

A Treescapes Curriculum

Activities for learning with local trees and woods

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UK Research
and Innovation



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PREFACE

This toolkit supports learning with children and young people in and around trees. If you are a teacher or other educator keen to develop outdoor learning or interdisciplinary learning on the natural world, you will find ideas and practical activities here. Some activities are for visits to woods while others focus on individual or small groups of trees. Some are for the classroom or between the classroom and outdoors. The point is not to teach children about trees – although that is likely to happen along the way – but to use trees and woods as a resource for learning.

We think that all areas of the curriculum can be explored outdoors as well as in the classroom and there are many benefits to outdoor learning. Once outdoors, trees and woods can provide a focus and structure for learning activities. This is the treescapes curriculum.

The research team gratefully acknowledges everyone who took part in our project, especially the children and young people we learned about treescapes with. We also acknowledge our colleagues across in the UK in the ‘Voices of the Future’ project who have helped shape this toolkit.

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If you use this resource, please let us know how you got on by completing our feedback form:

[A Treescapes Curriculum - feedback form](#)

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INTRODUCTION

This toolkit comes from a research project on learning with treescapes. Treescapes are what we call landscapes where trees and woods play a prominent role. We have experimented with all the activities in the toolkit and reflected with children on what we learned from them. As well as descriptions of the activities, we provide information on what happened when we did them and what their value to the treescapes curriculum could be. We also connect to the Scottish Curriculum for Excellence, although educators and outdoor leaders beyond Scotland will find the toolkit useful too.

How to use the toolkit

Educators and outdoor leaders should take a long-term approach to this resource. Can you use it across a term, a school year, or longer? Consider what a treescapes project would look like in your setting. Could it focus on a particular curriculum area or as interdisciplinary learning? What treescapes resources do you have nearby – is there a school field or grounds with trees? Is there a local woodland that is accessible?

We include insights from a primary school that planted a small woodland on their field, which became a new learning resource. Classes in another school were able to walk out to nearby parkland with mature woods in it. When you have thought about your local resources, think about which activities could work for you to engage children with trees and their local environment. Find out from the children what they would like to learn about too.

You may wish to make links with other professionals who work in this field, such as university researchers, your local council, land managers or forestry specialists. We also encourage educators and schools to develop their own approaches and their own expertise. Nobody will know your local environment better than those who live and work there, and through these activities – with some background work where necessary – you and your school will develop your own knowledge.

Most activities in this toolkit can be adjusted for numbers and ages of children. Our focus was largely on primary school children, but secondary schools may also find many aspects useful and we have included Scottish Curriculum for Excellence references through to the BGE phase, generally up to S3. We have worked with students in Senior phase at secondary school and in further and higher education too and many of the activities can be used for any age or level of participants. Treescapes learning can even provide an opportunity to connect with parents/carers and the wider community.

The toolkit has four themes:

1. Sensing trees and learning with bodies.
2. Trees and time: past, present, future.
3. The tree as a lifeworld.
4. Tree and soil ecologies: collecting, identifying, measuring.

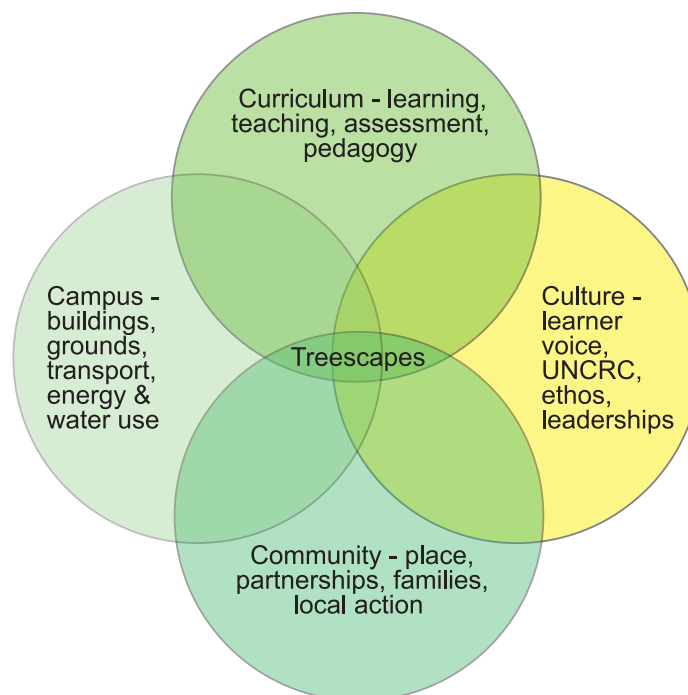
The themes cover different ways of learning with trees and their ecologies. Each starts with a brief introduction that includes links to the Curriculum for Excellence. You could focus on one theme at a time, or you might choose to try some activities from each. The activities also involve different skills. In some children will be stationary (e.g. drawing), while others require movement (e.g. egg box collecting or leaf identification). We recommend combining activities so that children get time to move about and to be still.

The value of a Treescapes Curriculum

This toolkit is designed as a starting point for embedding curricular learning in outdoor learning. For those following the Scottish Curriculum for Excellence (CfE), you will find that many **subject areas, skills, and themes in Interdisciplinary Learning** can be explored with your local treescapes. We have provided links to different parts of the CfE at the start of each theme.

Learning with treescapes is one way of meeting children and young people's entitlement to **learning for sustainability** set out in the Scottish Government's Learning for Sustainability Action Plan 2023-2030. This toolkit addresses the four goals for Sustainable Learning Settings:

- **Curriculum:** Many CfE subject areas are covered with a range of inclusive pedagogies. Sustainability together with key environmental issues such as climate change and biodiversity can be explored across the curriculum using treescapes.
- **Culture:** Treescapes allow children to gain their own experience in the environment and express themselves in a variety of ways. Rather than conveying information, these activities empower children to respond and find out for themselves – supporting the UN Convention on the Rights of the Child (Article 29 on goals of education).
- **Community:** Outdoor learning beyond the school gates can help develop partnerships for sustainability with landowners or managers, volunteer groups, and researchers as well as parents / carers. Children's active roles are vital as they will be the ones to look after our treescapes in years to come.
- **Campus:** The activities here provide opportunities to use what is available in school grounds or nearby green spaces, and new treescapes can be planned too – perhaps starting with sowing your own tree seeds. This toolkit encourages sustainable and community-focused management of treescapes around schools and other learning settings.



Scottish Government's Sustainable Learning Settings, with treescapes at the centre.

The activities are designed to be accessible to all learners and focus on children and young people's curiosity and ability to ask and respond to questions. Teachers we worked with often talked about the **inclusivity of outdoor learning**. Research by Forest Research (Outdoor learning: closing the attainment gap in primary schoolchildren in Scotland) shows that learning with trees, like outdoor learning more generally, can provide an 'equitable environment'. Children can lead their learning and develop problem solving skills and social skills needed to work well cooperatively.

Whilst this toolkit points to specific parts of the CfE, teachers will also find their own connection with CfE outcomes and skills. We invite you to record your own experiences of the activities as a way of mapping how learning with trees opens up different areas of the curriculum. We call this **finding and enacting the curriculum outdoors**.

From a pedagogical perspective, this toolkit is also underpinned by Green and Clark's idea of **slow pedagogy** (Time for childhood: Slow pedagogy). As the name suggests, this is about slowing down the pace of learning and giving children time to be with their learning in a sustained and deep way. It encourages teachers to pay attention to the pace at which children are learning and to provide opportunities to revisit places, ideas and creations. Many of the activities here can be done on a regular basis in different seasons and weather conditions. Each time children come back to the trees, they will learn something different.

We hope that the activities in this toolkit support you and the children and young people in your setting to develop your own ideas for learning with trees.

Learning for Sustainability Action Plan 2023-2030

Outdoor learning: closing the attainment gap in primary schoolchildren in Scotland

Time for childhood: Slow pedagogy

Let's keep in touch!

We are a team of researchers at the University of Aberdeen. Our project is called 'Voices of the Future: Collaborating with Children and Young People to Re-imagine Treescapes'. It involves researchers across the UK and you can find out more at Treescapes Voices.

As researchers we would love to hear about how you have used this toolkit. Please fill in our feedback form using the link below.

Or get in touch with the University of Aberdeen team:

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You can find out more at:

Treescapes Voices

A Treescapes Curriculum - feedback form

Theme 1: Sensing trees and learning with bodies

These activities are about experiencing wood, trees and treescapes as they appear to us. They can be done in the school grounds or the local community. They assume little or no background knowledge but they allow us to be open to the unexpected and what is usually not thought about. They encourage children and young people to trust and validate their own experience in the environment. Learners can explore trees at their own pace, which leads to conversations about tree ecologies too.

While this perspective is certainly helpful for outdoor arts and literacy activities that traditionally centre subjective experience, we think that allowing children and young people to sense trees themselves is important for generating all kinds of knowledge about the environment. Science also often relies on being comfortable and confident outdoors, and on the researcher (young or old) trusting what they experience. Learning to see, listen, touch and draw is important to all of this.

Links to the Scottish Curriculum for Excellence

Activity	Curriculum descriptor and Outcomes & Experiences	Curriculum skills
Finding wood in the classroom	Technologies Recognising and understating the properties and performance of materials. TCH 1-10a, TCH 2-10a, TCH 3-10a, TCH 4-10a	
Walking to the woods	Social Studies Appreciate the wonder of nature. SOC 0-08a Encourage others to care for their environment. SOC 1-08a Be able to discuss the impact of human activity. SOC 2-08a Be able to discuss the possible consequences of an environmental issue. SOC 3-08a Can discuss the sustainability of key natural resources. SOC 4-08a	Social Studies Observing, describing and recording.
Listening in the woods	Science: Biodiversity & Interdependence Distinguishing between living and non-living things and classification. SCN 1-01a, SCN 2-01a, SCN 3-01a	Sciences observing, collecting, measuring and recording.
Meet a tree	Science: Biodiversity & Interdependence: overall across all levels Learners explore the rich and changing diversity of living things and develop their understanding of how organisms are interrelated at local and global levels	Social Studies Observing, describing and recording.

<p>Meet a tree (cont'd)</p>	<p>Literacies As I play and learn, I enjoy exploring interesting materials for writing and different ways of recording my experiences and feelings, ideas and information. LIT 0-21b I can describe and share my experiences and how they made me feel. ENG 1-30a I can describe and share my experiences, expressing what they made me think about and how they made me feel. ENG 2-30a I can recreate a convincing impression of a personal experience for my reader. ENG 3-30a, ENG 4-30a</p>	<p>Literacy Making meaningful links for learners across different curriculum areas.</p>
<p>Drawing trees with charcoal</p>	<p>Expressive Arts, Arts & Design Create a range of visual information. EXA 0-04a, EXA 1-04a Can show awareness of detail. EXA 2-04a Can show accuracy of representation. EXA 3-04a Can demonstrate skills of observation and visual recording skills. EXA 4-04a</p>	<p>Expressive Arts Developing skills specific to the expressive arts and those which are transferable.</p>
<p>Outdoor weaving</p>	<p>Science: Biodiversity & Interdependence Distinguishing between living and non-living things and classification SCN 1-01a, SCN 2-01a, SCN 3-01a</p>	<p>Expressive Arts Developing skills specific to the expressive arts and those which are transferable.</p>
<p>Tree shapes with body and weather interactions</p>	<p>Expressive Arts: Dance Linking this activity to dance demonstrates how one area of the curriculum can support learning in another. Inspired by a range of stimuli, I can express my ideas, thoughts and feelings through creative work in dance. EXA 0-09a, EXA 1-09a, EXA 2-09a</p>	<p>Science learning and teaching approach Active learning an planned, purposeful play. Science Careful observation of how something behaves, looking for changes over time and exploring ‘what happens if...?’ and ‘how could I...?’ questions.</p>

Finding wood in the classroom

Age: 5+

Time for activity: 10 minutes + 10 minutes extension.

Materials: None, although woodworking tools could be brought in for the extension activity.

Preparation time: None

Location: Classroom

Number of children: Whole class.

Ask the children to look around their classroom and make a list of everything that is made of wood. This could include objects such as pencils and paper, furniture such as cupboards, and parts of the classroom itself such as skirting boards. Children can either report back by raising their hands in a class discussion or write a list.

Wood can be used in lots of different forms. Are there any whole pieces of wood in the classroom? Or are they all in processed or pulped forms (like woodchip or paper)? Is there anything that might have been made of wood in the past that is now made of plastic or other materials? This might be a useful question if there are not many wooden items in the classroom.

Extension:

Following this, we showed the children some woodworking tools which we brought in, including a plane and wood shaving tools. Together we practiced the gestures with our hands and arms that a woodworker would use with the tools.

What happened when we did it:

The children in our P4 class found a range of wooden items in their classroom ranging from pencils to furniture. We questioned what things were made of and how we could tell. We also talked about the processes by which wood comes to be used in these very different ways (e.g. chipping wood and glueing it together to make chip board).

Value for the treescapes curriculum:

This activity draws attention to the range of ways in which wood is used and the different material forms that wood can take in the modern world. It opens up the idea of being amongst materials rather than simply objects.

It can also help us think about links between the things that we use and the landscapes that we live in. These days these links may not be very obvious in many cases but in the past they may have been much stronger, especially when wood was much more widely used. Following this activity by working out in the woods can help think about the sustainability of using wood as a material.

Walking to the woods

Age: Any

Materials: None

Location: On the way to and from the woods.

Time for activity: Flexible

Preparation time: None

Number of children: Any

If your session with trees or woods involves a walk, perhaps from the school to a local woodland, then you have an opportunity for observation and discussion along the way. What do you notice about trees, hedges, other growing plants or animals that you might come across? The class leader can pause now and again to draw attention to what's going on. The point is not to convey any specific knowledge or learning, but to show that treescapes learning can take place anywhere. Walking creates an informal learning environment where the usual hierarchies of teacher-learner are broken down. Children can be encouraged to make their own observations and to ask questions. They may notice something no-one else has.

Extension:

Points raised during a walk can be returned to later, either in the woods or back in the classroom. They can help set the agenda for further learning and show children that their observations are valid and useful.

What happened when we did it:

One of our schools was situated ten minutes' walk from the wood we were using, through parkland with some trees. We often stopped to look at seasonal features of the trees, such as the blossom of a hawthorn, the seed cases of a beech or the evergreen leaves of holly. We spotted slugs, snails and insects on plants along the path.

Value for the treescapes curriculum:

Being on the move is a different way of learning about trees and woods that we may not often value. It allows everyone to observe and talk about the natural world and can help overcome the differences between teachers and learners.

We can all do more to notice our trees and other aspects of our local environment that so often form the background to our everyday lives. When we pay attention, there is much to see and talk about. We are more likely to be able to look after our environment if we find out what is going on around us as we move around.



Listening in the woods

Age: Any

Time for activity: 5 minutes. The period of quiet time can be built up with practice.

Materials: Sitting mats or a tarpaulin

Preparation time: None

Location: In the woods.

Number of children: Whole class

This is a 'mindfulness' exercise that encourages calm, while also opening everyone up to things going in and around the trees. Children can either find their own space in the wood with a sitting mat, or sit in a group around a tarpaulin. Everyone closes their eyes and listens to whatever sounds may be heard. After a minute or so, the group shares what they have heard. Alternatively, with eyes open they can point to where they hear a sound. Afterwards they can draw a 'map' of the sounds and what may have made them. If there is dry grass, everyone can lie down on their back and close their eyes. Be aware of breathing and allow senses to shape the time. This can be done at beginning and end of a session as a tune-in or a relaxation.

Extension:

The teacher can make a list of the children's responses and use them as the basis for further classroom work, e.g. literacy work on poems or creative writing.

What happened when we did it:

With the right encouragement we got this to work with all our classes. Children noticed both 'natural' sounds of birds or the wind in the trees, and other sounds of themselves, people nearby, and traffic. In spring and summer we heard different bird calls and talked about which birds were making them. On completing the exercise we felt the children had tuned in to the wood and were ready to concentrate on further activities.

Value for the treescapes curriculum:

As well as being an enabling exercise to focus the class, this activity shows how sound can be important in learning about the environment. It raises further questions about the source of the sounds and what ecological effects they might be having – does lots of traffic noise mean birds find it harder to hear each other? How might the wind be affecting how the trees grow (see 'tree shapes' activity)?



Meet a tree

Age: 5-12

Time for activity: 10-15 mins

Materials: Scarves can be used for blindfolds if desired.

Preparation time: None

Location: In the woods

Number of children: Whole class

This activity encourages children to pay close-up attention to trees in the wood. The class is split into pairs of children. One chooses a tree. The other closes their eyes or is blindfolded and carefully turned around to disorient them. They are led in a meandering fashion to the tree. The partner ensures the other is safe, leading them slowly and warning of any obstacles. Once at the chosen tree, the person reaches out their hands and can touch, smell, walk around the tree without opening their eyes. Encourage them to notice any specific features. Then the person is carefully led back to the start point and can open their eyes. They then try to find the tree. Then swap roles.

Alternatively, this can be done in small groups without blindfolds or closing eyes – simply ask each group to find an interesting tree and spend some time exploring it together. The class then visits each tree in turn and each group introduces their tree to the others, talking about what they like or have found out about it.



What happened when we did it:

In a couple of our classes we asked the children to think about the character of their tree as if it were a person, and even giving it a name. A holly became Prickly Pete ('don't get on the wrong side of him'), while an old beech with missing limbs was Chopper. The children remembered the names over subsequent sessions. Asking the children to describe their tree opened onto literacy possibilities that one teacher helped the class develop into poetry back in the classroom.

Value for the treescapes curriculum:

This activity involves all the senses in gaining knowledge about trees and the natural environment. Even if the sighted version is used, children should touch and get up close to their chosen tree. It can be the basis for further ID work as the characteristics of different trees are noticed, such as stage of growth, bark, shape of the tree and branches, etc. Arts practices including poetry and drawing can also lead on from this starting point.

Tree shapes with body and weather interactions

Age: 5-12

Time for activity: 15-30 minutes.

Materials: Drawing materials if desired.

Preparation time: Find a place where trees of different types and growth can be seen by the class. Take some time to think about why the trees may be growing in the way they are.

Location: Outdoors – trees in the immediate school environment could work well.

Number of children: Whole class

This is about recognising the different ways that trees grow. They respond to both human intervention and the environmental conditions. The activity here works well in winter because the whole shape of the trees can be seen more clearly. The teacher and any other adults work with the class as a whole, using questions to support pupils in observing the trees. We start with a question and answer part geared to observing the shape and condition of the trees.

Some trees may have been pollarded (cut back to the main trunk or central limbs) or pruned into a certain shape. Why? How do these trees differ from others nearby? Other trees may have been affected by shade or crowding from neighbours. What direction are they growing in, and why? Some may have been exposed to strong winds and bent to survive.

Next, ask the pupils in small groups of two or three to come together and form the shape of a specific tree with their bodies. One might be the roots on the ground, others may be the trunk and branches going in different directions. Why are you growing in this shape?

Put your 'trees' into a line. The adults become the wind, blowing from a certain direction. Which way will the trees bend? Now, the adults are a wall next to the trees. Which way will they go to get light? What other environmental conditions might make a difference to how the trees grow?

Extension:

Now that the class has carefully observed the shape of the trees and how they are growing, they can try drawing one (e.g. see activity 'Drawing trees with charcoal').

What happened when we did it:

We often asked our classes to become the shape of their trees. The children enjoyed this but they also had to look carefully at the trees and consider how they would work together to match the trees as closely as possible. Bringing in learning about the environmental and human effects on trees made for rich conversations about how trees and indeed other plants grow. We talked about how some trees had been pollarded to stop them taking up too much space in the school car park. Mature Sycamore trees across the road from the school could be seen growing towards the south and west where their main source of sunlight was coming from.

Value for the treescapes curriculum:

This activity mixes ecological learning with physical and social interactions, and creative practice in performance and art. It is a good example of interdisciplinary learning that can take place outside in quite easily in the school grounds or nearby.

Resources: We recommend Tristan Gooley's book 'How to Read a Tree' as a great source of insight into how and why trees grow like they do.

Drawing trees with charcoal

Age: Any

Time for activity: 15-20 minutes.

Materials: Large pieces of paper, e.g. from a roll of parcel wrapping paper cut into sections. Willow charcoal sticks for drawing, available from art suppliers. Fixing spray may also be useful.

Preparation time: None.

Location: Outdoors.

Number of children: Flexible.

During a visit to a wood, children are asked to choose a tree and draw it with charcoal. Each child receives a large piece of paper (e.g. 75cm x 50cm) and a piece of willow charcoal for drawing. The charcoal can be broken into smaller pieces for the children. Children will need to find a tree and position the paper on the ground in such a way that they can draw the tree. They should be encouraged to look carefully at the tree, including the shape and textures of the trunk and branches. They should try and fill as much of their paper as possible with the tree.

Charcoal is an excellent material for outdoor drawing as it enables large, quick and confident line making and textures. Its messiness is less of an issue outdoors, although children's hands may get dirty and they should be careful not to get their clothes dirty. Charcoal is partly burned wood, so the activity involves drawing wood with wood, on wood (though paper is made from other things as well as wood). Using an art fixing spray will help stop pictures from smudging after they are finished.

Drawing trees can be difficult as they are complicated objects. Questions can be posed by the teacher to lead the children through the activity. Ask them to look at the ground below a tree. What do they see? Roots. Then what is above the roots? The trunk. How far up before branches come off it? Which direction are the branches? What shape are they, straight or bendy? What's on the branches, any leaves, flowers or fruit?

Extension:

Children can learn the names of the tree species they are drawing and think about what makes each kind of tree distinctive. Why is each tree growing in the shape that it is?

What happened when we did it:

Many groups of children enjoyed carrying out this activity with us. Everyone was able to produce a large and distinctive drawing of their tree. Some children worked very carefully to create a careful representations of shape and texture, while others worked more loosely but still enjoying the use of charcoal outdoors. In one group children added materials from the woodland floor to their drawings which we documented by photography. At the end, we gathered all the drawings together to make a woodland art gallery before taking the pictures back to the classroom where they could also be displayed.

Value for the treescapes curriculum:

Children learn that trees grow in distinctive and individual ways. In the classroom, if children are asked to draw a tree, they are likely to draw a thick, brown, straight trunk and bushy green foliage. Outdoors, they find that trees are an enormous variety of shapes and textures. This links both to woodland ecology and to developing the children's capacity for observation and making art from real life.



Theme 2: Trees and time: past, present, future

Two senses of time can be explored with this part of the toolkit. Firstly, because they are long-lived relative to people, trees can help us think about time beyond our own experience in the past and the future. Mature trees will have been planted before children were born and perhaps before any of us were alive. What might they have ‘seen’ over that period? And young trees being planted now might be around long into the future, so what might happen to them and around them? Trees help us connect between past, present and future.

Secondly, trees change with the seasons and year by year. You can see what signs of each season can be found in the woods, or try planting tree seeds and watch them grow and change. Time is marked by these sometimes subtle or sometimes dramatic changes. In this way, we could reflect on how we experience the passing of time in our daily lives.

Links to the Scottish Curriculum for Excellence

Activity	Curriculum descriptor and Outcomes & Experiences	Curriculum skills
Treescapes in the past, present and future	Social Studies: People, past events & societies Understanding and using different kinds of evidence for life in the past. SOC 0-01a, SOC 1-03a, SOC 2-02a	Social studies: Comparing and contrasting to draw valid conclusions. Exploring and evaluating different types of sources and evidence.
Sowing tree seeds	Sciences: Biodiversity and interdependence Growing plants from seed and monitoring their growth and flourishing. SCN 0-03a, SCN 1-03a, SCN 4-02a	Sciences: Making predictions, generalisations and deductions.
Seasons with trees	Sciences: Biodiversity and interdependence Overview across all levels: Learners investigate the factors affecting plant growth and develop their understanding of the positive and negative impact of the human population on the environment.	Sciences: Observing and exploring, careful observation of how something behaves, looking for changes over time and exploring ‘what happens if...?’ and ‘how could I?’ questions.
Pollen analysis: ‘Palynologist for the day’	Sciences: Biodiversity and interdependence I can distinguish between living and non living things. I can sort living things into groups and explain my decisions. SCN 1-01a I can identify and classify examples of living things, past and present, to help me appreciate their diversity. I can relate physical and behavioural characteristics to their survival or extinction. SCN 2-01a	Sciences: Drawing conclusions based on reliable scientific evidence

<p>Pollen analysis: ‘Palynologist for the day’ (cont’d)</p>	<p>I can sample and identify living things from different habitats to compare their biodiversity and can suggest reasons for their distribution. SCN 3-01a</p> <p>I understand how animal and plant species depend on each other and how living things are adapted for survival. I can predict the impact of population growth and natural hazards on biodiversity. SCN 4-01a</p>	
	<p>Numeracy: Data handling</p> <p>I have used a range of ways to collect information and can sort it in a logical, organised and imaginative way using my own and others’ criteria. MNU 1-20b</p> <p>I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way. MNU 2-20b</p> <p>I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology. MTH 2-21a, MTH 3-21</p> <p>I can select appropriately from a wide range of tables, charts, diagrams and graphs when displaying discrete, continuous or grouped data, clearly communicating the significant features of the data. MTH 4-21a</p>	<p>Numeracy: Information handling. Data and analysis.</p>
	<p>Social Studies: People, past events and societies</p> <p>Understanding and using different kinds of evidence for life in the past. SOC 0-01a, SOC 1-03a, SOC 2-02a</p>	<p>Social Studies: Developing the capacity for critical thinking through accessing, analysing and using information from a wide variety of sources.</p>

Treescapes in the past, present and future

Age: 7+

Time: One hour classroom based, 20 minutes outdoors.

Materials: Printed maps.

Preparation time: Time will be needed to prepare digital and printed resources.

Number of children: Whole class.

Depending on where and when your school was built, there will be different evidence for what the area around the school looked like in the past and how far back in time you can trace it. In our experience of working in primary schools, many children find it difficult to imagine the places where they live in the past or what the same place will look like in the future. Because trees can live for a long time and woods may survive for centuries, they are a great way to get the class thinking about the links between past, present and future in their local environment.

Start in the present. It is important to think about what children already know about using and reading maps and using clues in images to decide where in a timeline they fit. Using a mapping website or app projected onto a whiteboard is a really good way into exploring the local area as a class. You can start by finding where the school is and then with the help of the children identify features of their local area that they know well.

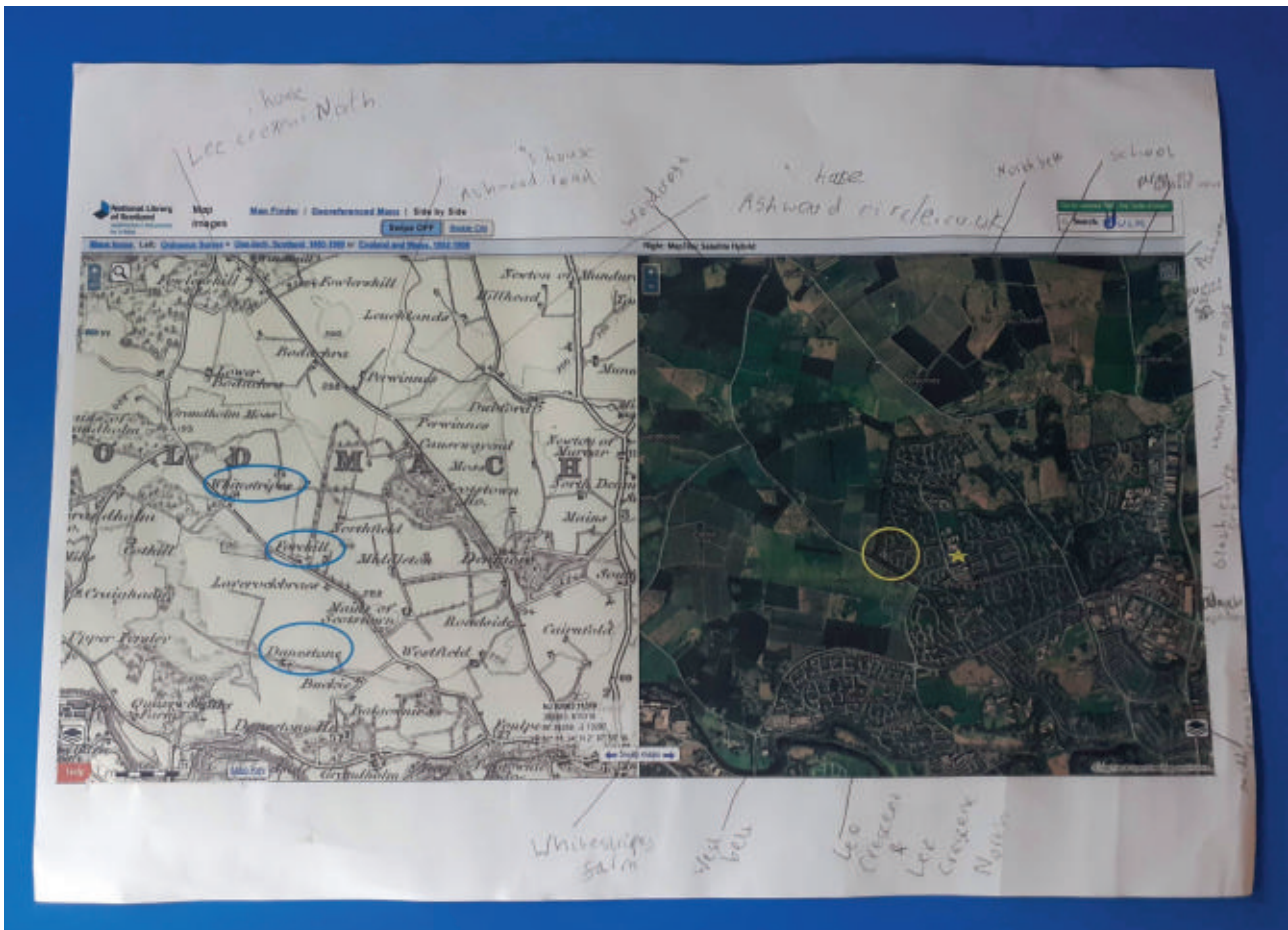
Once children are comfortable finding things they know on the map, you can ask them to find the trees and treescapes in which they play or they walk through, or if you regularly visit a wooded area as a class to find that. You can then switch between street view and map view and ask them to identify the same features. Once they have become familiar with their local area on a map, you can then introduce historic maps.

Using old maps: Two activities

- Build a set of slides or presentation starting with a contemporary map and then go back in time by looking at older maps. Ask the children what they notice about their local area as they travel back in time.
- Give groups of children a set of printed maps from different points of time and ask them to sort them into chronological order. Discuss why they made the decisions they did and what they notice about how the local area has changed in relation to trees.

Compare and contrast: A3 map

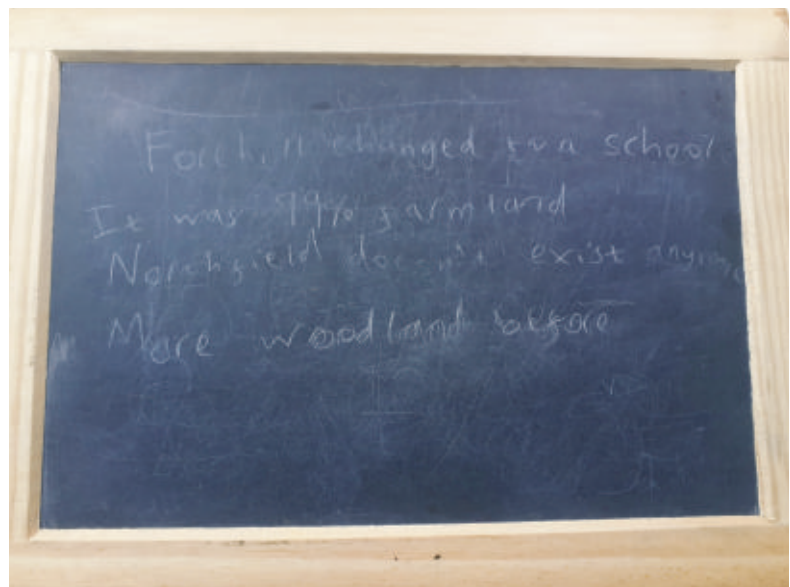
- Create a slide or digital poster and divide it into two halves, top and bottom. Insert a copy of First Edition OS Map of your local area in the bottom half of the slide and insert an up-to-date map of the same area in the top half of the slide. Print out the slide as an A3 poster and laminate if you wish.
- This can be used outside the classroom for children to find and identify the similarities and differences between the two maps in the local environment. This will work well if you have a slightly higher viewpoint from your school playground to the surrounding area. Or are there high windows in the school they could look through?
- A variant of this is to use a Google map or equivalent (try satellite or road map views) as the up-to-date aerial view of the local area. This can be used in the classroom for children to identify and use whiteboard pens to circle where the school is, where they live and any local woods.



Extension: Imagining the past and future of trees

This activity links to the large charcoal drawing activity. Once children have had the opportunity to explore what their local area looked like in relation to trees and treescapes in the past and to identify trees which have been there a long time, then this can be incorporated into drawing trees in situ. You will need large sheets of brown paper or other drawing paper and charcoal and a selection of trees outside for children to draw.

Divide the sheets of paper into three. Ask the children to draw a picture of a tree and what surrounds it in the middle section of the paper and then on one side of the paper a picture of what the tree would have 'seen' in the past and what it might 'see' in the future.



What happened when we did it:

One of the schools we worked with was located on the edge of the city and the children carried out tree based learning in the remnants of woodland planted between what had been fields and small wooded areas which had formed part of a country estate.

By making comparisons between a first edition OS map of the area near their school with a contemporary map of the same area, children were able to see that before the 1970s all of the land which is now occupied by their homes was a network of small farms and country estates.

We began the activity with a short slide presentation of old maps and photographs of the woodland near to the children's school. If you are working with your class of older primary aged children, then you can support them to explore digital archives and select historical maps and old photos to create their own presentations of the history of their woodland.

Value for the treescapes curriculum:

Children and young people encounter trees in the present, on their way to school, in gardens, parks and in the countryside. Learning about the history of trees and treescapes in the local area helps children to conceptualise how a place and what grows in it changes over time.

Understanding that the environment is dynamic and that the trees and treescapes children experience in the present have not always been there helps them to imagine what these might look like in the future. By exploring old maps and photographs, children can develop a deeper understanding of how people's everyday lives impact what grows in urban and rural areas. Through the exploration of historical evidence children can see things like the laying out of public parks and gardens, or the planting of beech trees to line the road up to a 'Big' house in the countryside or lines of mature trees planted at the edges of fields to protect them from the wind or to shelter animals.

Resources: Apps and websites such as Google Maps, Open Street Map, Digimap, National Library of Scotland maps (see resources at the end of this toolkit). You can also contact your local library service or archives for access to historical maps.

Sowing tree seeds

Age: Any

Time for activity: 30 minutes, flexible. Monitoring can take place over the following year.

Materials: Tree seeds, small plant pots, compost / soil, small stones for drainage (optional), stick labels and marker pen plus paper or computer, spoons or small trowels for potting up.

Preparation time: Time will be needed to collect and buy materials. Children may be able to bring in their own seeds.

Location: Classroom / messy play area, or outdoors.

Number of children: Flexible.

Sowing tree seeds is straightforward and very rewarding. You can replicate natural conditions, by collecting seeds in the autumn, sowing them and leaving them outside over winter to germinate in the spring. Seeds taken indoors may germinate much sooner.

Children could be involved in collecting seeds from a school wood or their local area. Conkers (Horse chestnut), acorns (oak), sweet chestnuts, beech, sycamore and many others can be tried. Trees that produce berries rather than nuts (e.g. wild cherry, rowan) will need to have the seeds extracted from the fruit.

If using stones for drainage, place a layer of stones at the bottom of a plant pot and fill with soil or compost. Tuck a tree seed into the pot (e.g. twice as deep as the size of the seed) and cover with more soil. We recommend adding a stick label with a number written in marker pen, and using that to keep a list on paper or a computer of what kind of seed is in each pot, and if you like who planted it. A larger collection of sown seeds is more likely to generate some successful germinations.



Pots can either be placed outside in a safe space for the winter (i.e. not in open playground) and / or given to the children to take home. In the spring, you can see what has germinated and the children can make decisions about what to do with their new trees. If they are to be kept, they will need to be potted on and eventually planted out. Their growth can be observed over time.

Extension:

Longer term observation and monitoring can be carried out. Children can discuss what conditions are needed for seed germination and why some seeds germinate at different speeds. How can young trees be looked after in the longer term?

What happened when we did it:

We carried this out with our after-school Gardening Club. Our tree seed station had space for about four children at a time and supervision was needed. Children were very keen on this and continued sowing until all our seeds were used. We left the seeds outside over the winter in a safe place in front of the school (not in the playground) and while not all germinated, we had plenty that did, especially sycamore and oak. Seeds taken indoors also showed some success. Children commented that they did not know it was possible to plant seeds and grow trees in this way.

Value for the treescapes curriculum:

This activity shows that trees can be grown quite easily. While children are often involved in tree planting, this usually involves trees that are already two or three years old. Instead, we can explore the earliest life of a tree that are usually hidden in tree nurseries. While your germination rates may not be as good as a professional set-up, children can consider the factors behind this and feel a sense of involvement in helping to grow new trees simply from seeds.

Seasons with trees

Age: Any

Time for activity: Flexible, can be expanded with other activities.

Materials: Clipboards and writing or drawing materials could be helpful.

Preparation time: None

Location: In the woods, extensions back in the classroom.

Number of children: Whole class

This is about learning from trees according to the different seasons. It works well over two or more sessions. Session 1 could introduce pupils to trees through the 'Meet a Tree' activity. This could be their designated tree through the seasons.

The structure of a tree can be discussed with younger classes ('The Rattlin' Bog' is a great song for this). Roots, trunk, branches, twigs and leaves can all be found and shown. How does the tree receive food and water? Introducing photosynthesis or other physical processes can be started here and explored in more detail back in the classroom.

Ask the children to use words or pictures to show the shape of the tree. What colour is the bark? How are the branches growing? What are the shapes and colours of buds, flowers, leaves and / or fruit? Think about the signs of the season that the tree shows. This can be developed further in Session 2 with specific activities around the seasons. For example:

Autumn:

Autumn leaves – why do leaves change colour? What stages are different kinds of tree at? Try some leaf art using leaves with different autumn colours.

Look at fruit and seeds from the trees – how do they help different trees reproduce?

Any indication of what creatures are using the tree?

Collect the seeds – draw, study with magnifiers, sow the seeds (see 'Tree seed sowing' activity).

Winter:

Quiz – try winter bud identification and tree shapes.

Find words or pictures to describe how forest or tree looks without leaves.

How and why do evergreen trees keep their leaves or needles?

If there is snow or mud, are there any animal or bird tracks that can be identified? What are animals, birds or insects doing at this time of year?



Spring:

Look at new growth. Can we tell where the recent growth on the tree is? For overall tree growth we can measure its height (see 'Measuring tree height' activity) or diameter – foresters use 'Diameter at Breast Height', the diameter of the tree trunk measured at 130cm above ground)

Which trees come into leaf early, and which later?

Find words or pictures to describe buds swelling, new leaves and flowers.

What other signs of spring can we find in the environment? (think about temperature, wind or other weather, other flora and fauna).

Summer:

Look at a tree's development over the season. How is the tree growing? Is it affected by shade, competition, or other resources?

What is on, in and around the tree? Summer is a good time for bug hunts – use bug boxes or magnifiers. Place a sheet or tarpaulin under a tree and shake the branches above it. What can you find, and can you identify it? Carefully put back any insects to their original location that you catch in a bug box.

Extension:

Explore trees and the seasons back in the classroom with further resources. You could bring leaves or twigs back to help learn about photosynthesis and respiration, the water cycle, the carbon cycle, plant nutrition and many other processes, all of which have seasonal aspects to them.

What happened when we did it:

Thinking about the time of year and signs of growth and life in the woods was a key part of our practice with schools. We found ways to describe what we experienced together in the woods that resulted in lots of talk, writing and drawing. In the autumn, children found seeds and berries and learned about different methods of dispersal. We found the tracks of foxes, mice and different birds in winter snow. In spring and summer, we looked at how the trees grew and what other signs of life there were around them.

Value for the treescapes curriculum:

Being more aware of seasonality is an important part of environmental awareness. As well as the specific activities of observing, drawing, writing and so on, there are opportunities to learn about the physical processes of life through direct experience. These experiences may be more likely to enable us to be concerned and care for our local environments, as well as global issues such as climate change (as the seasons are less predictable) and biodiversity loss.

Pollen analysis: palynologist for the day

Age: 6+.

Time for activity: 40-50 minutes.

Preparation time: Time to review and print materials (1-2 hours).

Location: Classroom

Number of children: Whole class.

Materials:

- A slideshow introducing pollen analysis with pictures of pollen grains from trees and shrubs. Download from <https://treescapes-voices.mmu.ac.uk/2026/01/30/a-treescapes-curriculum/>

This activity follows the procedure that a palynologist (pollen analyst) would use to collect, record, analyse and interpret a pollen sample taken from a lake or peatland sediment core. Pollen samples provide information about what landscapes were like in the past, allowing us to reconstruct past vegetation based on this evidence.

The digital resources for this activity are available on our website [add link]. These include introductory slides to explain what pollen grains are, where they come from, and how they are preserved in soil.

The exercise assumes that the pollen samples have been prepared in a laboratory and are ready to be looked at under a microscope. The lab procedure from this point is as follows:

1. The palynologist runs transects across the slide at regular intervals, and each time a pollen grain or spore is encountered it is identified and counted. This continues until a target sum has been achieved for the sample (e.g. 300 total land pollen grains).
2. Reference materials are used to aid the identification of the microfossils. These include manuals specific to the region from which the plants come and modern reference collections held in the laboratory.
3. Results are typically presented as percentages in a pollen diagram. This is a series of histograms showing the frequency of each pollen type against depth in the sample. The samples become more recent (younger) as you move up the profile towards the modern ground surface.
4. The data are used to make a vegetation reconstruction of the landscape to show what plants grew at a certain time in the past. It may be possible to deduce factors that have driven vegetation changes, such as human impacts (e.g. woodland clearance to create agricultural land) or climate (e.g. warm-cold and wet-dry cycles).

In our activity, Stage 1 is simulated by playing the slideshow. This contains 30 slides with pollen grains from ten common British plants, including trees such as birch, oak, Scots pine and hazel and herbs such as sedges and grasses. The slides are loosely based around a real sample collected from a peatland in north east Scotland that dates to the Neolithic period around 5500 years ago.

The slideshow is paused each time a pollen grain is displayed. The class identifies the pollen grain using the identification sheet and records it on their count sheets (Stage 2). Once all the slides have been seen, the children add up the pollen grains of each type (e.g. 8 birch, 7 sedge, 3 Scots pine, etc.) and draw a bar chart to display their results (Stage 3).

Finally, the children can look at their data and the pictures of the trees, and think about what the landscape might have looked like in the past when those plants were growing in it. The children made drawings of the landscape with the correct kinds of trees and plants growing there (Stage 4). Finally, the children can look at their data together with pictures of the trees and think about what the landscape might have looked like in the past when those plants were growing in it. The children then make drawings of the landscape (a reconstruction) with the correct kinds of trees and plants growing there (Stage 4).

Extension:

A class could make their own picture library of trees and shrubs by going on fieldwork to take photos in their local environment. This would work well if they had carried out some of the tree identification activities and were familiar with their local treescapes. If they can access woodland or rural settings children could see the types of habitats in which different trees might have grown in the past, which will not have greatly changed today. Willow and alder for example prefer wet ground. This kind of knowledge can help add detail to the vegetation reconstructions in this activity. Children can also look at pictures of the trees in the classroom using books or websites (see ‘Resources and further reading’ at the end of this toolkit).

What happened when we did it:

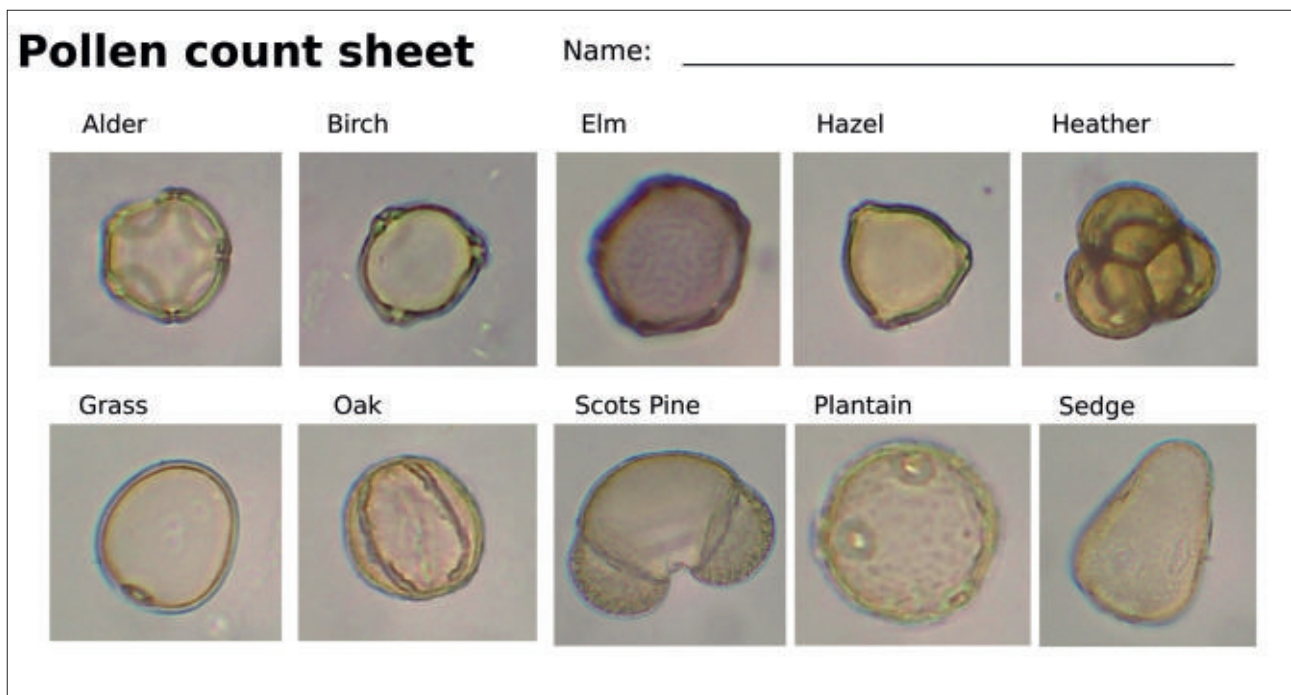
Most of the children were able to engage with this exercise and enjoyed the task, especially identifying the pollen grains. Graphing the results was challenging for the relatively young pupils we worked with (P2/3), but with assistance they all managed to produce an accurate graph to display their data. The vegetation reconstruction (Stage 4) was approached in different ways. Some children attempted to follow the prompts quite closely, so if there was a lot of birch pollen then they should draw lots of birch trees in the landscape, whereas others were less specific or favoured the trees that the pupils liked the most. Most were able to look closely and reproduce the actual shapes of the trees in the pictures.

Value for the treescapes curriculum:

Children can practice a range of skills here. Firstly, close observation is necessary to identify the pollen grains. This involves pattern recognition and shape-matching like a game of snap where the children would call out the name of the pollen type when they matched it with one on their identification sheet. Maths skills are needed to count and display the data in graphs. The exercise in vegetation reconstruction involves connecting data with the real world to convey what the landscape might have looked like in the past. Palynologists develop modelling approaches that simulate the likely arrangement of plant communities in past landscapes, but most vegetation reconstructions still rely heavily on the pollen data and ecological knowledge of plant species. This activity follows this more traditional approach to interpreting palynological data. The wider value here is understanding that treescapes change over long time periods and we can find out what they were like in the past. The pollen record is an invaluable resource for that.

Resources: The digital resources for this activity are available at this link.

LINK



Bottom picture: Collecting a pollen core with a Russian augur on Bennachie.
(Photo courtesy of Christine Foster.)

Theme 3: The Tree as a Lifeworld

The lifeworld is a philosophical concept. It refers to the world as it surrounds and is experienced by a person or a creature. It might be like a habitat, but it is not just about the material resources that we need to survive. The places that we are immersed in and we have relations with are our lifeworld.

The point of this part of the Treescapes toolkit is to think about trees not as a part of our wider environment, but as a lifeworld in themselves. What can we find in and amongst them? And what kind of creatures might experience a tree as their whole world? Making dens, whether large or small, helps us get to grips with the materials of a tree to create our own world with them. We might be able to get more in touch with our local environments if we thought about them as lifeworlds for ourselves or other beings. This could be the start of looking after our environment and being able to tell better stories about it too.

Links to the Scottish Curriculum for Excellence

Activity	Curriculum descriptor and Outcomes & Experiences	Curriculum skills
Bug boxes and magnifying glasses	Sciences: Biodiversity and Interdependence Understanding interdependence of different plants and animals. SCN 0-01a, SCN 2-01a, SCN 3-01a, SCN 4-01a	Science Developing skills of scientific inquiry and investigation using practical techniques
Dens and mini dens	Technologies Selecting appropriate materials, designing and constructing. TCH 0-09a, TCH 1-10a, TCH 2-09a, TCH 3-10a, TCH 4-10a	Technologies Curiosity and problem-solving skills, a capacity to work with others and take initiative
Bird feeders	Sciences: Biodiversity and Interdependence Food chains. SCN 1-02a, SCN 2-02a	
Creating stories outdoors	Literacy I enjoy exploring events and characters in stories and other texts and I use what I learn to invent my own, sharing these with others in imaginative ways. LIT 0-09b, LIT 0-31a I enjoy creating texts to meet the needs of the audience. LIT 1-20a, LIT 2-20a, LIT 3-20a, LIT 4-20a	Literacy effective learning Using relevant, real-life and enjoyable contexts which build upon children and young people's own experiences.



Bug boxes and magnifying glasses

Age: Any

Time for activity: Flexible.

Materials: Bug boxes, magnifying glasses, tarpaulin or bedsheet, paper and pencils if wanted.

Preparation time: None

Location: In the woods (best in spring, summer or autumn when there are likely to be more creatures on the trees).

Number of children: Whole class, split into small groups.

Here children have the chance to explore the world of the tree through the small creatures living in it. Within the theme of 'tree as a lifeworld', children can carefully observe a range of life that uses the tree. Trees with low hanging branches or young trees will be helpful for this activity, although older trees are likely to have more creatures living in them. Split the children into groups of three or four with each group choosing a tree to observe. Bug boxes (small containers with a magnifying lens in the lid) allow children to catch and look at creatures, while hand held magnifying glasses can allow them to observe things on the tree. A tarpaulin or bed sheet can be placed under a tree branch, and the children can then gently shake the branch to cause creatures to fall on to the tarpaulin where they can be more easily spotted.

Children can try and identify, draw or write about what they see. Species level identification will be difficult, but they could find words to classify at a broader level such as spider, caterpillar, centipede, millipede, woodlouse, beetle (including ladybird), moths and butterflies, flies, or 'true bugs' such as shield bugs and aphids. Questions for discussion might include: how does your creature live on the tree? What do you think it likes about this tree? What is it doing at the moment?

After observing, make sure that the creatures are put back carefully in the place they were found in. Using bug boxes should mean that the children do not need to actually handle the creatures, and care should be taken around anything that might sting or be harmful such as certain kinds of caterpillar.



Extension:

One teacher set her class a literacy task based on this activity and the idea of the lifeworld. Children were asked to write newspaper articles about goings-on in the tree from the point of view of its insect and bug inhabitants – imagining the events that might be newsworthy in the creatures’ daily lives. Could the articles be collected together into the ‘Tree Daily News’?

What happened when we did it:

Children generally enjoyed the close up contact with the trees that this activity involves. They sometimes clambered into the trees where they could, which teachers were sometimes okay with and sometimes not. They found a variety of insects and enjoyed getting to grips with the equipment. Finding names for things beyond ‘bug’ or ‘insect’ was sometimes challenging, and some preparation with ways of classifying these creatures could be helpful. In some cases, children did not like being close to the tree creatures, which might even provide another discussion point – how do we deal with the natural world when it might be unpleasant or scary?

Value for the treescapes curriculum:

Using simple equipment like bug boxes and magnifiers can help children understand the life supported by a tree in more detail. This is both because of the searching that is needed as children hunt around the tree and carefully look at it in different ways, and the observation of the creatures themselves when they are found. The idea of the tree as a lifeworld allows children take the perspective of something very different to themselves, developing awareness and empathy for non-human living things.

Resources: The charity Buglife have identification charts at <https://www.buglife.org.uk/bugs/identify-a-bug/>

Online image searches can also be used if you take photos of the creatures you have found.

LINK

Mini dens

Age: Any

Time for activity: 30 minutes, flexible.

Materials: Found materials in the woods, optional model animals or toy creatures.

Preparation time: None.

Location: Outdoors in the woods.

Number of children: Flexible.

A mini den is simply a small version of a classic woodland den – a construction of natural materials into the form of a shelter. Smaller or urban woods may not contain enough suitable materials such as large branches and space for safely building a person-sized den. Mini dens can be made almost anywhere where there is a source of natural materials such as twigs, leaves, stones, etc.

Children can work together in small groups of two, three or four. They should be given their own space in the wood and can explore for suitable materials. Children should be told not to break anything off trees or other plants and only to gather things already on the ground.

Dens can either be made as free-standing constructions or using existing settings such as the base of a tree trunk. Children can also add decoration or extras such as paths, gardens, etc to their mini dens. An optional activity is to provide model animals or toy figures or creatures to each group. This allows them to work with a sense of scale (making something that will fit their creature) and imaginative purpose (what would this creature like as a den?).

At the end of the session, the class can tour the mini dens and each group can introduce their den in turn, explaining what they did and what features they incorporated into their den. As with all ‘touching’ activities in the woods, children will need to learn what to avoid – any sharp thorns, stinging nettles, litter etc. Young children will need support with this.

What happened when we did it:

We tried this activity successfully with a range of classes at primary school level, and Jo has also used it with much older university students to explore natural materials in the environment. Children readily worked on the task and created settings and stories for their creatures. They often mentioned the dens when reflecting back on what they had enjoyed in their Treescapes activities.

Value for the treescapes curriculum:

Making dens, whether mini or full-sized, involves getting hands-on with materials. The wood becomes a place to touch, move and build, using sensory skills beyond just the visual. Den builders learn about the qualities of different materials such as twigs, branches, leaves and soil, and model animals help them to imagine what it would be like to inhabit their construction. Dens promote co-operative group work and skills in presenting back to the class as a whole.

Resources: There are online for resources for full-sized dens, e.g. Woodland Trust: <https://www.woodlandtrust.org.uk/blog/2019/10/how-to-build-a-den>

Note: Jo acknowledges inspiration from Amara Bushcraft, who used mini dens as a practice for making full-size natural shelters doing a weekend organised by Deveron Projects in 2018.

LINK



Dens

Age: 7+

Time for activity: 40 minutes.

Materials: Tarpaulins, rope and pegs for tarpaulin shelters, sitting mats optional.

Preparation time: For tarpaulin and rope shelters, you may want to set up a demonstration shelter.

Location: In a wood, with branches available on the ground if making traditional dens.

Number of children: Any, split into groups of 4-5.

This activity asks children to build full-size shelters or dens in the woods. For very young children, we recommend the 'mini-dens' activity.

Tarpaulin and rope shelters: As an introduction, ask questions to see what the class notices about the 'frame' of the demonstration shelter. What is required? What shape and design will keep out water and wind? Some pupils will never have tied a knot before. You may have to support groups to practice knot tying before they consider creating a shelter. Children can try either using four posts or trees to make a roof shelter or two posts or trees with a tarpaulin pegged out behind to make a sloped shelter.

Traditional dens: Children are likely to improvise dens quite happily. They may be tempted to try and move large logs or tree limbs from the woodland floor, but should be asked to only move smaller branches. They can be supported in making freestanding dens such as a lean-to with two upright 'Y' branches in the ground, a cross bar, and further branches leaning on the cross bar. An A-frame den can be made with two leaning sticks at the front and a long roof ridge to the rear, with further branches leaning on it as the roof. Alternatively, dens can use standing trees by leaning branches against a low lateral branch of a tree, for example.

As with all 'touching' activities in the woods, children will need to learn what to avoid – any sharp thorns, stinging nettles, litter etc. Young children will need support with this.

Extension:

The class could explore other wooden structures back in the classroom, such as a lavvu (traditional Sami tent from northern Scandinavia) or tipi (First Nations North American), or even Scottish crannogs.

What happened when we did it:

Children certainly enjoyed den and shelter making. Sometimes adult assistance was needed to push sticks into the ground or help with the structure of the den. On completion, we toured the dens and each group talked about what they had done.

Value for the treescapes curriculum:

Both tarpaulin and traditional branch dens will involve the children with woods as material resources. Given the task to make a shelter, they will need to explore what the woods have to offer and test out different ways of building. This can be thought of as inhabiting the woods for a short while – making a dwelling place there, just as animals and other creatures do. They will also need to practice teamwork skills of working together and oral skills in presenting to the whole class at the end on what they have done.

Resources: There are online for resources for full-sized dens, e.g. Woodland Trust: <https://www.woodlandtrust.org.uk/blog/2019/10/how-to-build-a-den>

LINK

Bird feeders

Age: Any

Time for activity: 5-10 minutes, depending on child involvement, plus observing over following days.

Materials: Pine cones, string, pack of bird seed for garden birds, pack of shredded suet, mixing tub and spoon. For this activity we assume you live somewhere within reach of coniferous trees with suitable cones.

Preparation time: Time will be needed to collect and buy materials.

Location: Classroom / messy play area, or outdoors.

Number of children: Any.

Pine cone bird feeders are an easy craft activity that gives children something to take home or hang up on school trees. Young children can be provided with pre-strung cones and older children can make them in full by themselves.

Pine (or fir or spruce) cones are needed. Scots Pine are ideal as they produce stiff cones. They may need to be collected and left in a dry, warm area for a week or two to open out. To make the feeders, tie a piece of string around 30cm long to the top of a pine cone. In the mixing tub, pour out a portion of bird seed and a portion of suet (about 1:1). Use the spoon to firmly mix and press the two together into a paste. With your hands, press the bird seed and suet paste into the pine cone. Children will need to wipe and wash their hands afterwards.

The feeders can be hung up by tying the other end of the string around a tree branch or twig. They may take a few days to be found by birds, but they should be popular. String and cones should be removed when finished, or they can be refilled.

Extension:

Children can report back on how long it took for their feeder to be eaten, and what kind of birds they have seen eating the seed.

What happened when we did it:

We operated this activity as one station amongst others that children circulated around. Both young and older children enjoyed making the feeders and they were able to show each other how to do it. Some were hung on school trees while others were taken home.

Value for the treescapes curriculum:

This activity helps children to learn about natural materials (pine cones) through touch and manipulation. They create an item that allows them to have an active impact on their environment by providing food for wild birds. This could be a talking point to consider other ways of looking after wildlife and nature that everyone can take part in.

Resources: Many websites and You Tube videos on pine cone bird feeders exist and helped us in our own design e.g.

<https://www.gardenersworld.com/how-to/diy/how-to-make-pine-cone-bird-feeders/>

LINK



Creating stories outdoors

Age: 7-12

Time for activity: 60 minutes.

Materials: A tarpaulin or sitting mats, a device to record the stories if desired (e.g. phone or tablet).

Preparation time: A demonstration story should be prepared that uses some natural materials in the wood.

Location: In a wood.

Number of children: Whole class, split into groups of three or four. Consider mixed ability groups.

This begins with an adult telling a short tale to model the activity. Use a few natural objects found in the woods to create characters and a story, using speech as the main carrier of the tale.

Groups of three or four youngsters go and find their own objects and allow their imagination to start to spin a tale. Some will need prompts – adults circulate and use the who, what, how questions to support the tale-creating onwards. Give this process ten minutes at the most. Then one group tells their tale, however basic, to another group and vice versa. Encourage speech and again, support with questions, or reminders if they've forgotten a thread. Encourage each person to contribute.

Once each tale has been told, you can repeat the process by swapping groups. This will continue to embed the tale and allow for further embellishments. Then bring the whole group together in a circle and each group tells to the whole class. There should be lots of praise, encouragement and a sense of achievement for having created their own tales.

Extension:

Stories can be recorded on a phone or tablet during the whole group session at the end. Once back in class each group can use the recording to create a storyboard of their tale, and then the groups can begin to write up their stories. Encourage the first draft to be written as a 'flow' with no corrections. From there, they can see where spelling and grammar can be adjusted.

What happened when we did it:

Grace Banks told her story to the class with a couple of Rowan berries and a stick. The children watched and listened attentively then spread out through the wood to find their own materials and start coming up with their own stories. We saw that those who can struggle in class often shine in spontaneous creating, while others can support the writing up.

Value for the treescapes curriculum:

This activities opens up literacies and story-telling practices to include orality and direct involvement with the local environment. The wood becomes a place for creativity where the children and everything in the wood can be part of the story. The story therefore sits in the wood, but it can also be brought back and developed further in the classroom.

Theme 4: Tree ecologies: collecting, identifying, measuring

Local ecologies can be learned about in the classroom and outside in the woods. These activities encourage participants to explore a variety of tree characteristics that connect them to other living things and natural processes. One of the most basic of these is the ability to note differences between trees, such as in the form of their leaves, and to give names to them. For the youngest children, exploring the materials in and around trees can be done with our egg box collecting exercise. We can also draw attention to the health of trees to think about woodland ecologies, what might cause diseases and what we could do to help.

We also include some more advanced scientific activities here that need some technical equipment and preparation, especially focusing on soil science. You might partner with your local university or research institute to gain more support with these, although many of them are also manageable without specialist equipment or skills.



Links to the Scottish Curriculum for Excellence

Activity	Curriculum descriptor and Outcomes & Experiences	Curriculum skills
Activity Leaf identification and Leaf Game	Sciences: Biodiversity and interdependence Distinguishing between living and non-living things, classification appreciating diverse habitats and biodiversity. SCN 1-01a, SCN 2-01a, SCN 3-01a, SCN 4-01a	Sciences Observing, collecting, measuring and recording evidence Classifying – through identifying key characteristics. Drawing conclusions based on reliable scientific evidence
	Numeracy Spotting and exploring patterns in my own and the wider environment. MTH 0-13a Exploring symmetry in my own and the wider environment. MTH 1-19a	
Egg box collecting and Memory Game	Sciences: Biodiversity and interdependence Distinguishing between living and non-living things, classification appreciating diverse habitats and biodiversity. SCN 1-01a, SCN 2-01a, SCN 3-01a, SCN 4-01a	Sciences Develop a curiosity and understanding of their environment and their place in the living, material and physical world. Observe, collect, measure and record evidence, taking account of safety and controlling risk and hazards. Social Studies Development of curiosity and problem solving skills and capacity to take initiatives. Observing, describing and recording.

<p>Egg box collecting and Memory Game (cont'd)</p>	<p>Numeracy Spotting and exploring patterns in my own and the wider environment. MTH 0-13a Exploring symmetry in my own and the wider environment MTH 1-19a</p>	
<p>Talking about tree health and diseases</p>	<p>Sciences: Biodiversity and interdependence I understand how animal and plant species depend on each other and how living things are adapted for survival. I can predict the impact of population growth and natural hazards on biodiversity. SCN 4-01a</p>	<p>Sciences Observing and exploring - careful observation of how something behaves, looking for changes over time and exploring 'what happens if...?' and 'how could I...?' questions.</p>
<p>Measuring the height of a tree</p>	<p>Numeracy: Measurement Experimenting, estimating, using metric units to measure, applying knowledge of measurement in the real world. MNU 0-11a, MNU 1-11a, MNU 2-11b, MNU 3-11a, MNU 4-11a</p>	
<p>Soil science activities</p>	<p>Science: Earth's materials Having explored the substances that make up Earth's surface, I can compare some of their characteristics and uses. SCN 2-17a Through evaluation of a range of data, I can describe the formation, characteristics and uses of soils, minerals and basic types of rocks SCN 3-17a</p>	<p>Sciences</p> <ul style="list-style-type: none"> - Observing, describing and recording - Comparing and contrasting to draw valid conclusions - Development of curiosity and problem-solving skills and capacity to take initiatives Interacting with others and developing an awareness of self and others - Developing the capacity for critical thinking through accessing, analysing and using information from a wide variety of sources - Discussion and informed debate

Leaf identification

Age: Any

Time for activity: 20 minutes

Materials: Leaf ID cards – selection of leaves, card, sellotape or paper clips, pen.

Preparation time: 10 minutes once leaves have been collected.

Location: Outdoors in the wood.

Number of children: Whole class.

This is a way to learn different species of tree by the leaves that grow on them. In advance of the session, you need to make the leaf ID cards. This involves collecting leaves from the tree species that you wish the class to identify. They could come directly from the wood in which the class will be working. The cards are made by fixing a leaf onto a piece of card with sellotape or paper clips and writing the name of the tree beneath it. Children could also help with this as part of the activity.

The class is split into small groups with each group receiving a small pack of cards (e.g. groups of 4-5 with 4-5 cards). Each group finds the trees and learns their names. Cards may be used again but leaves will need to be used fresh. Storing the leaf ID cards in a plastic bag or tub in a fridge will keep them in good condition.

Extension:

The activity could be repeated over a number of sessions until the children are confident in identifying trees from their leaves. During the searches, children will be open to lots of other conversations about the differences between trees, how they are growing and other aspects of their ecology, as they make observations in the woods. At the end of the session the whole class can name the trees together.

What happened when we did it:

The children looked carefully at the shape of leaves and matched them to living trees in the woods. Even young children of 5-6 years managed this task, sometimes with help, while older children completed it more quickly and could be given different leaf ID cards. All the groups we carried this out with were enthusiastic in looking at the cards and finding the right trees. The cards also encouraged the children to touch the leaves and learn more about them in this way too. The back and front can be viewed. Some even said that the leaves can be distinguished by smell. These interactions would not be available if identification was simply on the basis of pictures.

Value for the treescapes curriculum:

We found this to be a great way of increasing children's confidence in identifying different tree species from their leaves. The activity shows children directly how leaves and trees differ from each other, and that a wood may have many different species of trees growing there. Hopefully, this is not just for its own sake but as the basis for further learning and investigation. The activity can also encourage use of the senses, not just vision, but also touch and smell, and gross motor skills of how to move through a wood.



Resources: There are resources for tree and leaf identification online e.g. <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/>. We think that using actual leaves creates a rich learning experience.

LINK

Egg box collecting

Age: 5 – 12

Time for activity: 20 minutes search, 5 – 10 minutes sharing

Materials: Empty egg boxes (6 eggs). You can recycle old egg boxes or order new egg boxes from hen keeper suppliers.

Preparation time: Some parts of this may need preparation of egg boxes.

Location: Any outdoor space with a range of trees and other plants.

Number of children: Any number, work in pairs or threes.

This is a scavenger hunt activity that can be framed in different ways depending on what and how you are encouraging children to explore. The different seasons will also influence what children may find.

Open-ended: invite children to collect six things from the ground which interest them.

Touch: Attach things to the inside of the lid of the boxes so that there are a range of boxes with different textures distributed amongst the class. For example, something rough or spongy or slippery and invite children to collect a set of six things which have a similar feel to the texture inside the lid.

Colour: Make a fan of coloured lolly sticks and put them in the box and ask child to find things which match or nearly match the colours in the fan. You can discuss different shades of colours, this works particularly well in the autumn.



Categories: Invite children to collect five things the same and one thing different, and then guess what is the same and different in each pair of children's boxes.

While the children are collecting circulate around the pairs and ask them about what is in their box and why they have collected them. Once all of the pairs are happy with what is in their box, gather the class back together to show their boxes and to discuss what they found. They can talk about what they notice about their things and where they found them.

As with all 'touching' activities in the woods, children will need to learn what to avoid – any sharp thorns, stinging nettles, litter etc. Young children will need support with this.

Extension:

After the show and discuss, the children can then make pictures with the content of their boxes or use them in the creation of mini dens.

What happened when we did it:

We used this activity with Primary 2 and Primary 4/5 children in woodland near to their school. In response to an open-ended collection, one pair of children found things that made a noise such as rattles and scrapes inside their egg box. On a different occasion, after participating in a soil testing activity, two children collected six 'samples' of soil from different parts of the woodland, mirroring the ways in which their class had helped to prepare a soil sample.

With a more structured framing, children were given a word bank of different textures and images. One pair found six different natural objects including spiky leaves, round leaves, stones, moss, wood and beech seed casings.

Value for the treescapes curriculum:

This activity is one of a range of activities which help structure and support children's curiosity and field observation skills. Through searching for small, natural litter and sorting it into categories, children become more aware of the diversity of plants which grow in wooded areas and the evidence which they can find for specific kinds of trees and plants at different times of the year. Through noticing features like the seed cases for beech tree seeds, or a nibbled leaf or pine cone, children can engage in discussions about tree and woodland ecosystems.

Leaf game

Age: 5+

Time for activity: 5-20 minutes

Materials for extension activities: clipboards, pencils/crayons, paper, perhaps identification sheets for trees.

Preparation time: None

Location: In the woods – needs to be a diverse woodland with different kinds of trees.

Number of children: Whole class or small groups

Split the class into groups of four, with two pairs in each group (A and B). Each pair collects three leaves from trees in the wood or the woodland floor, two from one kind of tree and one from another. Pair A shows B one of the two same-tree leaves. They hide it, then show B their other two leaves. Which one is the same as the first leaf? Can pair B find the trees that the leaves came from? Then repeat with B showing their leaves to A.

As with all ‘touching’ activities in the woods, children will need to learn what to avoid – any sharp thorns, stinging nettles, litter etc. Young children will need support with this.

Extension:

Further activities could involve identifying what kind of trees the leaves are from, and ID sheets or cards from our Leaf ID activity could be useful. Children can also draw or take rubbings of their leaves – put the leaf onto a clipboard with a piece of paper firmly secured on top, and cover the leaf with pencil or crayon so the leaf shows through.

What happened when we did it:

This game has been fun for all ages. It supports the pupils in observing leaves more closely and in greater detail. We found it was not just leaves they notice. Bugs or other woodland finds can cause unexpected tangents.

Leaf rubbings are easier if weather is dry although pencils will work in rain.

The extension activities developed knowledge with older pupils in particular, who gained confidence in using ID materials. We laminated some of the leaf rubbings for later use in a community event.

Value for the treescapes curriculum:

Playing a game is fun and encourages positive interactions with each other and the woodland. Children pay attention to subtle differences between leaves and the trees, which shows them how diverse woods can be. Through the extension activities they may be able to identify the trees and bugs that live there too.

Memory game

Age: 5-12

Time for activity: 15 minutes, but can be repeated.

Materials: Paper or cloth small squares for the covers (e.g. 10cm x 10cm), plus large pieces of cloth, paper or other material may be needed as a gaming surface if playing outdoors.

Preparation time: Time will be needed to make the paper or cloth covers (cutting paper or cloth).

Location: In the woods, or found items can be brought back to the classroom and the game played there.

Number of children: Can be scaled up or down. Each group of four will need 20 small paper or cloth covers and one gaming surface if playing outside.

This is based on the memory game, sometimes called Pairs, played with cards or picture tiles. Split the class into groups of four, each consisting of two pairs. Each pair gather five pairs of small items, such as two small twigs, two of the same kind of leaf, etc, from the woodland floor. They are randomly placed under small cloth or paper covers on the gaming surface. Then the pairs swap places (to make it harder) and take it in turns to turn over two covers. If they get a pair of the same item, they are removed from play. The team with the most pairs wins.

As with all 'touching' activities in the woods, children will need to learn what to avoid – any sharp thorns, stinging nettles, litter etc. Young children will need support with this.

What happened when we did it:

This simple game was fun for all children.

Value for the treescape curriculum:

Children are enabled to observe in detail when they look for similar and different items. They have to find and touch different kinds of items in the woods, and in doing so they practice movement, observation and teamwork. In the game itself they practice taking turns and memory skills, as well as learning about the items they have found through close-up contact.

Talking about tree health and diseases

Age: Any

Time for activity: 5-10 minutes with options for extensions.

Materials: None.

Preparation time: Some background research into this topic will be helpful.

A visit leader can also prepare by searching for a diseased tree in a wood in advance of a class visit.

Location: Outdoors, with extensions back in the classroom. It can also be carried out as a classroom-only discussion with use of suitable resources.

Number of children: Any.

This activity simply involves the teacher or group leader being aware of what some tree diseases can look like, and being prepared to show and talk about them with children. Contrasts with healthy trees can be made.

Children can be asked to describe what they notice about diseased trees. In Elm, this might be bare, barkless branches with black outgrowths (Dutch Elm Disease), and in Ash, leaves may be brown and wilting in summer along with bare branch ends (Ash Dieback). Dutch Elm Disease is caused by a flying beetle that transports a fungus between mature Elm trees, while Ash Dieback is caused by a fungus that is spread by spores carried on the wind. There are many other diseases that can also be recognised, but these two are particularly noticeable.

We can all help to fight against tree diseases. Shoes and tyres should be washed after a visit to a wood. Plant material should not be taken away. And we can report sightings of tree diseases (see Woodland Trust website below).

Children can also be asked about signs of a healthy tree, such as new growth and strong branches. One sign of a healthy woodland is also plenty of young trees growing amongst the old ones, or in gaps where an older tree has fallen. A woodland without young trees may be being grazed too heavily by animals such as deer, and this process can eventually cause deforestation.

Extension:

In the classroom, children can show what they have learned about tree diseases in writing and drawing. They can research tree diseases using online resources and create further resources to raise awareness of this issue.

What happened when we did it:

Our main conversation point in this theme was around an Elm tree with Dutch Elm Disease in a woodland near the school. Children were able to describe the physical appearance of the tree and note that it did not look healthy. We discussed the life cycle of the fungus and the beetle that cause Dutch Elm Disease. Children asked what would happen to the tree, which also gave an opportunity to talk about the recycling of nutrients in the ground following the death of a tree, as well as the negative effects of the disease on the tree and other species (e.g. insects) that rely on it.

Value for the treescapes curriculum:

Tree health and disease are important topics in ecology and environmental science and they also relate to health and well-being. We commonly view woodlands as natural, healthy places, and while this may often be the case, certain tree diseases are becoming more common and create serious threats to tree species and woods. Children and young people can learn that plants can become 'ill' through disease, like animals do, and this has implications for the health of the woodland and our environment as a whole. They can also learn about what causes some tree diseases and how we can all help trees and woods to stay healthy.



Resources: The Woodland Trust have an excellent online resource on tree diseases and pests. <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/tree-pests-and-diseases/key-tree-pests-and-diseases/>

LINK

Measuring the height of a tree

Age: 9+

Time for activity: 15 minutes, can be repeated with different trees.

Materials: Long tape measure (e.g. 20 metres) for each small group, A4 paper, clipboard and pencil.

Preparation time: None

Location: In the woods, extensions back in the classroom.

Number of children: Whole class split into groups of about 5, but flexible.

This activity could begin with asking the children how tall they think a certain tree is. They can write down what they think. At the end, look back at their estimates. Was anybody close?

Measuring the trees in this way involves understanding that a square divided into two between opposite corners will create a right angled triangle in which the two shorter sides are the same length as each other. This can be demonstrated by folding the piece of paper as described.

1. Divide the children into groups of about 5. Alternatively, an adult can lead a larger group through the activity. Each group selects a tree that they would like to measure. They will need to be able to see the top of the tree from a distance equivalent to the height of the tree, so this won't work in dense woodland.
2. Within each group, fold a piece of A4 paper once to make a square and then fold along the diagonal between two corners of the square to create a right-angled triangle.
3. One child sights the triangle so that the hypotenuse (longest side) lines up with the top of the selected tree. The bottom of the triangle should be parallel to the ground. This entails walking back from the tree while looking up the hypotenuse until the correct point is reached.
4. Other children use a tape measure to find the distance from the tree to the child and write down the result. They then measure the height of the child from the ground to their eye line and add this measurement to the distance. In doing so they have created a large right-angled triangle using the tree and the ground as the two shorter sides. The measurement along the ground gives the height of the tree, because in a right-angled triangle with two 45 degree angles, the two shorter sides are the same length.

Extension:

Further maths work back in the classroom could explore the geometry of these measurements in more detail. It may be helpful to draw a diagram showing what is going on. What other ways of measuring trees are there, and why might they be useful (see resource below)? Why do foresters often use Diameter at Breast Height (DBH) as a standard measurement for trees?

What happened when we did it:

This was difficult for younger children and so we recommend doing it with slightly older groups. Some children enjoyed the technical aspects of working with the paper and tape measure, while others found it harder to know what to do and benefitted from more support. We felt a sense of achievement in coming up with the answer and comparing it to our earlier guesses.

Value for the treescapes curriculum:

As an exercise in applied maths, this activity shows how real-world problems can be solved using maths. But it also involves using their whole bodies to position the paper and the tape measure correctly, immersing themselves in the woodland environment to complete the task.



Resource: There are lots more ways to measure trees with children. In our research project, we wrote about some of them and reflected on what we learned. You can find out more here: <https://journals.uclpress.co.uk/r4a/article/id/3406/>



Soil science activities

Soils and vegetation including trees are intrinsically linked. Soils provide the medium for plant growth, they are the basis of our agricultural systems, and their various properties – depth, texture, structure, chemical status, and so forth – are important in determining plant species. Plants in turn play a role in creating and maintaining soils through nutrient cycling and adding an organic component as they decompose. They also protect soils from erosion through their foliage and roots. We ran several soils-based activities for young people to explore the importance of soils for treescapes.

Exploring what's hiding beneath your feet: soil test pitting

Age: 6+.

Time for activity: 30-40 minutes

Equipment (per group if possible): Spade, trowel, plastic bag, colour chart (Munsell colour chart, or download or make your own), tape measure or ruler, notebooks.

Preparation time: Time will be needed to make colour charts if required.

Location: Outdoors (e.g. grassland, woodland)

Number of children: Groups of around three or four.

In this activity pupils dig shallow soil pits to explore the depth, colour and other characteristics of a soil profile. This is best done in a natural environment where the soil profile has remained undisturbed for a long time – where it has not been heavily impacted by digging or by vehicles. Grasslands or woodlands are good options, but a school playing field could also work. You should always seek landowner permission in advance as the activity involves digging holes in the ground. However the impacts are typically minimal as the holes are back-filled with the soil that was removed, and the ground surface will naturally repair itself over time.

Scientists use a Munsell soil colour chart to record the colour of soils. This is a book of colours that labels the hue (e.g. yellow-red), value (lightness) and chroma (saturation or purity) of a soil. The British Geological Society have a download of common soil colours (see Resource, below) that can be labelled or just described in words. Alternatively, a colour chart could be created using software such as MS Paint.

1. Children should use the spade to dig a shallow hole – a soil test pit – of about 50 x 50cm at the surface. Adult help may be required to cut through the turf. Digging down around 30-40cm should be sufficient to see what is going on. Make sure that the soil is piled onto a polythene sheet or similar (e.g. plastic carrier bag), which makes it easier to put the soil back afterwards. Try to keep any blocks of turf intact and replace these last.

2. Use a trowel to scrape off and clean one side of the pit. Work across the face of the section rather than up and down, which will help to reveal any layering in the profile. You should see the topsoil, which is typically quite dark in appearance due to its high organic component, and the subsoil, which is lighter in appearance and often has a higher clay content. If the soil profile is shallow, you may even reach the parent material underneath the subsoil. This is often fragmented rock and mineral particles. They should look carefully to see any changes in colour or if there are other objects in the section such as stones or roots. The children can record their soil profile (the cleaned section face) by drawing and labelling in a notebook. Use a tape measure to record the depth of each layer.

3. To test the texture of the soil, the children should roll some between their fingers. If the soil is rich in clay it should roll into a thread or ball. If it contains sand it should feel gritty and you may also be able to see grains of sand. Children could also note the moisture level of the soil, e.g. very dry, dry, damp, wet, or very wet (a hydrological gradient).

4. For the colour test, children can take another pinch of the soil and gently rub it onto a page in their notebook. They may need to repeat this a few times. Allow the soil rubbing to dry, then compare it with the colour chart. Try and use more specific descriptive words for the colour such as 'dark yellowish-brown' rather than simply 'brown'. All this can be recorded in notebooks and repeated for both the topsoil and the subsoil.

5. Finally, return the excavated soil and turf to the pit, packing it down with your feet and/or the spade.

What happened when we did it:

Most children approached the task enthusiastically and wanted to help dig the holes. They were generally happy to handle the soil – touch plays an important role in describing and recording soil properties – though some were more reticent. Although the exercise was introduced as soil science, most pupils continued to refer to the soil using the terms like 'dirt' and 'mud'. In some of our pits we found shards of pottery, reflecting that there may have been vegetable plots in the past. We had looked at historic OS maps for the local area using Digimap (subscription needed).

Value for the Treescapes curriculum:

The activity provides an easy introduction to fieldwork outdoors with first-hand observation and data collection. It helps children to understand that soils are not homogenous, but are composed of a variety of physical components, each bringing their own qualities of texture, colour and so on. This can be a baseline for further work on soils and trees. We can learn that soils underpin just about all growing plants, including trees, and that keeping our soils healthy is important for us all.



Resource: The British Geological Society have a soil colour chart available for download at: <https://www.bgs.ac.uk/download/soil-colour-chart/>

LINK

You can look at the Scottish Government's web pages on soils: <https://soils.environment.gov.scot/>

LINK

Acidic or alkaline? Measuring soil pH

Age: 6+

Time for activity: 30-40 minutes

Equipment: soil pH meter or universal pH test strips, plastic beakers; spoon; trowel; several litres of 'pure' water (deionised/distilled) or tap water.

Preparation time: None

Location: Outdoors, anywhere with access to soil

Number of children: Any, working in pairs or threes

This activity involves mixing soil solutions and measuring their pH to determine their acidity, which is a key characteristic of soil for plant growth. It is best undertaken outdoors – anywhere where you have access to soil – although soil samples could be brought into the classroom. You could take samples from different areas to see if the acidity varies, for example comparing soils in flower beds with that from playing fields.

You will need either a portable soil pH meter or universal pH test strips. The latter is the cheaper option with rolls available for as little as £10. The disadvantage is that they are single use and are less precise. We used a Hanna Instruments pHep Pocket pH meter which retail for under £100. Pure (deionised/distilled) water is best for mixing the soil solution, which costs around £5 per litre or you might obtain some from local high school or university labs. You can use tap water if it is close to neutral (pH 7.0) and you can test it using the pH meter or strips. Don't use water that is already either strongly acid or alkaline as that will introduce significant error to the test.

You will also need a trowel to collect your soil sample, some plastic beakers or anything clean that can hold the soil and water, and something to stir the solution such as a spoon.

Start by discussing acidity, neutrality and alkalinity. These can be difficult concepts for young children to grasp but they can be considered through experience. Bitter foods or drinks such as fruit juices can be discussed as acids ('has anyone sucked a lemon?'). Plain water is generally around neutral, by contrast. Alkalines are tricky but they may be familiar with chalk, baking soda or oven cleaner (generally not for consumption!) – they neutralise acids. The point is that we can measure soil acidity using our equipment, and that will tell us something about what kind of plants are likely to grow well in that soil.

1. Use the trowel to gather a small sample of soil. Put it in a beaker, breaking it up as far as possible.
2. Add some of the pure water. Use about one part by volume of soil to 2.5 parts water (1:2.5). You can translate this into finger widths, i.e. one finger of soil then two and half fingers of water. The measurements do not need to be precise.
3. Stir the sample vigorously for about one minute then stand undisturbed on a flat surface for around 10 minutes. The physical components of the soil (clay, sand, etc) should settle to the bottom, whilst the chemical components of the soil will move into solution.
4. Carefully decant the soil solution into a clean beaker, taking care not to transfer across the solids that have settled to the bottom. Don't worry if some small particles move, but try to keep that fraction separate.

5. Use the pH meter or strips to measure the pH of the soil solution. If using a meter, you'll need to stand it in the solution to submerge the probe. In our experience, the meter reading should stabilise after 30-60 seconds. Use the pure water to rinse the probe between samples. Record the result from the probe or strip in a notebook. Values below 7 show that the soil is acidic, those above 7 are alkaline, and exactly 7.0 is neutral.

Extension activity:

Back in the classroom, research what kinds of plants or trees might grow best in the different soils that you test. Do they reflect what is actually growing where the samples were taken?

What happened when we did it:

The primary school pupils we worked with grasped the experimental and practical side to this activity and they were able to mix their soil solutions fairly quickly. Although the chemistry underpinning pH tests is not taught until secondary school, we were able to explore concepts of acidity through their experience.

Value for the Treescapes curriculum:

Soil acidity is an important factor controlling the distribution of plants and vegetation communities. This activity allowed us to talk about which plants have an affinity for (or tolerance of) acid environments, helping us to further explore how soils and vegetation are connected.



Why do puddles form? A simple infiltration experiment

Age: 8+

Time for activity: 30-50 minutes

Equipment: Infiltrometer rings, mallet, piece of wood (longer than the rings), plastic funnel if needed, stopwatch/timer, several litres of tap water (empty drinks bottles with known volumes are helpful), clingfilm / plastic wrap or a plastic bag, notebooks.

Preparation time: None once equipment is sourced.

Location: Outdoors

Number of children: Any, in groups of around three.

This experiment measures how quickly water is absorbed into the soil, a process known as infiltration. This is another important characteristic of soil that affects how plants will grow. For the experiment a site with short grass or a lightly-vegetated surface are ideal. Try to avoid locations with a thick root mat which make it difficult to set up the equipment.

An infiltration ring is a rigid metal or plastic ring around 5-20cm in height and 2-20cm in diameter. We used 5cm diameter metal rings from a soil auger, though other objects will work. They could be made by cutting a piece of drainpipe into 20cm lengths using a hacksaw. Lengths of pipe can be purchased cheaply from many DIY retailers, who will often cut them into smaller lengths if asked.

1. Push the infiltration ring a short distance into the ground (3-5cm). This is most easily done by placing a piece of wood across the top of the ring and tapping with a mallet. Once the ring is in place, try to remove as much vegetation and loose debris as possible from inside the ring, taking care not to heavily disturb the soil profile. Don't uproot any plants.
2. Once the infiltration ring is in place, lay some plastic wrap or a bag inside the ring to create an impermeable barrier between the ring and the soil.
3. Gently pour a fixed volume of water into the ring, making sure none spills over the rim. We used 500ml contained in drinks bottles, but if your infiltration ring is large you may wish to increase the amount. If the ring is smaller, a funnel can be used to help with pouring.
4. Remove the plastic wrap / bag and, at the same time, start the stopwatch. The water should start to drain into the soil, rapidly at first, but then more slowly as the soil becomes more saturated. Time how long it takes for all the water to percolate into the soil and record this in a notebook.

Set up numbered infiltration experiments across the fieldsite in a grid or along a transect. If the site has slopes and plateaus, you can find out what effects the shape of the land (the relief) has upon infiltration rates, and what direction the water is likely to take once it enters the soil.

Whilst the experiment is running, children can describe the activity in their notebook. Other details to record are: the date and time, the number of their experiment, and the current and recent weather. When did it last rain and how heavy was it? You can talk about the effect of prior conditions on infiltration rates. Children can also walk around the fieldsite to work out where subsurface water may be collecting. Search for clues such as standing water, streams, wet flushes, boggy areas or where different vegetation is growing. Afterwards, collect and compare the data from each group – did infiltration rates vary across the site? And if so, why?

What happened when we did it:

By setting the experiments to start at exactly the same time, the children took this as a 'race' to see where the water would drain away most rapidly. We discussed the results afterwards and explored ideas about soil structure. Alongside the physical components that comprise the soil (clay, silt, sand, stones/gravel and organic matter), much of the soil profile contains pore spaces that are filled with air or water. Children grasped the concept that once the spaces in the soil were filled with water, the soil could not accept any more and water would then begin to pool at the surface. Our fieldsite had a gentle slope with an area of boggy ground at the bottom. We looked for evidence for what direction the rainfall would drain in and matched that with the infiltration rates from our experiments. The water was absorbed faster in the higher and drier areas, and slower in the lower and wetter areas. So, although the process of water movement through the soil profile could not be directly observed, children were able to think about what was happening and draw conclusions about the site's hydrological system.

Value for the Treescapes curriculum:

This allows children to explore an area of their local landscape in ways they hadn't considered before. When water is added at the soil surface, usually via rainfall, a number of factors will govern how rapidly it drains through the soil. These include: the permeability of the soil (clay-rich soils drain slowly, whilst sandy soils drain rapidly) the presence of structural features such as cracks and sub-surface pipes that allow water to rapidly move through the soil, and the weather, which determines how much water the soil is already holding. As with the other soil science activities in this toolkit, we have the chance to think about the wider ecology of the landscape within which trees grow and we all live.



Resources and further reading

About us

'Voices of the Future' project
<https://treescapes-voices.mmu.ac.uk/>

LINK

'Future of UK Treescapes' research programme
<https://www.uktreescapes.org/>

LINK

University of Aberdeen
<https://www.abdn.ac.uk/>

LINK

Education and outdoor learning in Scotland

Education Scotland: Scottish Curriculum for Excellence benchmarks
<https://education.gov.scot/curriculum-for-excellence/experiences-and-outcomes/>

LINK

Scottish Government: 'Target 2030'. A movement for people, planet and prosperity. Scotland's Learning for Sustainability Action Plan 2023-2030.
<https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/06/target-2030-movement-people-planet-prosperity/documents/target-2030-movement-people-planet-prosperity-scotlands-learning-sustainability-action-plan-2023-2030/target-2030-movement-people-planet-prosperity-scotlands-learning-sustainability-action-plan-2023-2030/govscot%3Adocument/target-2030-movement-people-planet-prosperity-scotlands-learning-sustainability-action-plan-2023-2030.pdf>

LINK

Learning for Sustainability Scotland
<https://learningforsustainabilityscotland.org/>

LINK

Outdoor and Woodland Learning Scotland
<https://owlsotland.org/>

LINK

Books and research

Books for adults:

Tristan Gooley - 'How to Read a Tree'
Roger Deakin - 'Wildwood: A Journey Through Trees'
Fi Martynoga, Reforesting Scotland - 'A Handbook of Scotland's Trees'
Oliver Rackham - 'Woodlands'

Books for children:

Jen Green and Claire McElpatrick 'The Magic & Mystery of Trees'
Robert MacFarlane and Jackie Morris 'The Lost Words'

Research from the 'Voices of the Future' project:

Curtis, E., Schofield, J. E. & Vergunst, J. (2025) 'Learning with trees and young people in north east Scotland' in Gatt, C. & Loovers, J. (eds) Beyond Perception: Correspondences with the Work of Tim Ingold. Taylor & Francis, pp. 165-179.
<https://doi.org/10.14324/RFA.09.1.04>

Kraftl, P., Ambreen, S., Armson, D., Badwan, K., Curtis, E., Pahl, K., Schofield, J. E. (2025) 'Starting with trees: Between and beyond environmental education' British Educational Research Journal 51(2): 782-801.

<https://doi.org/10.1002/berj.4099>

Pahl, K. et al. (2025) 'How many ways are there to measure a tree? – An experiment in cross-disciplinarity' Research for All 9(1).

<https://doi.org/10.14324/RFA.09.1.04>

Other cited research:

Green D. & Clark A. (2024) 'Time for childhood: Slow pedagogy. A Froebelian approach'. The Froebel Trust.

https://files.froebel.org.uk/production/documents/FT_Slow-Pedagogy_pamphlet.pdf

Hamilton, J. (2018) 'Outdoor learning: closing the attainment gap in primary schoolchildren in Scotland'. Forestry Commission Scotland.

<https://www.forestresearch.gov.uk/publications/outdoor-learning-closing-the-attainment-gap-in-primary-schoolchildren-in-scotland/>

Mapping resources for historic treescapes

Open Street Map <https://www.openstreetmap.org>

LINK

Google Earth <https://earth.google.com>

LINK

Digimap <https://digimap.edina.ac.uk/> (requires Higher Education partner)

LINK

National Library of Scotland maps, including historic maps <https://maps.nls.uk/>

LINK

Tree, woodland and soil resources

Buglife bug identification charts:

<https://www.buglife.org.uk/bugs/identify-a-bug/>

LINK

Woodland Trust dens:

<https://www.woodlandtrust.org.uk/blog/2019/10/how-to-build-a-den>

LINK

Woodland Trust tree and leaf identification:

<https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/>.

LINK

Woodland Trust tree diseases and pests:

<https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/tree-pests-and-diseases/key-tree-pests-and-diseases/>

LINK

British Geological Society soil colour chart:

<https://www.bgs.ac.uk/download/soil-colour-chart/>

LINK

Scottish Government information on Scottish soils:

<https://soils.environment.gov.scot/>

LINK

Owen Johnson & David Moore: 'Collins British Tree Guide'