YOUNG COTSWOLD WAY EXPLORERS

Curriculum-based discovery pack

Lesson Plans

Autumn term

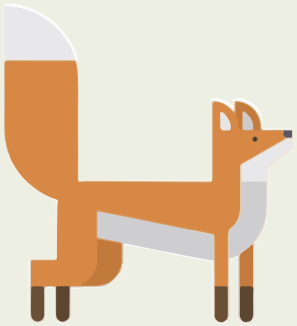
What is a woodland habitat?

Spring term

How does a woodland habitat change throughout the seasons?

Summer term

What are the different parts of a plant, and why are they important in a beech woodland?



Contents

Introduction

Welcome to our Young Cotswold Way Explorers pack. This resource has been designed for Lower KS2 Science – Plants, living things and their habitats. It is also a great resource for home educators and other groups who work with children aged 7-9years.

These three lesson plans have been designed to enable you as educators, to teach your pupils the requirements from the Science National Curriculum for Lower Key Stage Two.

They also take account of the fact that the non-statutory advice states that *'Pupils should use the local environment throughout the year to observe how different plants grow'* (YR3) and *'Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year'* (YR4).

This means we suggest you do one field trip per term to make the most of the seasonal changes in a woodland. However, we appreciate many topics are taught on a termly or half termly basis, and the sessions will still work if taught in this way.

Year 3 programme of study-areas covered:

Plants

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Year 4 programme of study-areas covered:

Living things and their habitats

- Recognise that living things can be grouped in a variety of ways.
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Field trip locations along The Cotswold Way

Please see pages 5-8 for specific field trip location information.

Cotswold Way National Trail

1. The Lynches Wood
2. Littleworth Woods (near Snowshill) National Trust
3. Dowdeswell Wood
4. Cleeve Common – Wardens' Wood
5. Lineover Wood
6. Crickley Hill Country Park
7. Coopers Hill Nature Reserve
8. Buckholt Wood
9. Painswick Beacon
10. Maitlands Wood
11. Haresfield Beacon and Standish Wood
12. Woodchester Park, Gloucestershire
13. Coaley Wood, Uley
14. Laycombe Wood, Wotton-under-Edge
15. Old London Road Nature Reserve
16. Westridge Woods
17. Pipley Woods
18. Ranger Woods
19. Primrose Hill Community Woodland

Field trip locations along The Cotswold Way

Here is a list of some of the woodlands on or near the Cotswold Way which you could visit with your pupils. Some are open access, and others require you to stay on the paths. It is best practice to contact the landowner or manager in advance of visiting with a large group. We have provided details below, but they are subject to change over time.

1 The Lynches Wood

///bowhead.suspends.warping

https://www.woodlandtrust.org.uk/visiting-woods/woods/the-lynches-wood/

- Information: https://www.nationaltrust.org.uk/visit/gloucestershire-cotswolds/dovers-hill
  The wood is part of a 2 mile circular walk from Dover's Hill car park.
  Facilities in Chipping Campden either on Sheep Street or at the Tourist Information Office.
- Parking: Good parking for minibuses at National Trust Dover's Hill car park. Access may be difficult for a coach.

2 Littleworth Woods (near Snowshill) National Trust

///remarks.explained.safe

https://www.woodlandtrust.org.uk/visiting-woods/woods/littleworth-wood/

- Parking: Best accessed from National Trust Snowshill where there is a car park
  https://www.nationaltrust.org.uk/visit/gloucestershire-cotswolds/snowshill-manor-and-garden

3 Dowdeswell Wood

///lamp.hits.jazzy

https://dowdeswellconservation.co.uk/

- Parking: Small parking area alongside the A40 and entrance to the wood (///gain.sports.natively)

4 Cleeve Common – Wardens' Wood

///joystick.regarding.brains

www.cleevecommon.org.uk

- Information: Woodland shelter bookable (free) on request from Cleeve Common Trust.
- Parking: Small car park suitable for minibuses. Access may be difficult for a coach.

/// What3Words, gives the location of each woodland site. www.what3words.com

5 Lineover Wood

///decimals.hers.polo

https://www.woodlandtrust.org.uk/visiting-woods/woods/lineover-wood/

- Information: Has waymarked trails, plus map and information boards/leaflets.
- Parking: The wood's northern entrance and car park (///gadget.earphones.rich) is off the A40 Cheltenham to Oxford Road, opposite the reservoir. From Cheltenham, head east on the A40 Oxford Road. The wood's southern entrance is off the A436. Coach drop of may be possible with The Koloshi pub/restaurant next to entrance with prior arrangement. The use the Cotswold Way to walk into the woods avoiding the A40.

6 Crickley Hill Country Park

///sundial.pelting.commuting

https://www.gloucestershirewildlifetrust.co.uk/nature-reserves/crickley-hill

- Information: Café and toilets open to the public.
- Parking: Coach parking available by prior arrangement with Gloucestershire Wildlife Trust. Gloucestershire Wildlife Trust also run learning programmes from here. Details here: https://www.gloucestershirewildlifetrust.co.uk/learning

7 Coopers Hill Nature Reserve

///shadowed.pronouns.breath

https://www.gloucestershirewildlifetrust.co.uk/nature-reserves/coopers-hill

- Information: Very steep slope https://www.prinknashabbey.org/contact is open to the public and has a shop and café. Contact them direct for up to date information.
- Parking: The nearest car park is called Fiddlers Elbow, located off the A46 with a height restriction of 6ft 6ins, the postcode is GL4 8ET. There is also a small amount of parking at the other entrance, SO892147 (///cheat.boardroom.neater)

8 Buckholt Wood

///genius.cemented.roofs

http://publications.naturalengland.org.uk/publication/1736969

- Information: National Nature Reserve owned by Natural England. Some areas are Common land with Right to Roam access. Cranham Scout Centre available to hire. https://scoutcentre.org.uk/ has indoor and outdoor space, toilets, kitchen and dining area.
- Parking: Small car park with room for a coach to turn off Sanatorium Road (///acoustics.acclaim.brink)

/// What3Words, gives the location of each woodland site. www.what3words.com

9 Painswick Beacon

///lonely.inch.rubble

https://www.localwalks.co.uk/gloucestershire-walks-blog/painswick-beacon-walk

- Parking: Informal parking only suitable for minibuses at Cat Brain car park (///export.stuck.lifted) or further to the south is Walkers car park which is also suitable for minibuses (///bunny.update.scales). No coach parking available.

10 Maitlands Wood

///rainbow.sheds.mimed

https://www.woodlandtrust.org.uk/visiting-woods/woods/maitlands-wood/

11 Haresfield Beacon and Standish Wood

///decent.teaspoons.soups

https://www.nationaltrust.org.uk/visit/gloucestershire-cotswolds/haresfield-beacon-and-standish-wood

- Parking: Pay and display National Trust car park (///hinted.sleepless.dislodge) suitable for minibuses. Room for a coach to pull in, but not park. (///scorpions.liners.carefully)

12 Woodchester Park, Gloucestershire

///pink.decently.immediate

https://www.nationaltrust.org.uk/visit/gloucestershire-cotswolds/woodchester-park

- Information: Toilets, café and play trail.
- Parking: National Trust car park.

13 Coaley Wood, Uley

///kicks.culling.braked

https://www.woodlandtrust.org.uk/visiting-woods/woods/coaley-wood/

- Parking: Parking is available in a large layby off of the B4066 Crawley Hill. Parking also available further along the Cotswold Way at Coaley Peak (///safest.curving.sneezing)

14 Laycombe Wood, Wotton-under-Edge

///recount.perfumes.fuss

https://www.woodlandtrust.org.uk/visiting-woods/woods/laycombe-wood/

- Parking: Laycombe Wood is between the villages of Bowcott and North Nibley, adjacent to Waterley Bottom. It can be accessed from these villages or from the Old London Road, and the site runs adjacent to this and the B4058. These have several laybys or grassy verges for informal parking, as does Waterley Bottom. Public footpaths also enter and exit in various places.

/// What3Words, gives the location of each woodland site. www.what3words.com

15 Old London Road Nature Reserve

///minder.news.statement

https://www.gloucestershirewildlifetrust.co.uk/nature-reserves/old-london-road

- Information: Scout hut (Conygres Campsite) can be hired http://www.wottonscoutgroup.co.uk/join-us/ and has indoor space and toilets.
- Parking: There is a small amount of parking available next to a stone barn at the entrance of the reserve, or slightly further along Old London Road in an extended layby. Off road parking is available at the Scout Hut. This fits 20 cars, or minibuses. Not suitable for coaches.

16 Westridge Woods

///fists.tones.making

https://www.woodlandtrust.org.uk/visiting-woods/woods/westridge-wood/

- Information: Walk along the Cotswold Way from Wotton-under-Edge or from the Conygres Campsite to access these woods.
- Parking: Scout hut (Conygres Campsite) can be hired http://www.wottonscoutgroup.co.uk/join-us/ and has indoor space and toilets.

17 Pipley Woods

///leaflet.feasting.kicked

http://pipleywood.com/

- Information: Public toilets (20p) at Lansdown Park & Ride. In 2023 this woodland was closed due to Ash Dieback. Please check the website before visiting.
- Parking: Lansdown Park and Ride. Possible private parking available by pre-arrangement at Bath Racecourse.

18 Ranger Woods

///refills.trouble.cloth

https://discoverbath.co.uk/further-slate-ranger-wood/

- Information: Private woodland with public access on the established footpaths.

19 Primrose Hill Community Woodland

///foal.wires.dirt

https://www.primrosehillwoodland.com/

- Parking: Informal parking on residential streets.

/// What3Words, gives the location of each woodland site. www.what3words.com

Session format

1. Classroom

Each session starts with a question which pupils will strive to answer from their field trip out along the Cotswold Way and surrounding area. The question will be introduced through the use of an animation which can be shared via an interactive whiteboard or laptop etc.

2. Field Trip

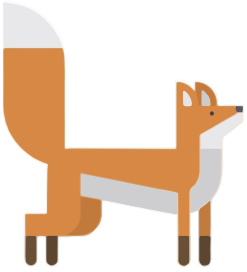
Pupils will answer this question by setting up simple practical tests and making observations using a range of equipment. These observations can be encouraged through games and exploration. Pupils will gather and record their data in different ways.

To ensure children experience the outdoor environment as deeply as possible, activities in this pack try not to rely too heavily on note taking or worksheets. The emphasis is on children having their hands free to explore and discover what is around them.

3. Back in the classroom

Pupils will present their data or findings to help answer the original question. The ways in which they do this will be varied and link to other areas of the curriculum such as literacy and numeracy. They will also record their findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

These can then be used to report findings and the results used to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.



Assessment statements – by the end of these lessons:

All children should be able to:

- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.
- Identify the different parts of flowering plants.
- Predict what will happen in an investigation.
- Make observations.
- Identify the main stages of the life cycle of flowering plants.
- Recognise that living things can be grouped in different ways.

Most children will be able to:

- Explain the functions of the different parts of plants.
- Set up an investigation and make predictions.
- Make observations and conclusions.
- Identify different parts of a flower.
- Identify and describe the stages of the life cycle of flowering plants.
- Be able to answer questions based on their learning.
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Some children will be able to:

- Set up reliable and accurate investigations.
- Make and explain predictions.
- Make and record accurate observations.
- Use scientific language to explain their findings.
- Explain the functions of the different parts of a flower.
- Be able to ask and answer questions based on their learning using scientific language.

Glossary of useful terms:

Cambium	The cambium layer is a thin layer between the xylem and phloem which is responsible for secondary growth (thickening of stems and roots).
Canopy	The canopy layer is made up of the overlapping leaves and branches of the trees high above our heads.
Characteristic	Characteristics are features of living things which help scientists classify them.
Classification	Classification is the method scientists use to group living things.
Compound leaves	Made up of smaller leaflets.
Cordate leaves	Heart shaped.
Deciduous	Deciduous (also know as broadleaved) trees shed their leaves seasonally, at the end of the growing season.
Dichotomous	Divided into two parts.
Dispersal	Dispersal is the way something is spread over a wide area.
Elliptic leaves	Oval shaped.
Evaporation	When a liquid turns into gas (e.g. water into steam).
Evergreen	Evergreen trees keep their leaves throughout the year.
Flowering plants	Reproduce with seeds which are protected by a fruit or nut, trees are flowering plants. They are the biggest, most varied groups of plants.
Flowers	Flowers make seeds which grow into new plants. Colourful petals and nectar attract pollinators to the plant.
Habitat	A habitat is a place where a plant or animal (or any other organism) lives.
Leaflets	One of the subdivisions of a compound leaf. e.g. one of the small leaves that makes up the leaf of an ash tree.
Leaves	Leaves make food for the plant using sunlight and carbon dioxide from the air.
Lobed leaves	The edge of the leaf goes in and out in 'lobes'.
Micro-habitat	A micro-habitat is a small area which differs from the surrounding habitat. e.g. under a fallen log in a woodland.
Needle leaves	Thin and pointy.
Non-flowering plants	Do not produce a fruit or nut and include conifers (which still produce a seed inside a hard cone), and ferns and mosses (which do not produce seeds, but spores instead).
Nutrient	A substance needed by an organism to stay alive and healthy.
Paired-statement key	A paired-statement key is set out as a list. You start at number one on the list and work your way through the statements until you reach the name of the living thing you are classifying.

Glossary of useful terms, continued:

Phloem	Phloem is a plant tissue that transports food from the leaves (made through photosynthesis) down to the rest of the plant.
Photosynthesis	Photosynthesis is the process which green plants use sunlight to make their own food.
Pollination	Pollination is the transfer of pollen from one flowering plant to another, usually carried by insects, animals or the wind.
Prediction	To make a prediction is to say what you think is going to happen in the future, usually based on the results of experiments and observations.
Roots	Roots anchor the plant into the ground and absorb water and nutrients from the soil.
Sapling	A sapling is a young tree.
Seasons	In the UK we have four divisions of the year (spring, summer, autumn, and winter). They are marked by particular weather patterns and daylight hours, due to the earth moving around the sun.
Simple leaves	A leaf that is not divided into leaflets.
Stem	The stem holds the plant up and carries water and nutrients from the soil to the leaves.
Trunk	A trunk is the stem of a tree.
Xylem	Xylem is a plant tissue that transport water and nutrients from the roots up to the rest of the plant.

Pack resources

Resource name	Used in lesson(s)	Extra information
Animation	All	You will notice the animation is in three sections. These align with the three questions and therefore the three lessons.
Lesson Plan 1	1	Include: Introduction in the classroom using the animation, lesson plan for the field trips, plenary session back in the classroom and suggested ideas for follow on activities.
Lesson Plan 2	2	
Lesson Plan 3	3	
Build a tree script	2	
Map	All	Shows the locations of easily accessible woodlands along the Cotswold Way which can be used for the field trips.
Risk Register	All	List of risks to consider when creating your risk assessment for a field trip.
Glossary	All	List of key terms and their meanings for teacher or student use.
Pdf downloads		

Essentials for all field trips

First aid kits and tick removal tools.

Clipboards and pens/pencils.

Risk assessment.

Hand gel.

Optional:

You may want to download the free app 'seek' (by iNaturalist) to give you confidence when identifying plants. It is also a fun way to add to a citizen science project.

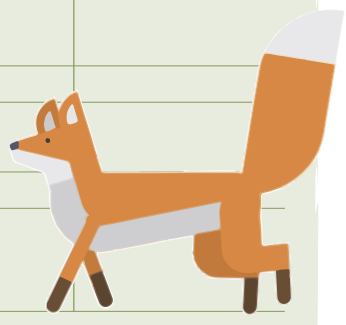
Sit mats (can be cut from cheap camping mats).

Whistle.

Something to take photos with.

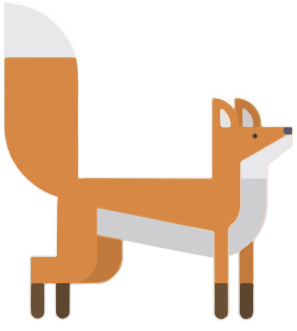
External resources

Resource Name	Used in lesson(s)	Classroom or field trip	Where to find it	Extra information
Collage materials	1 Extension activity	Classroom	Old wildlife magazines, online images.	
Leaf identification chart	1, 3	Both	Woodland Trust Tree tools for schools	
Winter tree identification chart	1	Field	Woodland Trust	Helpful if visiting a woodland during the winter when leaves will not be on the trees.
Woodland plants identification chart	1, 2	Both	Field Studies Council	
Magnifying glasses	All	Field	www.nhbs.com	Enter magnifier into the search bar. Several options available. consider brightly coloured ones, so they are easy to find if dropped!
Crayons	1	Field		Any thick crayons without paper are fine.
Light coloured sugar paper	1	Field		Normal paper works okay if this is all you have.
Double sided tape	1	Affix to cardboard strips for field		25mm width works best.
Blindfolds	1	Field	Try asking for donations from anyone who regularly takes long haul flights.	Enough for half of your class as they will be working in pairs.
Stapler	1	Both		
Strips of cardboard approx. 3-4cm wide. Long enough to go around a child's head to make a crown	1	Pre make for field		
Hole punch	1	Classroom		
Treasury tags	1	Classroom		
Glue sticks	1, 2	Classroom		
Example classification key	1	Classroom	Example classification key	
BBC bitesize What is a Key? clip	1	Classroom	Bitesize	
Scissors	1, 2	Classroom		
Natural History Museum tree key	1	Classroom	Natural History Museum	
Catkin guide	2	Field	Woodland Classroom	
Pens, colouring pencils, nature based magazines, scrap tissue paper etc.	2	Classroom		



External Resources, continued

BBC Plantlife clip	2	Classroom	Youtube	
Large Tarp (optional)	2	Field		For build a tree game if it is wet. This activity could also easily be done back at school in hall.
How to measure a tree download	2 Extension activity	Field	Learning Through Landscapes	
Planting investigations download	2 Extenstion activity	Classroom	Learning Through Landscapes	
Top Trumps template	2	Classroom	Top Trumps template pdf	
Photos of woodland trees and their features	2	Classroom	Online	
Fruits and seeds identification chart	3		Woodland Trust	
Tape measure	2	Field	www.nhbs.com	
Metre rulers	2	Field	www.nhbs.com	
Pencils & paper	2	Field		
Dried butter beans or similar	3	Field	Wholefood shop if not available in larger supermarkets.	
Seasonal predictions	2	Field	Produced in classroom session before the trip.	
Apple, small knife and chopping board	3	Field		



Lesson Plans

Plants, living things and their habitats – In depth study of a beech woodland over a year

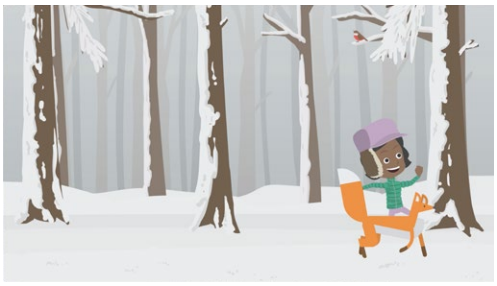
QUESTION 1:
What is a woodland habitat?

Autumn term (suggested)

In the classroom:
Play the animation in full and let the children watch it without interruption.

▶ Now play it again and stop when the child asks 'But what is a habitat?' at 18 seconds.

Ask the pupils – *What is a habitat?* To evidence the children's learning this could be written in the middle of a flip chart page.



Jot down the children's ideas, then recap by watching the animation again up until 56 seconds after the child says "Oh yes please!". Add any new information to the discussion/flip chart.

In small groups or pairs, ask the children to come up with some ideas of different habitats they might know, bearing in mind what they have just learnt about what a habitat is. Habitats can be large or small depending on the plant or animal in question.

Extension activity:
Ask the children to create a collage of their perfect habitat. *Think about where you would find food, water and shelter. Which plants and animals would you like to share your habitat with? And which would you not!?*

See if any of the groups mention a woodland habitat. When they do – use this as a jumping off point to introduce the idea of going to visit a woodland. Has anyone been in a woodland before? What was it like?

▶ Watch the animation in full again.

Extension activity:
Ask the children - *What features of a woodland habitat did you spot in this video?*

Field trip:
Visit a woodland and observe the woodland. Look at two distinct areas of the woodland to gather baseline data: 1. The woodland floor and 2. The tree canopy.

As you walk to the start you could set the children a 'walking challenge' to focus their attention, for example:

- *How many different shades of green (or any other colour) can you see?*
- *Imagine you live in this habitat – you know a predator is close but you need to get home – can you walk without making a sound?*
- *Imagine you live in a tree – search for the tree you think would be best to call your home. Tell a friend which one you chose and why.*

1. The woodland floor

Ask the children to observe which plants are growing on the woodland floor – use ID guides to record what you find. Encourage the children to have a good look at how the leaves are attached to the stem as this will help with identification.

Extension activity:
Ask those who finish early if they can group them into flowering and non-flowering plants? Depending on the time of year, flowers may not be present, but other clues may be, for example, buds, fruits or seeds.

2. The tree canopy

Explain that all deciduous trees are flowering plants. If you have evergreen trees nearby make a comparison.

Ask pupils how they might be able to answer the following questions; *What is happening to the trees at this time of year? Are all the trees here the same type? What can you use to help you identify the trees you have found?*

Play hug a tree:
Equipment needed: Blindfolds
Aim: Explore trees more closely using senses of touch and smell

Organise the group into pairs. Demonstrate the game using a child from the group or another adult as your partner. One pupil in each pair is blindfolded and gently spun around a couple of times. The blindfolded child is carefully led to a tree by their partner. Ensure the blindfolded child has their hands out in front of them so their hands meet any obstacles in their path before their heads. Encourage them to use their other senses to learn about the tree. Remind them to concentrate on the girth, texture and smell as well as any other defining features. The blindfolded pupil is then led away from the tree. After removing their blindfold, they must now find their special tree. The partners can then swap over.

Reflect on how easy or difficult they found this and explore the reasons why. For example, it might be easier in a woodland made up of lots of different species of tree rather than one where all the trees are the same size and species.

Next, ask the group *How else can we tell trees apart?*

Look for as many **different** tree leaves as you can find and create leaf rubbings. Alternatively trace the outlines of the leaves and draw on the veins. Use the leaf ID guides to identify the different trees you have found. Keep these – they will be needed later!

Optional activity:

Use the leaves to create a leaf crown. The leaves of plants from woodland floor species and trees can be used to decorate the crowns. Also look for feathers and other features of a woodland habitat to add. Wear them with pride!

When walking back, ask the children if they think this habitat has always been like this? See if they can find any clues as they walk to help answer the question.

Back in the classroom:

Create a tree ID guide classification scrap book.

Take out your leaf rubbings (and leaf crowns if you made them). How many different tree species did you find in your woodland? Record your findings by labelling each of the rubbings, using the ID charts to help you.

Top Tip

Bring some leaves back to the classroom to allow for more rubbings to be created and for easier identification, as rubbings can sometimes be a bit blurred, depending on the individuals' capabilities

Encourage the children to start to classify their leaves. *Can you sort your leaves into groups of similar types of leaves?* Allow the children to choose how they group them, it may be by colour, size, shape etc.

Extension activity:

Further sorting and classifying – *Can you organise your leaves into a repeating pattern? Can someone else copy your pattern with some more leaves? Can you copy someone else's? AND/OR In your group of objects can you find an odd one out? Why is it the odd one out? Can you explain your decision?*

Use the leaves to create a scrap book (YR3) or (dichotomous) key (YR4).

YR3 – Bind the labeled rubbings/drawings together either with a hole punch and treasury tag or by sticking them into a bound book.

Extension activity:
Create a cover for your leaf ID book using your favourite leaf.

YR4 – It's best if children have four distinctly different leaves, identified in the above exercise to work from.

Use this BBC bitesize clip about keys to introduce the idea:

Explain that if they have four leaves, they need to think of three questions which tell them apart, or classify them. Each question has to be answered yes or no. For example, is the leaf lobed? Is the leaf compound or simple? Does the leaf have prickles?

Use the Example classification key on the white board to show an example of what they are trying to achieve. When the children have found a classification system that works they can mount their leaves/rubbings onto a larger piece of paper, drawing in the key around it. If children find this easy with four leaves, they can continue to add more, but they may have to adjust their key each time they add a leaf. For students who are really enjoying this and want to stretch it further, you can use the Natural History Museum tree key to show how many trees can be included in a key.

Extension activity:
Drawing on all you know and have experienced of woodland habitats, write a descriptive text explaining the key features of a woodland habitat. Include a description of a micro-habitat within a woodland.

QUESTON 2:
How does a woodland habitat change throughout the seasons?

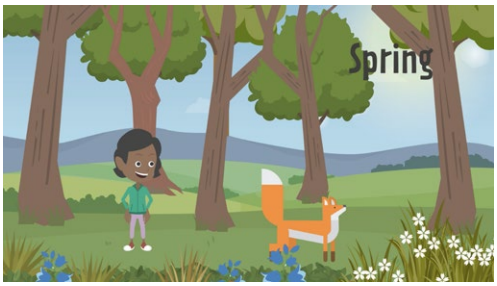
Spring term

What are plants in your woodland doing at this time of year, and why do you think that might be?

In the classroom:

Recap of what a beech woodland habitat is (rewatch animation) and the sorts of plants and trees found there. Introduce the idea of plant seasonal changes and life cycles by watching the animation to the end.

Using the tree template ask the children to create the four seasons of their woodland.
This can be done simply by drawing, making a collage, or using pictures cut from magazines.



pupils may wish to take notes of changes they can see in the animation. Rewatch from 1 minute to 2 mins 23 seconds a couple more times to let them do this. Pay particular attention to what is happening right now, perhaps ask the children to look out of the window at any plants they can see and add to their notes before starting the task.

Once complete ask the pupils to predict what they might see the plants doing when they visit their woodland.

Watch these video clips Video 1 and Video 2 and check if anyone would like to revise their predictions.

Keep a written record of their predictions and take them with you on the field trip.
These could be made as a class or in groups, or as individuals.

Field trip:

Return to the same woodland and observe once again in the same way.

1. Woodland floor

Observe the plants here – *what can you find and what are they doing?*
Are their leaves out, are there any flowers? Use previous knowledge to group the flowering and non-flowering plants. *Look carefully at any flowers. What can you see?*

Ask each child to pick a flowering plant and sketch it. Encourage them to observe their plant carefully.

To keep them focused encourage them to look at:

- *The leaf shape.*
- *The arrangement of the leaves on the stem i.e. are they alternate or opposite, are they all the way up the stem of just at the bottom, are they in pairs, singles or another multiple.*
- *The number of petals the flower has.*
- *The shape of the petals.*
- *The shape of the flower.*

After they have completed their observational sketches then ask them to use the charts to identify their plant. They are much more likely to get it right now they have really looked at their plant in detail.

2. Tree canopy

Once the woodland floor plants have been identified move on the observe the tree canopy. Have the leaves on the trees appeared yet? Can you see any catkins? Observe and record.

Play build a tree:

Equipment needed: Script, tarp (if wet)
Aim: To learn about the different parts of a tree

Each child will come together to build part of the tree. As the tree is built you will be explaining to them which each part does. Use the Build as tree script provided in this pack.

Top tip

Think about the number of people who will eventually play as you allocate each part to ensure everyone has a role to play. Involve adults and encourage dramatic interpretation! If the ground is wet this can be done on a tarp.

3. Find a gap in the canopy

For example, a fallen tree, or woodland edge, ride or glade. Observe the difference in ground flora between somewhere with light and somewhere shaded. Can the children draw any conclusions about what the plants on the woodland floor might need and are unable to get under the canopy? If you are visiting in early spring and you have not observed many leaves in the canopy yet, ask the pupils to think about how different it might feel once the canopy closes. What is the difference between the plants on the woodland floor and the mature trees?

Revisit the seasonal predictions they made back in the classroom. Were they correct? Note down any new observations.

Using their knowledge of plants and seasons, can they predict what might happen next?

Extension activity:

Take a mindful moment

Let the children enjoy a mindful moment with a tree. Ask the children to find a favourite tree and stand or sit with their backs against the tree and look up. Encourage them to rest their hands upon the bark of the tree. Give them a few moments to just enjoy doing this, encourage them to do it silently. If they are engaged, encourage them to then close their eyes for a moment and try to pick out all the different woodland sounds they can hear.

Ask them to open their eyes again. Still looking up pose some questions for them to ponder. For example – *What can you see? Can you see the sky? What might it look like in another season? Can you follow a branch with your eyes all the way from the trunk to the tip? Can you count how many times you see a single branch cross with another?*

4. Measure a tree

Based on their observations, classroom studies and knowledge from the build a tree game ask the group to come up with a list of things they think plants need to grow. In a Q&A session, help them recognise the five things plants need to grow – nutrients from soil, light, water, space to grow, air.

Extension activity:

Measure the height of a favourite tree. Ask students to go to the woodland edge or a clearing (they need to be able to clearly see the top of their tree) and pick their favourite tree.

How tall do they think their tree is? Can they make a guess? Use one or more of the methods on the How to Measure a Tree download to see if their prediction is correct.

Ask the children to order themselves according to how tall their trees were. Who had the tallest tree? Who had the smallest? Discuss why the trees may be different heights depending on their immediate environment within the woodland habitat, drawing on what they have learnt about what a tree needs. See if you can find a tree leaning towards light, to show trees do not always grow straight up.

Back in the classroom:

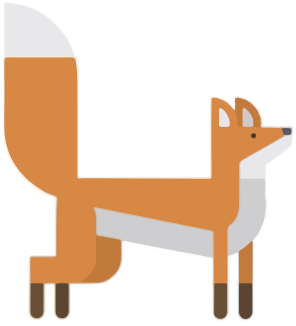
Create a trees Top Trumps (download template)

Equipment: Top trumps templates, information about trees, pens and pencils
Aim: To consolidate pupils learning about trees and highlight their similarities and differences

Ask the students to create their own set of top trumps cards using the information they have gathered in the field. They could include: height of tree, leaf length or size (using their leaf ID book/ key from lesson 1), earliest blooming (from additional research), rarity, leaf area (by tracing their outlines onto squared paper) etc.

Extension activity:

Set up a long term science experiment in the classroom to explore what happens when plants do not get one of the five things they need. Complete a planting investigation, using one of the ideas from the Planting Investigations download.



QUESTION 3:
What are the different parts of a plant, and why are they important in a beech woodland habitat?

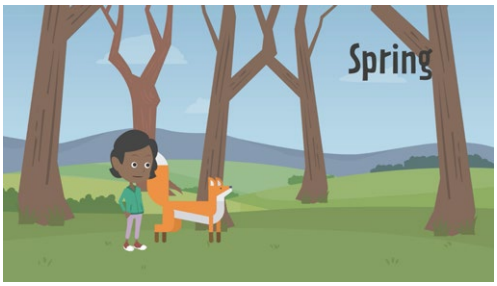
Summer term

In the classroom:

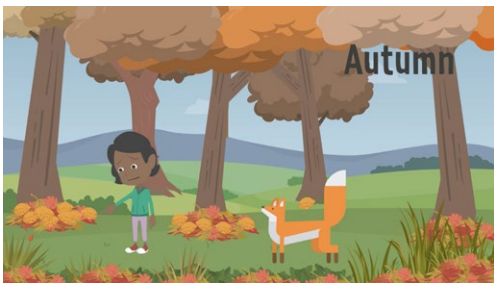
Play the animation in full to reintroduce the topic. Recap what plants need to survive making a note of the five things (nutrients from the soil, air, water, sunlight and space to grow).

Extension activity:

Ask the children to list soil, air, water, sunlight and space to grow, on a piece of paper. Then ask them to note down evidence of each thing from the film as they watch it again. They may need to re-watch it more than once.



Now rewatch the animation. Stop it at 1 minute 18 seconds. Ask the class to look at the list of things plants need to survive and ask them why they think plants 'wake up in spring'. Explain trees and plants need sunlight to make their food (through a process called photosynthesis).



Continue to play the animation until the beech nut falls from the tree at 2 minutes 25 seconds

Ask the groups what do they think fell on the child's head?

Once you have established it was a beech nut/beech seed/beech mast play the animation to the end.

Ask the children to recall the other species of trees they identified back in the first lesson, perhaps revisiting their leaf ID books (YR3) /keys (YR4). See if they can list some of the trees. Record their list on a flip chart or similar. Then see if anyone knows the seed that goes alongside each tree species. You can refer to this helpful Countryfile article or this website to guide you. Pupils could also be tasked with using the Tree Guide UK website to find out the answers for themselves too.

Next, watch this video clip showing how an oak tree grows from an acorn.

Take out their field sketches of flowering plants from the lesson 2 field trip. Can they label the different parts of their plant (stem, leaves, flower), and then add in roots too?

Field trip:

Return to your woodland and start by observing again the two distinct areas of the woodland:
1. The woodland floor and 2. The tree canopy. Note any changes since your last visit.

1. Woodland floor

Ask each child to find the plant they sketched (and recently labelled) in lesson 2.
Has anything happened to their plant? What has changed and what has stayed the same?

Start to introduce the idea of plant life cycles to the groups as they observe how their plant has changed. Depending on what they chose and the time of year of this visit, their plant may still be flowering, or it might have started to fruit/go to seed. It is likely to have changed in size and shape over the growing season.

Ask the group to think of everything they know about flowering plants so far. Then ask the group to run to a space on your left if they think trees are flowering plants, and to your right if they don't think trees are flowering plants.

Ask each group to tell the other group their reasons for choosing the side they are on.
After the discussion comes to an end, ask the children if anyone wants to swap sides and let them move if they want to.

Explore an apple

Equipment needed: Apple, small sharp knife, chopping board
Aim: To explore how trees create seeds and introduce the idea of seed dispersal

Next take out your apple. Ask the groups what you are holding. – An apple. Where do apples come from? – Trees. Why do trees bother growing apples? – To disperse their seeds. Where are the seeds? – Inside the apple (use your knife to slice into the apple to show the group the seeds)

How did the seeds get there? – They formed when flowers (blossom) were pollinated. Ask the group again if anyone would like to move sides. Allow them to move. Hopefully all the children agree now, that trees are indeed flowering plants.

Explain that in woodlands, trees are often very tall so we might not see their flowers. Also depending on how they are pollinated, their flowers might not be very obvious. Trees that need insects to pollinate their flowers such as orchard trees, or horse chestnuts, have large scent filled flowers to attract pollinators. Some trees however, rely on wind pollination, and therefore have very small, dull flowers or catkins. They do not need to waste energy creating fancy flowers!

Play Little Squirrels

Equipment needed: Enough butter beans for three per child
Aim: To introduce the idea of seed dispersal in a woodland

Find a space within the woodland, ideally slightly separate from where you are doing the rest of the field work, and determine the boundaries. Explain that soon it will be autumn, they need to imagine they are squirrels preparing for the winter. Give each child three butter beans explaining they represent nuts from trees such as acorns.

Who knows what squirrels do with nuts and seeds they find? Squirrels will harvest the acorns in autumn and hide many of them as a cache for winter when food is harder to come by.

Give the children a set time (3-5minutes) to go and hide their acorns. They can choose if they want to put them all in one place or in different locations. Don't dwell on this too much at this stage. Once their time is up regroup and move on to the next activity.

2. Tree Canopy

Ask each child to use the leaf ID chart to identify their favourite tree in a given area. They should, by now, be fairly familiar with leaf shapes and how to use the guides. Remind them to pay close attention to the arrangement of leaves, checking if they are composite or simple formed before trying to identify them.

Extension activity

Ask each child to sketch their tree. Ensure they look at it from afar, so they can see how the growth form differs from those around it, especially if there are different species in the woods you are in. Trees do not look like 'lollipops' in real life. They should observe the arrangement of the branches and how they connect to the trunk of the tree, as well as where the leaves are growing from the branches.

Once they have identified their species of tree, ask if they observe if it is growing any fruit or nuts? *Why would a tree be doing this? Collect as many different types of fruit and seeds as you can find – either physical examples, drawings or photos.*

Complete Little Squirrels Game

Challenge the children to retrieve their acorn cache as quickly as they can as it is now the depths of winter and they are hungry! They may not actually find their own, but may find others' acorns instead! If they chose to hide their acorns in different places, they may only be able to find some of them.

Review how many squirrels 'survived the winter' and discuss what has happened to the acorns that have not been retrieved or stolen. i.e. the squirrels have reliably ensured the seeding of new oak trees.

Extension activity:

Discuss who had the most effective strategy for survival - the squirrels who hid all their acorns in one place vs. those who hid in three separate spaces. Weigh up the pros and cons of each.

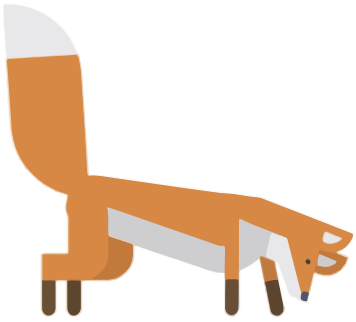
Extension activity:

Encourage children to collect and bring in fruit, nuts and seeds that they find in their garden/local park/walk to school/home etc.

Back in the classroom:

Seed dispersal is a key element of the life cycle of plants. Explain to the class why it is important that all plants and trees spread their seeds as far as they can – and that this process is going all around them. There are several different ways a plant can disperse their seeds. From what they have seen, can they work out what they are? Wind, gravity, water, animal.

Look at all the different examples of nuts, seeds, and fruit you have gathered from the field trip (and beyond). Use the table below and try and make sure you have at least one from each category.



Name	Method of Dispersal	Example
Poppers	Have stalks that hold the seed to the plant and when the plant is moved it pops and sends the seed flying.	Grasses Himalayan Balsam
Droppers	Drop their seeds to the ground.	Horse chestnut (conkers) Oak (acorns)
Fliers	Have wing-like structures that help the fruit "fly away" when it falls off.	Sycamore Ash
Floaters	Have light fluffy strands that help the seed float away on the breeze.	Dandelions Thistles
Grabbers	Catch and hold on to an animal as it passes by.	Beech Burdock
Passers	Are edible fruit that are eaten by animals and deposited elsewhere with 'free' fertiliser.	Apples Hawthorn

Ask the children to classify each seed, nut or fruit depending on how they think it is dispersed. This could be done as a large group exercise or in smaller groups. Encourage lots of discussion.

Ask them:
What clues did you use to decide which way each seed disperses?

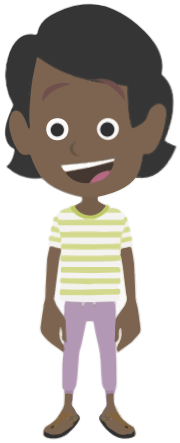
Is there any way you can test your classifications are correct? Write instructions on how to conduct your test.

Extension activity:

Can each group design (and make) their own seed dispersal system using the information they have gathered from the field trip and from looking at their seeds, nuts and fruits?

Extension activity:

Write a story about what might happen in a beech woodland, if the beech trees were affected by a disease which meant they could not create beech nuts (also known as masts)?



Appendicies

Build a tree script

Heartwood

Choose one or two tall strong people and ask them to stand with their backs together.

You are called the Heartwood. You are the inner core of the tree. You are what gives it its strength and your role is to keep the trunk upright so that the leaves can get energy from the sun. You have been around a long time, you are the most preserved part of the tree but you are dead. You used to be alive but as you grew your tubes blocked up with resin and pith.

Tell the Heartwood to *stand tall & strong*. Ask them to practise making the sound of a strong beating heart. Then stop as you build the rest of the tree.

Taproot

Choose around three people to be the Taproots. They should sit facing outwards with their backs to the heartwood.

You are very long roots and are called Taproots! Your role is to get water from deep into the ground, you can be about 90m deep! You act as an anchor to the tree. You are some of many Taproots on this tree but you are not on all trees e.g. beech trees have very shallow roots.

Lateral Roots

Choose people with long hair. If the ground is dry get them to lie on the ground with their feet at the feet of the Heartwood and Taproots.

There are hundreds of you. You grow outward like branches all around the tree but underground. You help to keep the tree upright. Each root has tiny hairs (ask the roots to spread out their hair). You have thousands of these hairs to absorb water and nutrients. You will grow in the direction of sources of water.

Tell the *Lateral Roots and Taproots to slurp*. Ask them to practise their 'slurp'!

Sapwood

Choose enough people to form a complete circle around the Heartwood. They should circle the Heartwood holding hands and facing inwards! Ask them to be careful of the roots.

You are called the Sapwood or Xylem. You draw water up to the highest branches and you are the most efficient pump in the world. You can soak up about 1,400 litres of water a day!

Tell the Sapwood to practise drawing the water up. Ask them to go 'Wheeee!' and to lift their arms up. Ask the Roots to slurp again and then the Sapwood to bring the water up. They work in unison – slurp-whee-slurp-whee!

Cambium/Phloem

Choose enough people to create a complete circle around the Sapwood.
They should circle the Sapwood holding hands and facing outwards!

You are the Cambium and the Phloem. The Cambium is the growing part of the tree, you add new layers to the sapwood and phloem each year (tree rings). Explain that trees do not grow like human hair. Trees grow outwards whereas hair grows from the scalp and not from the ends.

Near the outside of the tree you are the Phloem. Your role is to carry the food manufactured by the leaves and to distribute it around the tree.

Ask the people to stretch out their hands and flutter them to create branches and their leaves. Explain that leaves make food which needs to be transported down and around. Get them to practise saying 'Whoosh' as they move from standing with their fluttering leaves to crouching, with their arms lowered.

Bark

Using the last remaining people, create the bark. Create a circle around all the layers, with hands joined or arms linked.

You are the Bark. Your role is to stop the tree from drying out and to protect the flow of food in the Phloem. You also protect the tree from insects, fungi and pests. Humans can damage you if they pull you away from the tree. As you get older you crack and stretch.

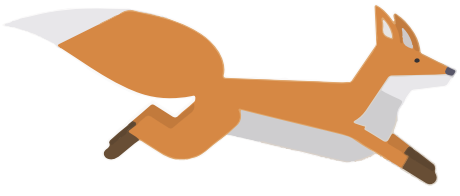
Ask the Bark to practise 'growling' as they protect the tree. The Phloem should put their arms through the Bark to show branches and leaves.

At the end, ask everyone to do their noises and actions all at once to show the busy workings of a tree and important role each part of the tree plays.

Reflect on the game. Did the group realise how busy trees are all around us?

Explain that in the spring time, the xylem is very busy pumping water and nutrients up to the canopy to enable the leaves to burst from buds and grow.

Start to encourage the students to think about why the trees are putting all their energy into growing tall, and why most of their leaves are in the canopy.



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6+

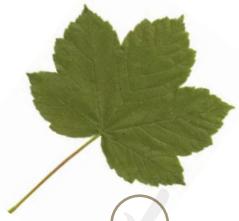
Be a super spotter!
How many trees can you identify?

Leaf ID


Alder


Beech


Oak


Sycamore


Birch


Holly


Elder


Ash


Horse Chestnut


Rowan


Field Maple


Hawthorn


Hazel

Found any other leaves? Do you know which trees they're from?

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Get twiggy with it!
Will you spot these sticks on your travels?

Twig ID


Ash


Beech


Hawthorn


Field Maple


Horse Chestnut


Blackthorn


Birch


Rowan


Larch


Alder


Oak


Sycamore


Elder


Lime


Dog Rose


Hazel


Lilac


Elm

How're your detective skills? Did you find them all?

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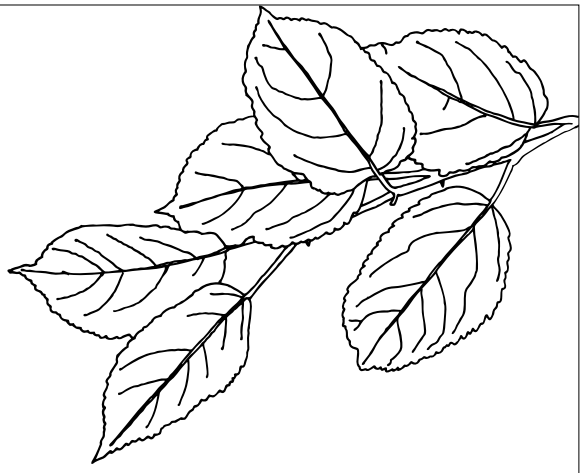
NATURAL HISTORY MUSEUM



Tree identification key

Identification keys are used to identify specimens. This key is made up of a master key and 7 other keys.

How to use this key

- start at step 1 in the master key
- compare your specimens to the statements at each step
- keep following the instructions until you reach the name of a tree

Contents of this key

This identification key is made up of the following sections:

SPRING TREES: CATKIN GUIDE

Your reference guide to catkins of native & common British trees

The COMPLETE TREE ID COURSE

HAZEL
Corylus avellana
Feb - March

GOAT WILLOW (m)
Salix caprea
March

WHITE POPLAR (m)
Populus alba
March

ASPEN (f)
Populus tremula
March

ALDER
Alnus glutinosa
March

BIRCH
Betula pendula & Betula pubescens
late March - early April

HORNBEAM
Carpinus betulus
April

OAK
Quercus robur & Quercus petraea
May

SWEET CHESTNUT
Castanea sativa
June

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Go From Clueless to Confident On Your Journey to Becoming a Tree Expert

Join *The Complete Tree ID Course* Today

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10 Ways to Measure a Tree

A variety of simple and more complex methods to measure the height of a tree

9-12

Estimate & Measure

1) Estimate

Compare the height of the tree to a known object. If your partner is 1.5m tall, is the tree 7 times as high? A football goal is usually 2.44m tall, a car height can be measured and compared etc.

2) Look through your legs

Stand with your back to the tree, about as far as you estimate the tree height is from the tree. Look backwards, through your legs. You are trying to just see the top of the tree. You will need to move towards or away from the tree until you are just able to see the tree top. The distance you are from the centre of the trunk is the tree's height.

3) Use a pencil and a pal

Hold a pencil up vertically at arm's length, with the sharpened tip at the top of the tree. Hold the pencil near the opposite end. Move towards or away from the tree until your thumb lines up with the ground level, while keeping the tip of the pencil on the top of the tree.

Without moving your grip, arm length or feet, turn the pencil horizontally. Line your thumb up with the centre of the trunk on the ground. Get your partner to move out from the tree until their feet are at the tip of the pencil – without walking towards or away from you, only sideways.

The distance from their feet to the centre of the trunk is the height of the tree.

4) Use two people the same height

You need a partner who is as close to your height as possible.

One of you lies down, feet towards the tree, about the distance from the tree that you estimate it high. Your partner stands at your feet.

The person lying on the ground needs the top of their partners head to line up with the top of the tree. You will need to shuffle and wriggle, to move away or towards the tree a few times until you achieve this.

The distance from the lying down person's eyes to the centre of the tree trunk is the height of the tree.

5) Use a measuring stick (Simple version)

Each pair need a stick (a metre rule would also work). You need to hold your arm out, lay the stick on your arm and line the tip of the stick up with your shoulder. Grasp the stick where it lies in your hand.

Hold the stick vertically, without letting it go or moving your hand on the stick. Walk backwoods until the tip of the stick lines up with the top of the tree. Your partner can check that your arm is parallel to the ground and the stick is vertical.

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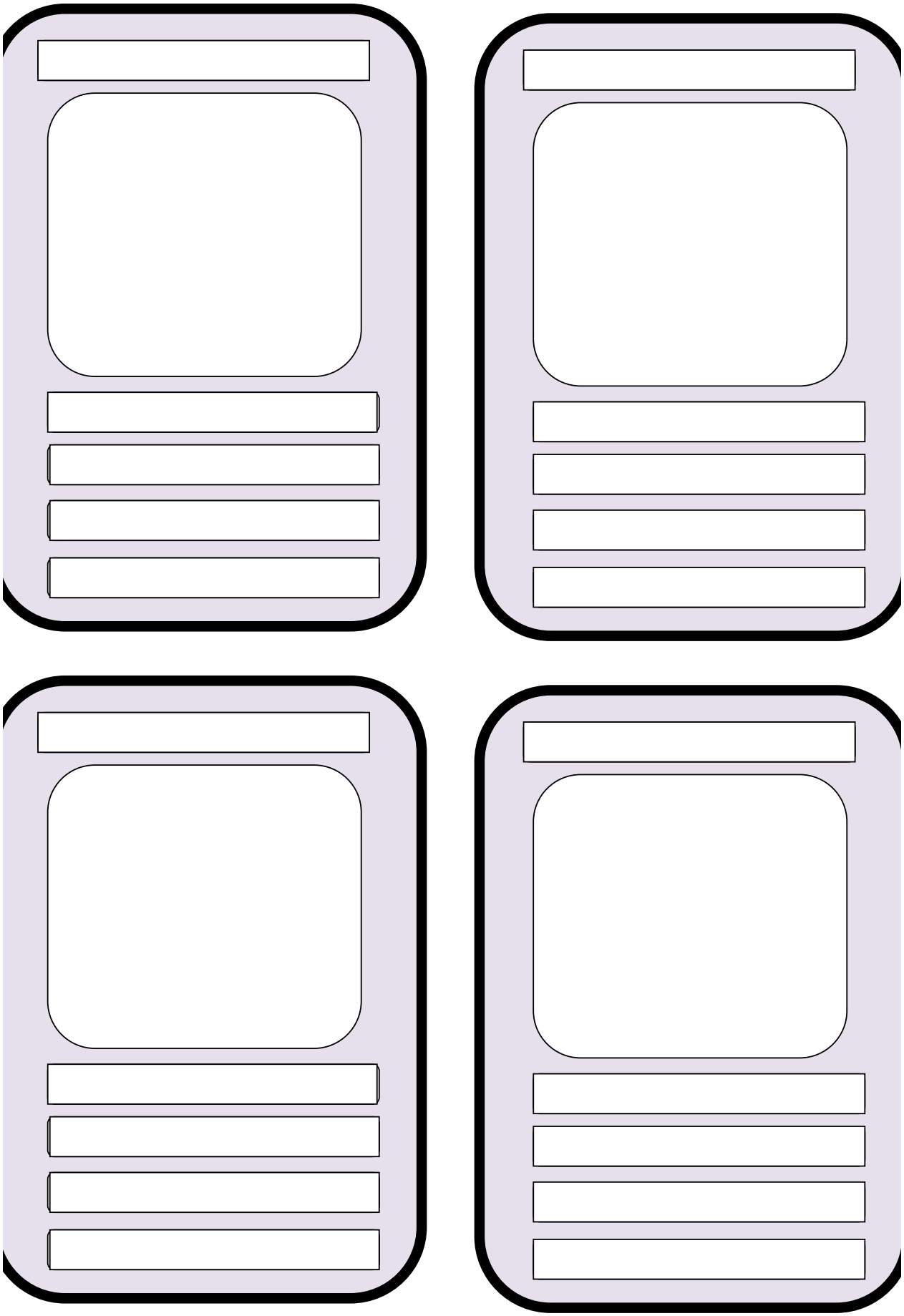
PDF download – Top Trumps template



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Fruits and seeds ID
How many berries, nuts and seeds can you find?

Horse chestnut Conkers

Bramble Blackberries

Oak Acorns

Hazel Hazelnuts

Silver birch Catkins

Blackthorn Sloes

Dog rose Rosehips

Elder Elderberries

Ash Keys

Alder Cones

Rowan Berries

Holly Berries

Beech Nut/Mast

Field maple Helicopters

Lime Seed

Hornbeam Seed

Images: Nature/WTPL Margaret Barton, Pete Holmes, Anna Bickley, Bruce Beattie, Juliana Dirkerhe, Kayleigh Jacobs-Rutter, Sam Oxford-Dean, Ben Lee, Shaun Nixon

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Planting Investigations

Design your own experiments to see what plants need to grow well

5-9

Scientific Enquiry

The process of planting is a real-world basis for mathematical applications and scientific investigations even with the youngest of scientists. The basis of this investigation does however lend itself to more advanced enquiries as well about the impact of soil pH or different fertilisers.

To begin, the children will need to cover the **science** of what a plant needs to grow. They will also need to understand how to plant their seed in the soil: filling the pot with soil, dibbing a hole using a lolly stick and measuring its depth before popping the seed in, covering it over and watering it. This can be consolidated with an **instructional writing** activity and would run well with older pupils supporting younger pupils.

Equipment

- Sunflower seeds
- Squared paper and pencils for recording
- Rulers
- Identical plant pots with drainage holes
- Watering can
- Compost and a little sand
- Sunny, part-shaded and shaded areas

Activity

Identify a plant that you will grow as a class. We would suggest sunflowers. Discuss what a plant requires to grow i.e. soil, nutrients, water, sunshine, carbon dioxide.

Split the children into teams of 3 and allocate each team a variable which they can change over several weeks.

Here are some suggested teams but the children will probably come up with their own:

1)Does it matter how deep you sow the seed?
1 seed planted shallow, 1 planted mid-level and 1 planted deep.

2)Does the type of soil matter?
1 seed planted into ordinary soil, 1 planted in compost, 1 planted in sandy soil.

3)Does the amount of watering matter?
1 seed watered every day, 1 watered every other day, 1 watered once a week.

4)Does the amount of sunshine matter?
1 seed in direct sunshine, 1 seed in a semi-shaded area and 1 in a heavily shaded area

The children will need to agree as class how they measure the impact of their variable. They could look at which seeds germinate first, or they could measure the seedlings each day and see which are the tallest after a given time.

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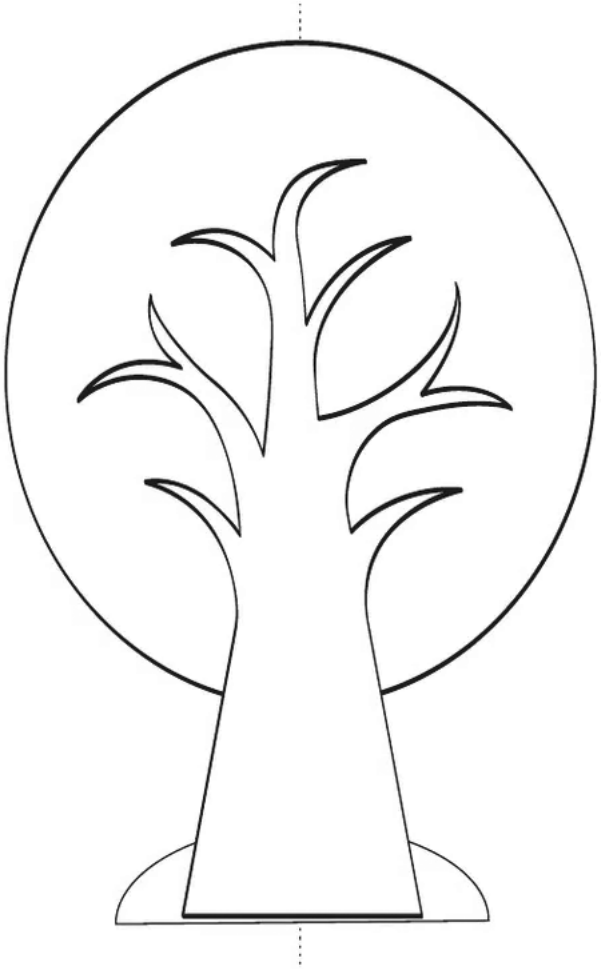
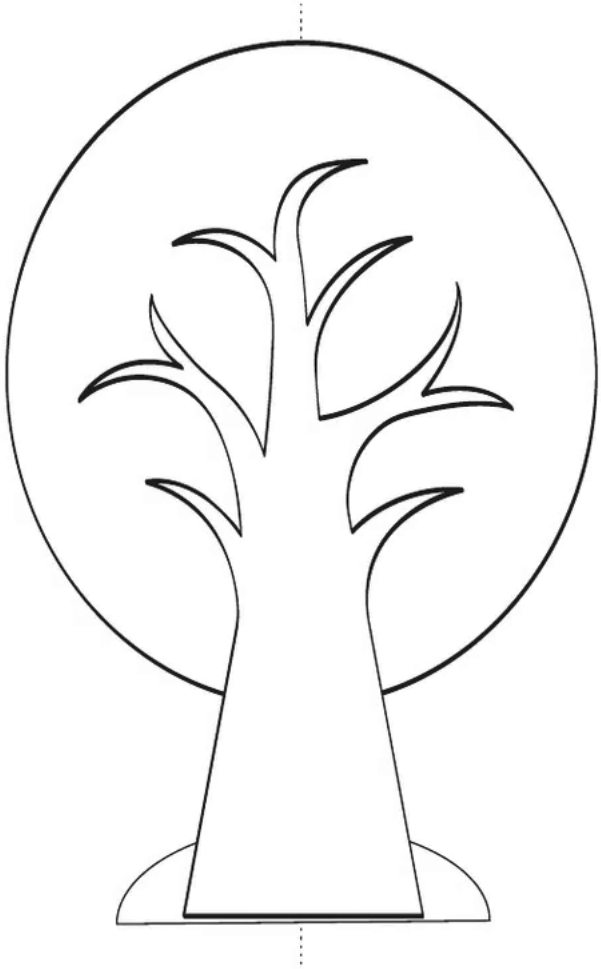
PDF download – Four seasons tree template





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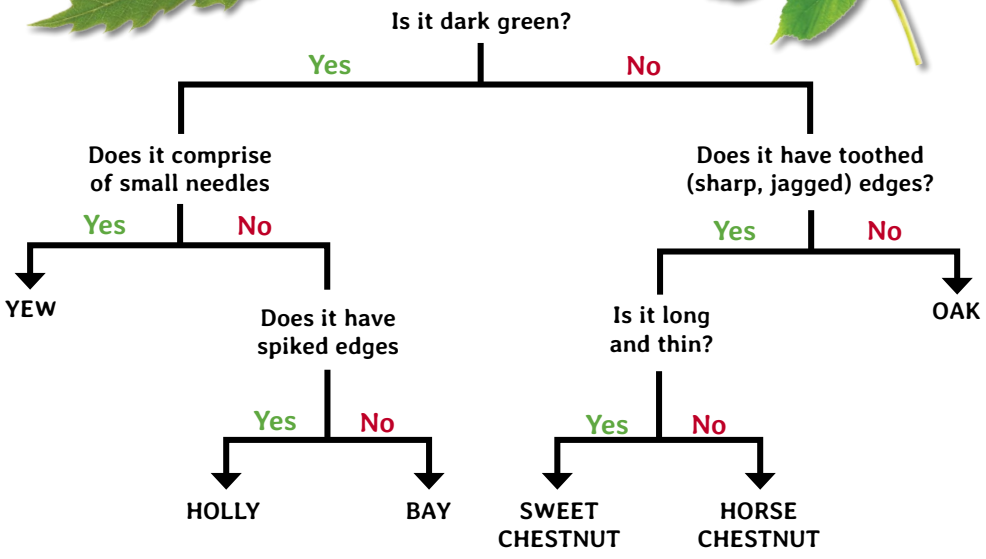
Science Essentials Key Stage 2

Classification Keys

Classification keys are used to sort living things according to their characteristics. They are made up of questions with a "yes" or "no" answer. Have a go at sorting these leaves using the classification key below to discover what tree they come from.



Method:

1. Choose a leaf to classify and start with the first question at the top of the classification key.
2. Follow the branches either "yes" or "no" and then ask yourself the next question.
3. When you have reached the last question, you will know what tree the leaf came from.

1

Risk register

Risk	Considerations
Weather conditions	Hot weather – hats, shade, water. Cold weather – warm clothes, shelter. Wet weather – waterproof clothes and shoes, shelter.
Slips/trips and falls	Sensible footwear. Recce best routes in advance. Main footpaths, mud, cambers, slippery surfaces, roots and rocks etc.
Public highway/traffic	Safe road crossings. Vehicles on site.
Livestock/animal attack	Livestock on site. Dogs on site. Faeces. Opening and closing gates.
Getting lost	Boundaries. Ratios. Recce site in advance to familiarise leaders.
Safeguarding children and child protection	In line with school policy and procedures.
Falling objects	Locations in windy weather. Ash dieback.
Boundaries	Electric fences, barbed wire, gates and latches.
Heights/drops	Steep slopes. Quarry edges etc.
Carrying equipment over long distances	Only take what is required. Split kit amongst the team.
Transport to and from venue	Use of minibus or own cars. Safe parking for loading/unloading.
Bodies of water, mud or bog	Recce in site in advance to familiarise leaders. Avoid close contact if possible.
Minor injuries	First aider. First aid kit.
Medicines	In line with school policy and procedures.
Emergencies	In line with school policy and procedures. Know What3Words location of your site and vehicular access points.

Contact details

This learning pack has been put together by the Cotswolds National Landscape team, with support from the Cotswold Way Association.

Cotswolds National Landscape

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