.

STEM SENTENCES:
I think the plant in the light will _____ because _____
I think the plant in the dark will _____ because _____

The children will need to observe the plants regularly over a week or so. Once the investigation is complete, they will need time to reflect on what the results of their investigation have shown and how they can use these results to answer the learning question.

What have we learned today?

Reflect on the children’s **learning about Nature** and assess their understanding by asking the children: *Why do a plant’s leaves grow above ground? How do its leaves help to meet the needs of the plant?*

Draw out the **learning from Nature** and the **principle of Diversity** by asking the children: *Do you think all plants need the same amount of light?* Discuss their ideas, encouraging them to give reasons

for their thinking and establish that some plants grow best in shadier areas (e.g. the woodland plants the children encountered in the learning enquiry *Which is my favourite wildflower and why?*), while others thrive in full sunshine. This diversity means that plants can grow in a huge range of different habitats.

Resource 4A



onions

Resource 4B



beetroot



celeriac

Plants

Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Working scientifically:

Gathering and recording data to help in answering questions

Scientific enquiry type:

Pattern seeking

Vocabulary relating to plants, working scientifically and thinking sustainably is highlighted within the unit introduction.

Thermometers

Nature journals

Optional: Cameras

Optional: Laptops or tablets

Children requiring additional support may benefit from visiting three pre-selected areas of the school grounds.

Challenge the children to consider: *Which of the plants on the fact cards would grow well in the places you visited outdoors?* Encourage children to justify their answer.

CLIMATE ACTION PLAN:
Biodiversity and Nature

How does temperature affect plants?

What do we already know?

Start the lesson by retrieving the children’s prior **learning about Nature** by displaying the images on Resource 5A of allotments in the summer and in the winter. Ask the children: *What can you see?* In pairs, the children discuss their thinking before sharing their ideas with the class.

Ask: *Why do these growing areas look different in winter and in summer? What is different about these two seasons?* (e.g. there are fewer plants growing in the winter when the weather is colder; we can see lots of plants growing in the summer when the weather is warmer). Share ideas and address any misconceptions.

What are we learning today?

Move the children’s **learning about Nature** on by establishing that most plants generally grow, or grow faster, in warmer conditions but that different plants grow best at different temperatures. If it is too hot or too cold, plants can die.

Share with the children the fact cards on Resource 5B. These give the temperatures that different plants grow best at in the UK. Focusing on one card, discuss with the children the information on it and ensure they remember that °C is the unit we use to measure temperature. It may help to model measuring the temperature in the classroom with them using a thermometer to give them a point of reference.

Working in small groups, the children read the information on the fact cards and order the cards from coldest temperature to warmest.

You may need to agree first whether they use the coldest or the warmest temperature on each fact card to order them. As a class, discuss how they have ordered the cards and reveal the correct order: snowdrop, forget-me-not, spinach, lavender, sunflower, courgette.

Using the cards to help them, ask the children: *Which plant do you think we’d see earliest in the year? Why?* (e.g. snowdrop because it grows best when it is cold) *Which would grow best in the summer? Why?* (e.g. sunflower and courgette because they grow best when it is hot)

How are we learning today?

Explain that in the next part of the lesson the children will be working like scientists by gathering data to help them answer the question: *Do we find different plants growing where it’s cooler, warm and hotter?* In pairs, the children discuss what data they would need to collect to answer this question and how they will collect it.

Discuss their ideas as a class and agree on a suitable method, for example, measuring the temperature in different places outdoors and drawing some of the plants they can see growing there.

Take the children outdoors to **learn in Nature**. In small groups, they take the temperature at different places around the school and draw (and name, if they can) the plants growing in each place, recording their data in their Nature journals. If they have access to cameras, they could photograph any plants they are unfamiliar with to then look up using Google Lens.

TIME TO EXPLAIN:
Regroup to discuss what they have found, factoring in time for the children to compare their results with another group first and to comment on any similarities and differences. Discuss their data as a class and any trends that emerge (e.g. we found dandelions growing where the temperature is cooler, warm and hotter; we only found tomatoes growing where it’s hottest).

STEM SENTENCES:
We found _____ growing in the coolest place.
We found _____ growing where it is warm.
We found _____ growing in the hottest place.

What have we learned today?

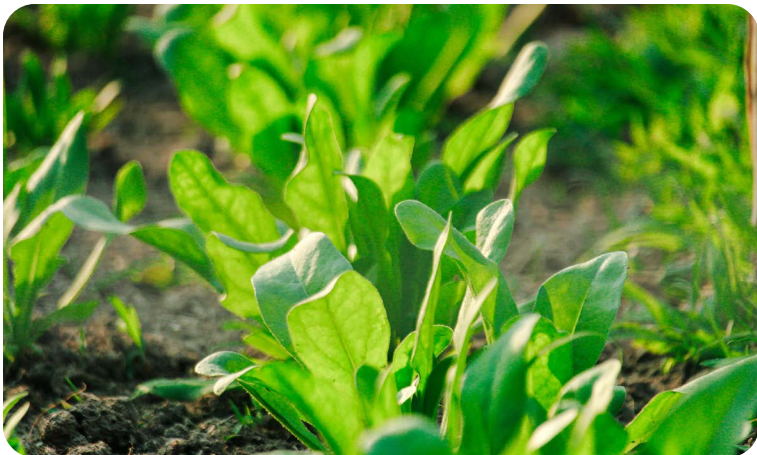
Reflect on the children's **learning about Nature** and assess their understanding by asking the children: *How does temperature affect plants? Do we find different plants growing where it's cooler, warm and hotter?* Discuss how they can use their results to answer the investigation question.

Draw out the **learning from Nature** and link the learning to the **principle of Diversity** by asking the children: *Do all plants grow best at the same temperature?* Establish that the diversity of temperatures at which different plants grow best allows a huge range of plants to grow in a range of habitats.

Resource 5A



Resource 5B



spinach

I grow best at 16°C to 21°C.



courgette

I grow best at 22°C to 28°C.



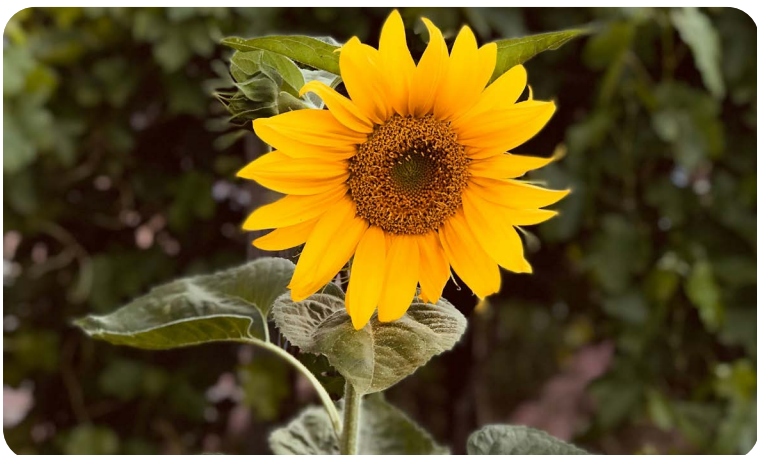
snowdrop

I grow best at 5°C to 10°C.



lavender

I grow best at 22°C to 28°C.



sunflower

I grow best at 20°C to 25°C.



forget-me-not

I grow best at 10°C to 15°C.

Living things and their habitats
Identify and name a variety of plants and animals in their habitats, including microhabitats; identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other

Working scientifically:
Identifying and classifying; gathering and recording data to help in answering questions

Scientific enquiry type:
Identifying, classifying and grouping

Vocabulary relating to plants and living things and their habitats, working scientifically and thinking sustainably is highlighted within the unit introduction.

Individual whiteboards and pens

Copies of Resource 6B (one per group)

Magnifiers

Nature journals

Optional: Cameras

Children requiring additional support may benefit from exploring the fact cards as a guiding reading activity prior to the lesson.

Challenge the children to relate their learning in this lesson to their learning about the needs of plants earlier in the learning sequence e.g. sea holly has deep roots because it grows in a dry habitat but all plants need water.

CLIMATE ACTION PLAN:
Biodiversity and Nature;
Adaptation and resilience

How are plants suited to UK habitats?

What do we already know?

Start the lesson by retrieving the children’s prior **learning about Nature** by displaying the images of the dandelion and daisy plants on Resource 3A once again. Ask the children to choose one word to describe what they can see (plants) and to draw a third example of a different plant on their whiteboards. Share the examples that the children have generated and encourage them to name their plants.

Annotate Resource 3A, writing the words ‘water’ and ‘light’ in large letters above the

images. Ask: *Why have I added these two words to the image of the plants?*

Share the children’s ideas and address any misconceptions. Ask: *Do I need to add anything else?*

Establish that the image shows two examples of plants, that plants are living things and that in order to grow and stay healthy, their basic needs are water, light and the right temperature.

What are we learning today?

Move the children’s **learning about Nature** on by sharing with them the question: *What is a habitat?* Watch the BBC Bitesize [Habitats](#) compilation before discussing their ideas. To answer this question, encourage them to draw on their science learning linked to the spring term learning enquiry *Where are the polar regions and how are they changing?* Establish that a habitat is the place where a plant or animal lives.

Share with the children the images on Resource 6A of a UK pond habitat, coastal habitat and woodland habitat and ask them to identify them. Ask: *What words would you use to describe them?* (e.g. the woodland habitat is shady and cool; coastal habitats can be cold and wet, or hot and dry, and they can be very windy because there’s not much shelter there; pond habitats are wet) *What plants do you think/ can you see growing in these habitats?*

Discuss their ideas and explore the images before introducing the idea that different plants are suited to live in different habitats, just as different animals are.

Introduce the fact cards on Resource 6B and explain that the children’s task will be to read the information on them and use the clues to sort them according to whether they think they grow in a pond habitat, a coastal habitat or a woodland habitat.

In small groups, the children complete the sorting activity. Discuss their ideas as a class before revealing that the beech tree, bluebell and fern grow in woodland habitats, the sea holly, thrift and marram grass grow in coastal habitats and the yellow flag iris and waterlily grow in pond habitats.

With reference to the information on the fact cards, use questioning to discuss what the children have found out about how these plants are suited to their habitat. Challenge them to identify any adaptations that plants growing in a similar habitat have in common (e.g. woodland plants are adapted to make the most of the limited light in this habitat; coastal plants have tough leaves that won’t dry out in dry, windy conditions; some pond plants grow very long stems so that their leaves can reach the surface of the water to get more sunlight).

How are we learning today?

Move the children’s **learning about Nature** on by asking: *What habitats can you think of in our local area?* (e.g. school field or grassy bank, allotment or school growing area, park, pond, riverbank or towpath, hedgerow, woodland)

Focus the children’s attention on the habitat they will be learning in during the next part of the lesson. Establish that they will be working like scientists to record the different plants that grow in this habitat in their Nature journals and to think how they are suited to this habitat. Provide them with magnifiers to use for close observation to help with their drawings and take them on a welly walk to **learn in Nature**.

As you discover a new plant, stop so the children can observe and draw it in their Nature journals. Encourage the children to draw on their prior learning about wildflowers in the Year 1 learning enquiry *Which is my favourite wildflower and why?* to identify any familiar plants. They could photograph any plants they are unfamiliar with to look up using Google Lens back in the classroom.

Focusing on each of the plants you find, ask the children: *How do you think this plant is suited to its habitat?* (e.g. daisies and dandelions grow in short grass so they don’t need to grow tall to get enough sunlight; ivy climbs so that it can get more sunlight;

succulents store water in their leaves so they can survive in dry habitats). You may also encounter plants such as brambles and nettles that have developed adaptations to protect them from predation (e.g. thorns or stinging hairs) rather than adaptations to their habitat.

TIME TO EXPLAIN:

The children add labels to the drawings in their Nature journals to explain their understanding of how the plants they have encountered are suited to their habitat.

STEM SENTENCES:

We found _____
It grows in a _____ habitat.
It is suited to its habitat because _____

What have we learned today?

Reflect on the children's **learning about Nature** and assess their understanding by asking the learning question for this lesson: *How are plants suited to UK habitats?*

Encourage them to draw on their learning from the fact card activity and from the information recorded in their Nature journals to answer this question. With reference to the information about the woodland, coastal and pond plants on the fact cards, ask: *Would any of these plants be suited to live in the habitat we explored? Why or why not?*

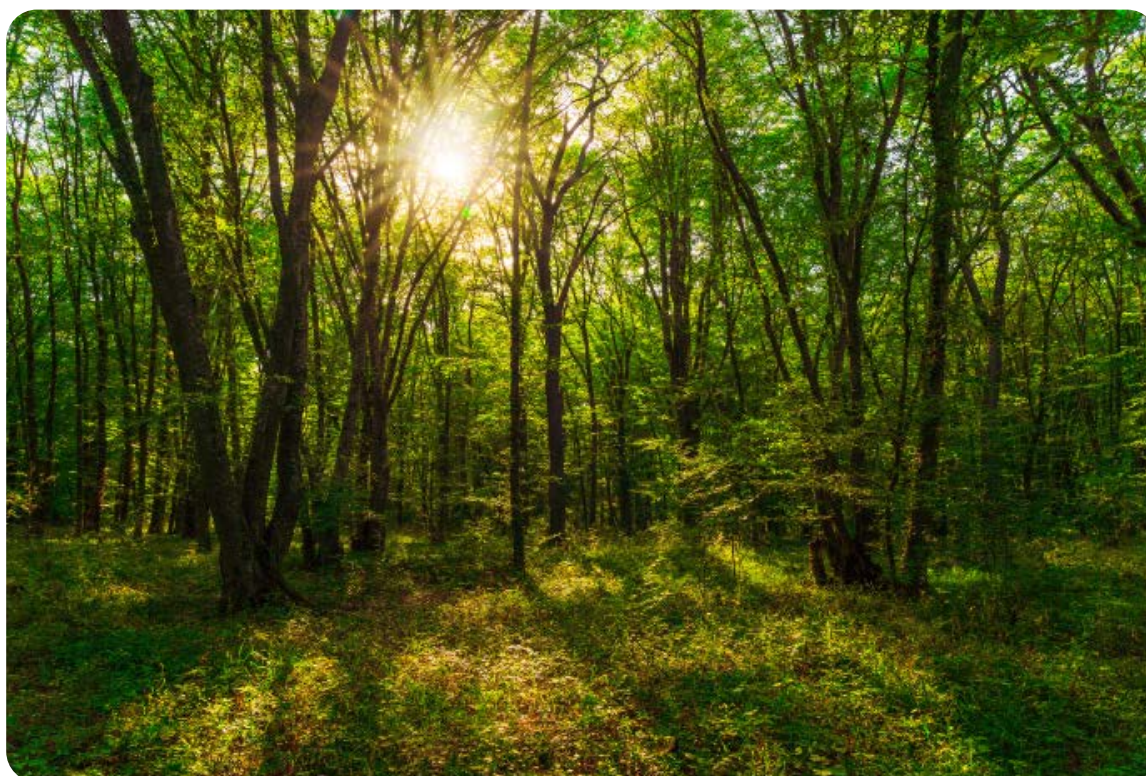
Draw out the link between this learning and the **principle of Diversity** by asking the children: *Are all plants suited to their habitat in the same way? Why is this important?* Discuss the idea that the diverse adaptations of different plants

means that plants are able to survive in a wide range of different habitats and support a wide range of different ecosystems.

Focusing on the marram grass from the fact card activity, you could extend the children's thinking by discussing how the long roots of marram grass actually help to hold sand dunes together. This creates a more stable habitat in which a diverse range of living things can thrive.

Ask the children: *What can we learn about the plants that grow in the UK?* Draw out in the discussion the idea that a healthy habitat contains a range of plants that have adapted to grow there in diverse ways.

Resource 6A



Resource 6B

**Hart's tongue fern**

There isn't much light where I grow. The tall trees all around me make a lot of shade. I have long, wide leaves so I can get as much sunlight as possible.

**sea holly**

It can be very windy and hot where I grow, so I have tough, waxy leaves that don't dry out. I grow well in sand. I have a deep root to keep me steady in the sand and to help me find water underground.

**waterlily**

I grow in water where it can be dark. I have big, round leaves that float on top of the water to get more sunlight. I have long stems to connect my leaves to my roots at the bottom of the pond.

**bluebell**

You will find me growing in the shade of tall trees. I grow and flower before the trees have their leaves, when more sunlight reaches the ground. I store energy in my bulb underground ready to grow and flower the next spring.

Resource 6B

**beech tree**

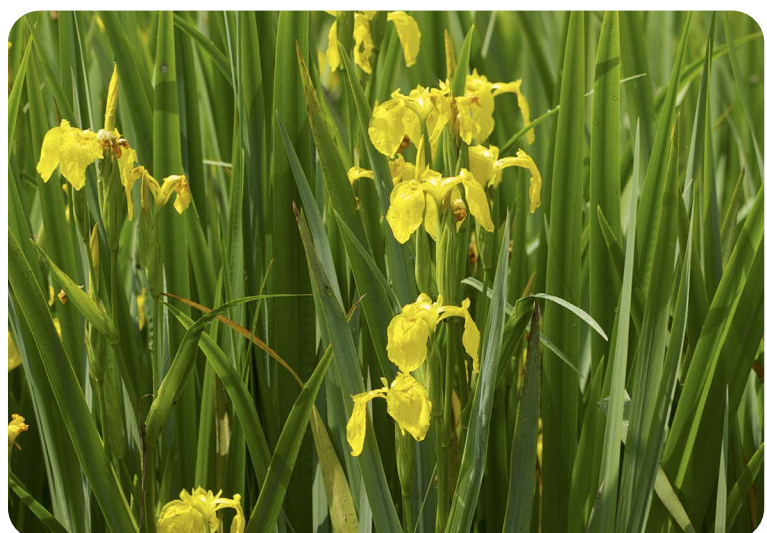
I grow where there are lots of other trees. I grow tall and spread my branches out wide to catch as much sunlight as I can.

**thrift**

I grow on top of cliffs where the wind is very strong. I don't grow tall, so I don't get blown over. I have thin, waxy leaves that don't dry out.

**marram grass**

I grow on sandy beaches where it is windy and dry. I have deep roots to keep me steady in the sand and to help me find water underground. I have tough, thin leaves that don't dry out.

**yellow flag iris**

I grow at the edges of ponds and rivers where the ground is very wet. My sword-shaped leaves grow very tall above the water to get more sunlight.

Resource 6B



broad-leaved pondweed

You'll find my roots underwater where there isn't much light. My stems can grow as long as 2 metres so that my leaves can sit on the surface of the water. They get more sunlight here.

Additional image credits

Sea holly (eryngium martitimum) by Michael Apel © 2009 Michael Apel, licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/) (creativecommons.org/licenses/by-sa/3.0/)

Yellow flag iris (iris pseudacorus) by Jörg Hempel © 2013 Jörg Hempel, licensed under [CC BY-SA 3.0 DE](https://creativecommons.org/licenses/by-sa/3.0/de/) (creativecommons.org/licenses/by-sa/3.0/de/)