Activity T1

TREE TRAIL – HEARTBEAT OF A TREE

Location: Site

Keystage: 1 and 2

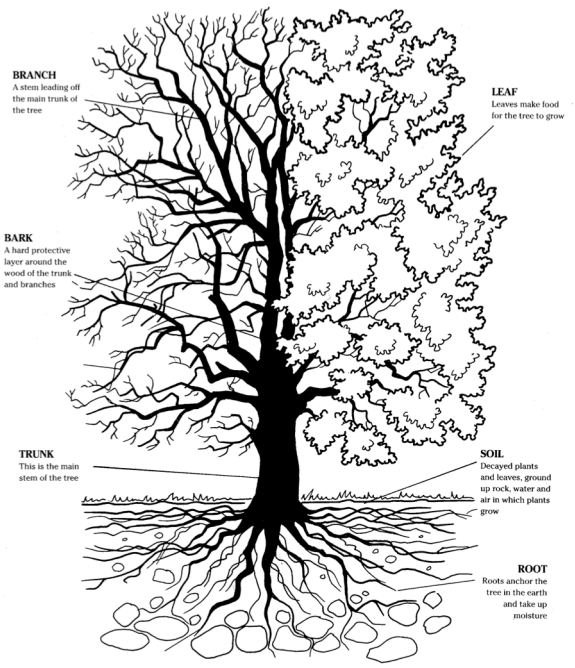
Equipment:

1. A stethoscope.

A tree is a living thing. It has 'blood' called sap and veins to carry it in. Look at the inside of your own wrist. Can you see your veins?

Learning Outcomes

1. To appreciate that living organisms have circulatory systems and to relate this to human circulation with the heart as a pump to circulate blood around the body through vessels (KS2- Sc2, 2c,d).
2. To consider the seasonal change in activity of the tree.
3. That water and minerals are taken in through the root and transported through the stem to other parts of the plant.



Activity

1. Use your stethoscope to listen to your own heartbeat.
2. Sometimes it helps if you jog on the spot for a short while first! Do you know why?
3. Now listen to the heartbeat of a tree. Put your stethoscope firmly onto the trunk of your tree. If you listen very carefully you will hear a faint whooshing sound. This is the sap rising inside the trunk.
4. It is always louder in spring when the tree wakes up after winter.
5. In winter the tree is dormant (or asleep!) so you won't hear its heartbeat.

Extensions

- Did you know that some trees can live for up to 4,000 years if they are looked after!
- Look at the way food and water move around the tree as sap
- Do activity T5 - Leaf Slides and T6 - Leaf Rubbing, to examine veins in a leaf.

Skills:
- KS1/KS2: SC1, SC2 EN1
- Listening
- Observation
- Comparison 1-1 Living things

Key Words:
- Stethoscope
- Sap
- Vein
- Heartbeat
- Dormant

Activity T2

TREE TRAIL - EYE-IN-THE-SKY

Location: Site

Keystage: 1 and 2

Equipment:

1. Small mirrors

Trees provide homes for many creatures.
Birds build their nests in them, squirrels leap from tree to tree. If you look closely, you will see all sorts of mini-beasts too. Using an 'eye-in-the-sky', you can see what the world looks like to a tree or a creature in a tree.

Learning Outcomes

1. To appreciate the size, beauty and splendour of a tree canopy.
2. To use imagination to explore the tree canopy.
3. To develop special awareness with mirrors.

Activity

1. Look down on your mirror until you can see the sky in it.
2. WARNING! DO NOT LOOK DIRECTLY AT THE SUN!
3. Slowly set off on an adventure through the site until you end up under a large tree with spreading branches.
4. Do not look anywhere but in your mirror.
5. Sit underneath your tree with your back to the trunk.
6. Use your mirror to imagine the journey of an ant. It goes up the tree trunk, along the branches, across twigs and onto a leaf at the top of the tree.
7. Once at the top, slowly come back down the tree as a raindrop rolling from your leaf back down the twigs, branches, trunk and finally to you on the ground.

Extensions:

- Drama - Act out your journey.
- Recount through writing/illustrations to explore experience and create imaginary worlds.
- Do Activity W1 - Minibeast Hunt to discover invertebrates living in the tree.

Skills:

- Imagination
- Observation
- KS1/KS2 SC2
- EN1

Key Words:

- Reflection
- Image
- Trunk, Branches
- Creatures
- Mini-beast
- Journey
- Habitat

Activity T3

TREE TRAIL – WHICH TREE ARE YOU?

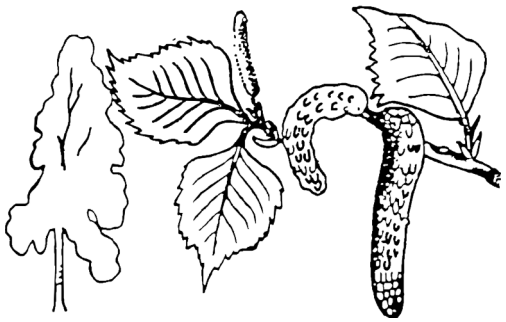
Location: Site

Keystage: 2 (or 1 with Help)

Equipment:

1. Trees and Shrubs Identification Key – Appendix 4
2. Tree books (optional)
3. Envelopes/bags to collect the leaves in

The leaf keys in the pack can be used for this activity. The large keys are more complete but not as simple to use.



Learning Outcomes

1. To identify trees by the shape of their leaves using the branching keys (KS2- Sc2, 5a,b).
2. To make comparisons between tree leaves (KS1-SC1, 2h)
3. To discover plants living in the local environment (KS2- Sc2, 5b) and relate life processes to these (KS1- Sc2, 1b and c and 5c).
4. To group living things according to observable similarities and differences (KS1- Sc2, 4b).
5. To learn the leaf shape of at least some trees.
6. To recognise the environmental value of trees – habitats, food, carbon sink, aesthetic value.

Activity

1. Explain to the pupils how the keys should be used by working through an example leaf. In particular define 'lobed' leaves and leaflets. Mention that they may find some trees that are not on the key (especially for the simple key).
2. The children can work in groups, on their own or in pairs. Ask them to find and identify 4 or 5 different trees.
3. They should choose a tree and carefully pick one leaf from it. This should be saved for any later work in the classroom.
4. Use the tree leaf keys (simple or more complex) to identify the tree.

Extensions:

- Find out: Is your tree evergreen or deciduous? How high will your tree grow?
- What length are the leaves? Are the leaves the same length? What do we use the tree's wood for? What do the fruits or seeds of this tree look like? Draw and colour your leaf. What else can you find out about your tree? How good is your tree for wildlife?
- Make your own keys for the leaves you have found.

Skills:

- Identification
- Classification
- Investigation
- Use of keys
- KS1- Ma3, d. KS2- SC2, Ma3, c.

Key Words:

- Evergreen
- Deciduous
- Leaflet
- Lobed
- Toothed
- Key

Activity T4

TREE TRAIL - HOW HIGH?

Location: Site

Keystage: 2

Equipment:

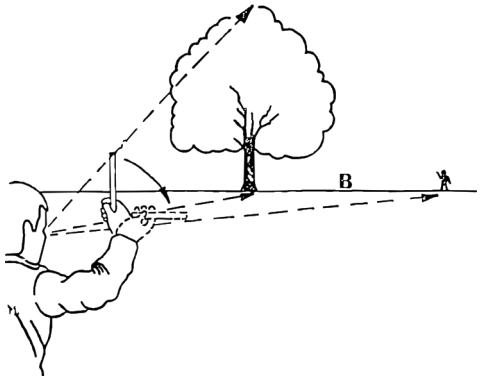
1. Pencils
2. Plastic measuring tapes (10m)

There are several ways to measure the height of a tree. If you have a clinometer you should use that. If you do not, then the easiest is the pencil method.

PLEASE NOTE THAT THIS ACTIVITY MAY BE VERY HARD IN SOME AREAS DUE TO UNDULATING GROUND AND WATERCOURSES; SAFETY ISSUES SHOULD BE CONSIDERED.

Learning Outcomes

1. To learn how to estimate the height of a tree.
2. To find out the heights of several trees on the site.
3. To investigate patterns of which type of trees are tallest and where they are located.



Activity

1. Choose a large tree. Try to find one that you can see the top and the bottom of clearly.
2. Hold a pencil at arms length with the bottom level with the base of the tree trunk, and the top level with the tree top. (You may have to move closer or further away.)
3. Keeping the pencil in place, turn the pencil horizontally (on its side, keeping one end level with the base of the tree trunk). Ask a friend to stand where the other end of the pencil end points (level with the tree).
4. The distance between the trunk and your friend will be the height of the tree (B).

Extensions

- Find the age of the tree- Activity T8 - How Wide? How Old?
- Do this for several trees and investigate whether the trees' heights correlate with their ages.
- Which type of trees are the tallest/smallest for their age?

Skills:

- Maths- KS2- Ma3-4
- Measuring
- Team work
- Recording
- Investigation

Key Words:

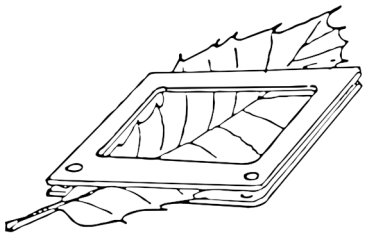
- Horizontally
- Distance
- Height
- Clinometer

TREE TRAIL – LEAF SLIDES (leaf variation)

Keystage: 1 and 2

Location: Site

Leaves come in many shapes, sizes and colours. Some are thick, some are thin, some hairy, some smooth. Leaves have veins. These carry food and water with them. Water is carried up from the roots to the leaves and food made in the leaves is circulated around the tree.



Equipment:

1. Slide holders (Plastic or cardboard frame- see illustration)
2. Leaves
3. Magnifying glasses

Learning Outcomes

1. To appreciate the variation on leaves and the impact of environmental factors such as grazing, disease, death and decay.
2. To understand the role of the leaf in producing new material for growth (KS2- Sc2, 3b).

Activity

1. Choose a leaf (preferably from the ground).
2. Look for something that makes it special and/or unusual. Use the magnifying glasses.
3. Put leaf in a slide holder. (This is the ticket to the slide show).
4. All stand in a circle. One person is the slide projector operator.
5. Hold slides up to the light to show their vein patterns and colours.
6. When the operator clicks, everyone passes their slides to the person on their right.
7. Each time hold the leaf slide up to the light.
8. Stop doing this when everyone has his or her original leaf back.

Extensions:

- Investigate which colour light from the white light spectrum is filtered out by the chlorophyll in the leaf. Use a triangular prism to separate the colours of the spectrum out.
- Investigate why leaves are green.
- Look for holes in the leaves. Consider what animals may have caused these.
- Examine leaves under a microscope. Look for cells and stomata (holes for air to go in and out). You will need to gently peel a section of the leaf surface away and place on a moist slide.
- Investigate the process of photosynthesis.

Skills:

- Detailed examination
- Co-operation within a team
- Comparing and contrasting
- KS1/2 - SC2

Key Words:

- Magnify
- Cells
- Spectrum
- Veins
- Photosynthesis

Activity T6

TREE TRAIL – LEAF RUBBING

Keystage: 1 and 2

Location: Site or classroom

Equipment:

1. Paper
2. Clipboard
3. Thick wax crayons (leaf colours)

Learning Outcomes

1. That leaf shapes and sizes vary according to species, age and environmental factors.
2. That water and minerals are taken in through the root and transported through the stem to other parts of the plant.

Activity

1. Find a leaf. (In autumn use fallen leaves. In spring and summer pick one leaf very carefully to minimise damage to the tree.)
2. Look closely at its shape, size, symmetry, edges and vein patterns.
3. Place the leaf on a clipboard, underside facing up.
4. Put a piece of paper on top and hold firmly in place.
5. Rub a crayon on its side quite hard until the leaf shows through the paper.
6. The trick is to keep your leaf and your paper still.
7. Do this several times using different colours. Pupils could swap leaves with a friend and add to their rubbings.

Extensions:

- Are all the leaves on one tree the same shape and/or size?
- Link with Activity T3 – Which Tree Are You?
- Which tree has the biggest leaves? Smallest?
- Are all leaf edges smooth? Jagged?
- Are leaves sometimes in groups on a stem? Or in pairs?
- Are the leaves opposite each other? Alternative?
- Consider the purpose of the veins in the leaves.
- Do leaf printing with paint and/or make Leaf Tiles (see overleaf).

Skills:
- Comparing and contrasting
- Teamwork
- Using colours
- Shape and symmetry recognition
- KS1 SC2, MA3

Key Words:
- Size
- Smooth
- Jagged
- Underside
- Veins
- Shape
- Symmetry

Leaf Tiles

Ask each child to select several good leaves which they would like to preserve. Make a clay mix with the ingredients below:

2 cups plain flour
1 cup salt
1 cup water
2 tablespoons cooking oil

Shape the clay into a ball and roll it out to about 2 cm thick. Press the leaf, vein side down, into the clay so that it marks it. Remove the leaf carefully.

Bake in the oven at gas mark 1 or 2/120°C/250°F for about 2 hours. The finished tile can be varnished or painted.

Activity T7

TREE TRAIL – A TREE'S SKIN

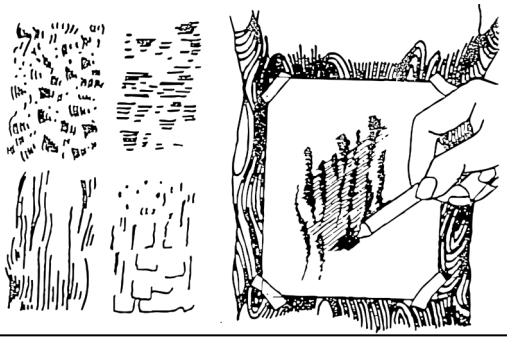
Location: Site

Keystage: 1 and 2

Equipment:

1. Paper
2. Thick wax crayons

The bark of a tree is like its skin. It protects the tree from disease, damage and insects. Without bark trees will die. Trees have very different types of bark – some rough, some smooth.



Learning Outcomes

1. To appreciate the variety of textures and patterns on tree bark.
2. To record the bark pattern on a variety of trees.
3. To understand that bark is important for the protection of the tree from disease and predation.

Activity

1. Choose two very different trees.
2. Look closely at the bark of each one using a magnifying glass, your eyes and feel with your hands.
3. Describe how they are different.
4. Do a bark rubbing for each tree to record the different textures; hold a piece of paper firmly against the trunk of the tree, then rub a crayon on its side against the paper until the pattern of the bark shows through.
5. Are any things the same or similar?

Extensions:

- Did you know that trees have their own patterns just like we have finger prints?
- Use fallen pieces of bark to create a collage etc.

Skills:

- Shape recognition
- Comparing and contrasting
- KS1/2 SC2 EN1

Key Words:

- Pattern
- Rough
- Smooth
- Texture

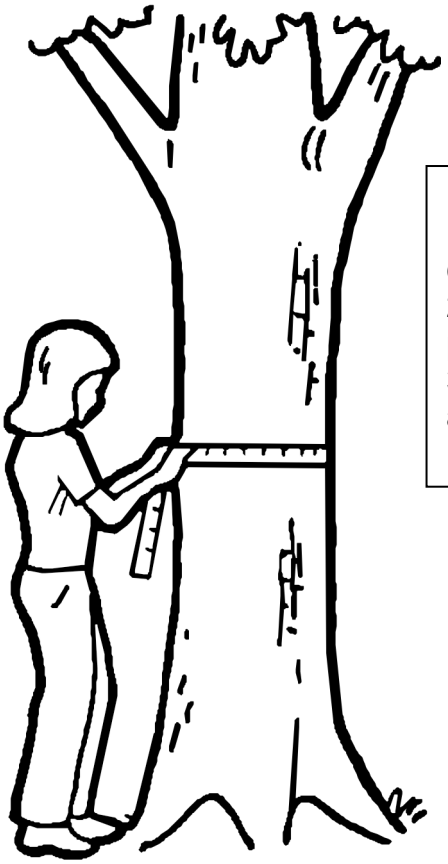
Keystage: 2
(or 1 with help)

Location: Site

This is a useful way to find the age of a living tree. It can be used as part of a discussion about how we can determine the age of different organisms.

Equipment:

1. Tape measure
2. Calculator
3. Pencil and paper
4. Table showing what to divide by for each tree type (see overleaf).

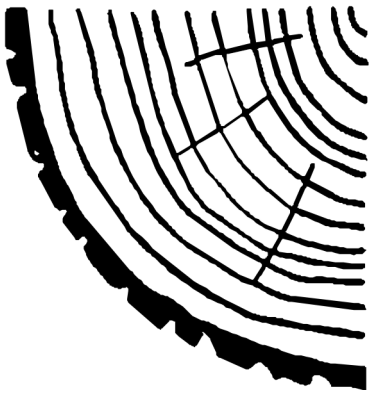


Learning Outcomes

1. To learn that tree age is directly related to tree trunk circumference and that this varies with tree species.
2. To have considered evidence, observed patterns, made predictions and evaluated results (KS2- Sc1, 2i-m)
3. To make simple comparisons and identify simple patterns or associations.

Activity

1. Find an old tree (or what you think is the oldest tree).
2. Try to guess how old it is and/or the girth of the trunk
3. Can you put your arms right around it?
4. Use a tape measure to find out the circumference (or girth) of the tree trunk in centimetres at 1.3 metres from the ground (or adult chest height) How does this compare with your guess?
5. Decide what type of tree it is.
6. Decide whether the tree is growing on its own or in a group.
7. Divide the circumference (in centimetres) by the number shown in the table overleaf (or use average of 2.5).
8. Record your findings.
9. How do they compare with your guess?
10. Look at other trees nearby to compare ages and growth rates.



Extensions:

- Discuss tree rings and why they cannot be used to find the age of the tree.
- Use tree keys to identify the tree – Activity T3 - Which Tree are You?
- Discuss reasons for the difference between values (in the table) for trees growing in a group and on their own (i.e. less competition for trees growing on their own).
- For an old tree, think about local, national or global events since the tree began its life. Consider what the tree might have 'seen'.
- Compare the growth rates of different tree species. Consider why pine and spruce are used for commercial forestry trees.
- Ask pupils to calculate:
    - How much older the tree is than themselves (subtraction);
    - How many times older the tree is compared with them (division).

Skills:

- Measurement
- Calculation
- Comparison
- Tree Identification
- Imagination
- KS2 MA2,3,4, SC2

Key Words:

- Circumference
- Girth
- Estimate
- Competition
- Growth Rate
- Forestry

Table to Calculate the Age of a Tree

Species	**Growing in a wood**	**Growing on its own**
	Divide the circumference in centimetres by:	
Holly	1.25	1.75
Oak, Beech, Limes, Sweet Chestnut	1.88	2.20
Hazel, Ash, Elm, Willow	2.50	3.20
Sycamore, Alder	2.75	3.50
Pine, Spruce	3.13	4.00

Activity T9

TREE SEED COLLECTION AND SOWING

Location: Site and school

Keystage: 1 and 2

Equipment:

1. Bags or old envelopes to collect seeds
2. Tree (and seed) identification keys (Appendices 4 and 28)
3. Tree Seed Planting Guidance Sheet (Appendix 27)
4. Appropriate planting equipment (pots, peat free compost etc.)
5. Gardening gloves.

An excellent activity for autumn. Seed Gathering Sunday is around the 11th October, but berries etc. are better collected before that date. Beforehand read the Tree Seed Planting Guidance Sheet (Appendix 24). Seed treatment and planting can be done back at school.

Learning Outcomes

1. That seeds grow into flowering plants (including trees) (KS1- Sc2, 3c)
2. That life processes common to plants include growth, nutrition and reproduction (KS2- Sc2, 1b).
3. To relate life processes to plants found in the local environment (KS1- Sc2, 1c).
4. To make links between life processes in familiar plants and the environments in which they are found (KS2- Sc2, 1c).

Activity

1. Introduce the activity by discussing how trees reproduce. Explain that some tree seeds are to be collected to offer a 'helping hand' and enable trees to grow in places other than where the seeds might naturally be dispersed to.
2. Explore the site looking for tree seeds and collecting them in the bags/envelopes.
3. Sort the tree seeds into tree type (this can be done during collection if different groups look for different seed types).
4. Treat and/or sow the seeds at school.

Handy Hint: For acorns and other types of nuts, viability can be tested by dropping the seeds into a bucket of cold water. Those which float should be discarded (unless a shoot is already present) and those which sink should be viable and are likely to grow under the right conditions.

For concise useful information about growing trees from seed refer to The Good Seed Guide produced by The Tree Council.
ISBN Number: 0-904853-01-2

Extensions:

- Look at methods of seed dispersal (wind, water, animal, explosion). Sort all types of seeds (including herbaceous plants) into their seed dispersal method as you explore the site. Use double sided tape to create a sorting sheet for seeds to be stuck on (see Appendix 29).
- Discuss why some trees are beneficial for wildlife (native species) whilst others are considered 'weeds of the woodland' (introduced species).
- Use Activity T8- How Wide? How Old? To find out how many years it will take the seeds to grow to a certain size – How old will the pupils be by then?

Skills:

- Sorting
- Observation
- Following instructions
- KS1/2 Sc2

Key Words:

- Dispersal
- Viability
- Native
- Introduced