

do
one
thing
get
tree
planting



Welcome to the BBC Breathing Places Schools trees for wildlife activity. This is the Do One Thing activity for the autumn term of 2009.

Every child should have the chance to plant a tree

Each school that is registered with BBC Breathing Places Schools will have the opportunity to receive a rowan tree sapling for planting in November. The legacy that this tree will provide, along with the thousands planted in other schools, will benefit wildlife for decades.

Before you plant the tree, look at the activities we have made available. Some are in these Teacher's Notes, others are on the website as downloads. These will build the children's understanding of how trees work, how wildlife and people benefit from them and why we should do something to help these beautiful living things.

Holding a tree day, with the tree planting itself as the climax of the day, would be a fitting end to this term's activities. We have an agenda for the day that will make it memorable for everyone in the school and will provide the opportunity to reflect on the other Do One Thing activities that your pupils may have completed – making your school a Breathing Place for nature.

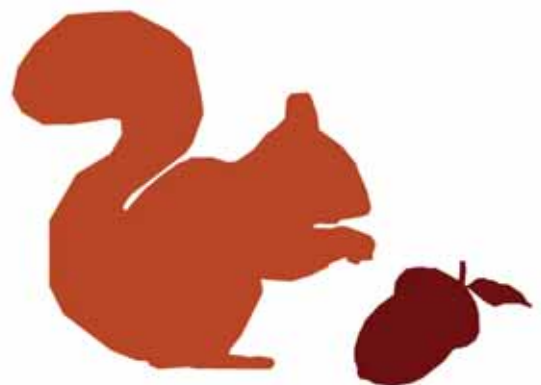
Follow a journey back through the life of a tree from death to birth

A tree's value does not end when it dies.

Trees are wonderful for wildlife, providing food and shelter for minibeasts, birds and mammals. The wood from dead trees is also a vital element in nature if it is left on or in the ground.

As trees decay, they can become hollow and this can provide homes for birds, mammals and minibeasts.

If you have a tree in the school grounds that has died or become dangerous, instead of removing it completely, why not leave the stump? You can also gather up some of the branches to create a mega-log pile. Both will provide homes and food for minibeasts for years to come.



Activities

New paper from old

This activity will help your pupils to learn about recycling and the structure of paper while letting them develop practical skills.

Most paper is made from wood pulp and can be recycled into new paper following a few simple steps.

Making recycled paper can be a fun activity for your pupils. Download the detailed instructions on **making recycled paper** that will lead you through the complete process. You will find ideas to make this a valuable activity for nature as well as for art, design technology and literacy while spreading a strong recycling message.

A good way to make paper in your class will be to group the children together into teams with four or five pupils in each. Allow them to work with one pulp bowl per team and let them make one sheet of paper each in a session.

There is a ring to history

Tree rings tell the story of a tree, one for each year that it has lived. You can download the **Tree rings** activity sheet explaining how your pupils can create a visual record of history using a tree stump or tree section.

In this way, your pupils will learn how old a tree is by counting rings and they will develop an interesting way to visualise historical events.



Interesting facts

The world's oldest tree

The oldest tree in the world has a name, "Methuselah", and is over 4,760 years old. This bristlecone pine tree lives in California in the United States. It was already growing before the great pyramids at Giza were built. The tree was over 2,000 years old when Pheidippides ran from a battlefield near Marathon to Athens spawning the name of the now popular running event (490 BC) and was already 2,800 years old when T'sai Lun invented paper, as we know it today, in China. "Methuselah" has seen the coming and going of all the ancient civilisations of the world and has provided homes and food for millions of minibeasts and many thousands of birds and mammals.

The importance of rainforests

Rainforest covers only 2% of the surface of the earth yet it holds 75% of the known land-based plant and animal species. The world loses an area of rainforest approximately the size of a typical school's grounds every second! The trees are chopped down for their valued hardwood and to make way for other land uses, such as palm oil plantations, softwood trees for paper and open land for raising cattle.

Questions on this topic for your pupils

What do the rings in a section of tree trunk signify?

How can dead wood help wildlife if left alone?

When studying world history, ask the children to work out how old the tree "Methuselah" was when key events took place.

Where are most of the world's rainforests?
Can you point to their location on a globe?

What are the parts of a tree and what do they do?

It is easy to see the different parts of a tree when it is mature and has its leaves.

Tree growth:

- The trunk rises out of the ground and branches protrude from the trunk allowing the tree to spread. For most trees, there are twigs on each branch continuing the spreading process and on these are the leaves.
- The roots anchor the tree in the ground and can occasionally be seen where the soil has eroded around them but are usually hidden. A good rule of thumb for gauging the length of the roots is that they will extend to cover the same area as the branches.

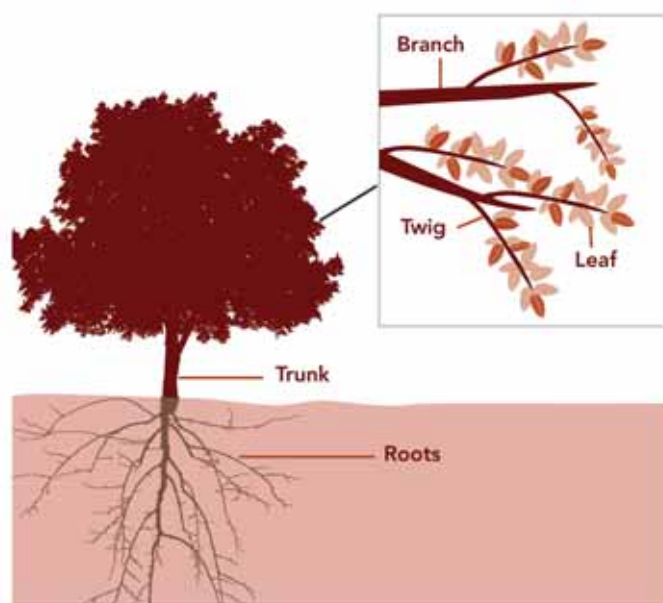
Tree feeding:

- The roots gather water from the ground. This water is sucked up the trunk, along the branches and along the twigs until it reaches the leaves.
- The leaves combine the water with carbon dioxide from the air using light energy from the sun to transform this mixture into sugars which are then pumped back down the tree to feed its growth. The process in leaves is known as photosynthesis and is common to all plants on land. For a large tree, a lot of leaves are required. The next activity will allow the children to estimate how many leaves are on a tree.

- Photosynthesis absorbs carbon dioxide and releases oxygen into the atmosphere, vital for sustaining life on Earth.

Tree leaves:

- The leaf's green colour in spring and summer comes from chlorophyll, the chemical that controls photosynthesis.
- Deciduous trees (ones that lose their leaves for winter) produce less chlorophyll in autumn. As the available sunlight reduces, the leaves change colour and become yellow, orange or red depending on the balance of other chemicals and the weather. This is how the beautiful autumn colours in woodland develop and indicate that the leaves are about to fall.
- Deciduous trees survive through the winter by shutting their growth system down and shedding their leaves. When enough warmth and sunlight return in the spring, a new set of leaves grow and the process of photosynthesis starts all over again.



Activities

Branching out

Your pupils will improve their identification skills for both the constituent parts and different types of trees using the factsheets and collection bags in this activity.

Take your pupils out to see some trees and encourage them to identify the different parts of the trees that they find.

There are **identification downloadable factsheets** showing the leaves, twigs, fruits and nuts of common trees. The pupils can use these to identify the types of trees that they find.

There is also a downloadable design for an easily made **leaf-collecting bag**. Each of the pupils can make their own bag before going out.

Make sure that the children understand that they should not eat nuts and berries that they might find as some could be poisonous.

Encourage the children to collect leaves, twigs, nuts and berries that have fallen from the trees that they find. They will be able to identify the different species that they have seen using the factsheets. These items will be useful for art projects in the classroom.

Making bark rubbings

Why not take rubbings from tree bark? All that your pupils need are some sheets of smooth paper and wax crayons. Working in pairs, get one child to hold the paper against a tree trunk while the other rubs the flat side of the crayon across the paper. The pattern of the bark will quickly appear. Write the name of the tree on the back for later reference. Then let the other pupil make a rubbing, on the same or another tree. Your pupils can apply this same approach to make rubbings of leaves from the tree but should use lighter weight paper.

Watching the wildlife

Keep an eye out for birds, mammals and minibeasts to see how they are using trees. Make sure your pupils note where they saw them, for instance at the top or on the trunk, and what they were doing. Remember, minibeasts can be very small and easily missed – so extra attention may be needed to spot them.

A nature display

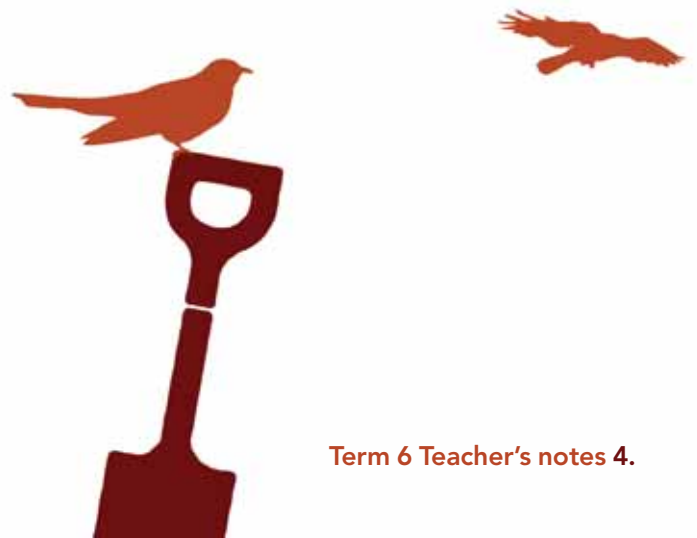
When you get back to class, your pupils can create a display for each type of tree using leaves, bark rubbings, twigs and possibly nuts and fruit. This can be done by sticking or taping the items onto a card that is labelled with the tree's name. Include any observations of wildlife.

Make sure that your pupils wash their hands with soap after handling their collection of tree materials.

Leaf chiefs

Your pupils can do a little research in the library or on the internet to find out more about the trees that they have identified. Some trees have strong links with wildlife and many trees are associated with interesting history and fascinating folk tales.

Here is an opportunity to create 'Leaf Chiefs'. Individual pupils can learn a lot about one type of tree and then they can tell the others about it. The 'Leaf Chiefs' can work with other children to create stories using what they have learned about their tree and the wildlife that depends on it.



Interesting facts

Hearts of Oak!

'Hearts of Oak' is the official march of the Royal Navy. The chorus tells us why:

**"Hearts of oak are our ships,
Jolly tars are our men, we always are ready;
Steady, boys, steady!..."**

Oak was the wood of choice for making sailing ships. HMS Victory, Admiral Lord Nelson's flagship, which is now a museum ship in Portsmouth, took the wood of 5,500 oak trees for its construction. She was built in 1765 and is still going strong, showing the remarkable durability of oak.

Keeping our feet dry and the air clean

Trees draw great quantities of water from the soil. They are planted along streets to help minimise flooding as they prevent the ground from becoming saturated. London plane trees are planted in many cities around the world for this purpose and are particularly useful as they also help to reduce air pollution.

What do trees taste like?

Maple syrup is the sap of the maple tree found commonly in Canada and the United States. This sweet treat is the sugary liquid that is created in the leaves of the tree to make the tree grow. Many trees have flowers. Tree honey is made by bees that feed on the nectar gathered from these flowers.

HMS Victory



Questions on this topic for your pupils

Name some other benefits of having trees around our houses. Can they help us keep cool in the summer?

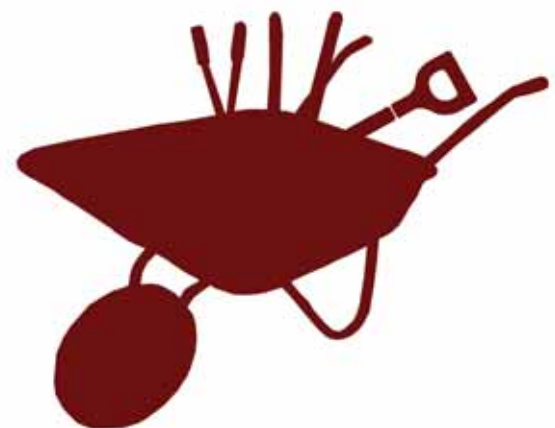
Trees sometimes appear lopsided, leaning over or having their leaves predominantly on one side. What might cause this?

What is the link between tree sap and bicycle tyres?

How big is a tree?

For trees to use photosynthesis to keep growing they need to have a large number of leaves and good access to sunlight and that is why branches spread out from the trunk. It is possible to work together to estimate the number of leaves on a tree even though there are too many to count individually.

There are also fun ways to estimate the height and to measure the circumference, known as the girth, allowing the age of the tree to be estimated. This will provide some hands-on mathematics for your pupils.



Activity

How tall is that tree?

Your pupils will be able to work out the height of a tree by application of a little elementary geometry.

Here are two ways to do it. Why not split your class into two groups and try different methods? Then the groups can compare results. Your pupils will need a ruler, pencil or stick for this exercise. For both methods, they should work in pairs.

Method 1

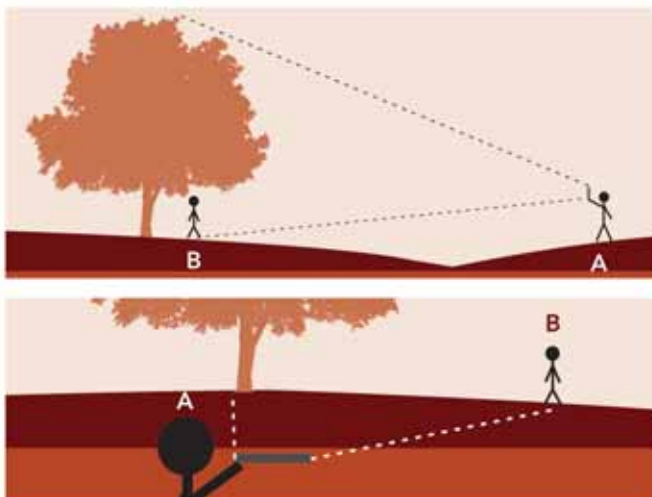
Pupils A and B stand at the base of the tree. Pupil A holds a ruler straight out in front of him/her in a vertical position.

Pupil A then closes one eye and backs away facing the tree until they reach the point at which the ruler and the tree appear to be the same size.

Pupil A then rotates the ruler until it is horizontal, ie parallel to the ground, keeping one end lined up with the base of the tree.

Pupil B walks away from the tree at right angles to the direction that pupil A went, counting paces. When pupil A can see pupil B in line with the end of the ruler, s/he tells pupil B to stop. Record the number of paces taken. This is the height of the tree. The height can be worked out in metres by measuring how long one pace from pupil B is and multiplying by the number of paces.

Method 1



Method 2

Measure and record pupil A's height and get her/him to stand at the base of the tree.

Pupil B closes one eye and walks a distance from the tree holding a stick vertically in an outstretched arm until pupil A appears to be the same height as the stick. Pupil A's known height becomes the unit of measurement. Estimate the number of these known units it takes to reach the top of the tree and multiply by pupil A's height.

How old is that tree?

You can estimate the age of a deciduous tree by measuring its girth about one metre above the ground. Pupils will need a tape measure for this activity and it is best to work in pairs.

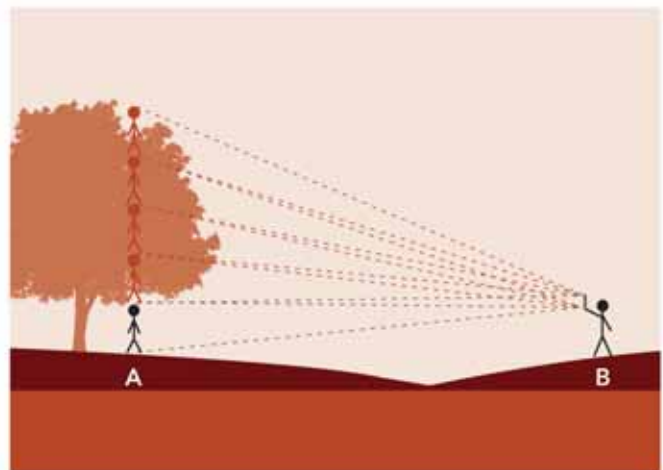
Pupil A measures from the ground up one metre on the trunk of the tree and pupil B puts his/her finger on the tree at that point.

Give the tape to pupil B who will hold the end of the tape where his/her finger was.

Pupil A then runs the tape around the tree and back to the start point. Read the distance from the tape and record this.

Trees grow about twice as quickly when they are on their own rather than in a wood. The growth is typically 2.5cm per year for a number of common trees growing on their own. It is difficult to know if a lone tree has always been a lone tree so let's use a typical figure of 2cm per year.

Method 2



How big is a tree?

You will need to find a tree to survey. You may have one in your school grounds or in a local park or woodland. It is best to use a deciduous tree as a conifer's needles can be a bigger challenge.

How many leaves does that tree have?

Step 1 Work as a team

Break your class up into three groups: the branch team, the twig team and the leaf team.

Branch Team – Count and record the number of branches on the tree (NBranches)

Twig Team – Count and record the number of twigs on a typical branch (NTwigs)

Leaf Team – Count and record the number of leaves on a typical twig (NLeaves)

For older children the twig and leaf teams could examine more than one branch or twig and calculate the average number of twigs per branch and leaves per twig.

Step 2 Put it all together

To work out how many leaves there are on the tree, calculate the following sum:

Total leaves = NBranches x NTwigs x NLeaves

You will find that this is a large number, typically in the tens of thousands.

This simple equation will allow the age of the tree to be estimated.

$$\text{Age} = \frac{\text{Girth (cm)}}{\text{Growth per year (cm)}}$$

If the girth is 200cm then the tree is approximately 100 years old. This is only an estimate but helps to illustrate how long trees can live.

You can combine this activity with the identification activity and your pupils can add the data to their tree displays for the different species identified and measured.

Interesting fact

Tallest Tree – The tallest tree species currently known is the Californian redwood. The tallest known redwood is called "Hyperion" and is located in the Redwood National Park in California. It is 115.55m tall. To help your pupils to understand the scale of this tree, ask them to draw "Hyperion" on graph/square paper and draw the tree that they have measured to the same scale on the same page. Why not give the tree that has been measured a name?

Questions on this topic for your pupils

What geometric shape is the basis for method 1 for estimating the height of a tree? It is a special kind of triangle.

What is the tallest tree in Britain and what kind of tree is it?



Fruit and nuts

Trees have a range of ways in which they reproduce although most are based on the dispersal of seeds from which new trees will grow.

Here are some common trees and shrubs (small trees) with their seeds and fruit that your pupils are likely to find around the school or in nearby parks and woodland.

Tree name	Fruit/Nut	Dispersal
Sycamore		The seeds are like little helicopters and will fly on the breeze.
Field Maple		
Ash		
Oak		Animals and birds collect these seeds for food and bury them for the winter. They forget where some are and a tree can grow from these forgotten seeds.
Hazel		
Horse chestnut		
Rowan		Birds and animals eat these berries providing vital sustenance in autumn and early winter. The seeds are actually inside the berry and are not digested. They pass through the bird or animal and grow where they are left.
Elder		
Holly		

Activity

Grow trees from seed

Your pupils can grow their own trees from seeds. For this you will need some yoghurt pots or the bottom of milk cartons, some peat-free soil and some seeds from local trees.

You need to think about what your school will do with the trees when they grow. This can form a good planning activity where you can guide your pupils to think of the long-term consequences of growing trees. Here are some things to think about:

- Is there a place in the school grounds where you can plant the trees and who can give permission?
- Is there a local park which needs some new trees and who will authorise planting in that park?
- Is there a derelict local area that is being redeveloped which could do with some trees and, as always, who do you need to talk to?
- Are any of the children's parents interested in adding a tree to their garden? Or a community forest in their area?

There is a detailed activity sheet to download that takes you through the required steps to **grow an oak tree from an acorn**.

Make ornamental nut bugs

Why not get your pupils to combine their observation, artistic and design technology skills to make models of minibeasts using conkers, acorns and other tree seeds. Download the **make nut bugs** activity sheet and you will find everything you need to get started.

Jackfruit



Interesting facts

Squirrels and acorns

Squirrels and oak trees work together. Squirrels like to eat acorns, which are the seeds of the oak tree. There are too many to eat at once so the squirrels collect them up to eat later. They bury the acorns in the ground, planning to come back when they are hungry. Fortunately for the oak tree, the squirrels do not have very good memories and they forget where some of the acorns have been buried. These acorns can then grow into new oak trees.

Fruit is good for people as well as wildlife

We should eat plenty of fruit in a balanced diet. Many people enjoy apples, pears, cherries and plums to name just a few fruits that grow on trees. Amazingly, all of the varieties of apples are variants of one species, *Malus domestica*, and they are the result of selective breeding to change their flavour and/or growing characteristics.

Fruit can be pretty big!

The world's largest tree fruit is the jackfruit which can be 90cm long by 50cm in diameter and weigh up to 36kg (the same weight as about 350 apples). It is native to South-East Asia. The picture below shows a jackfruit growing in the Kerala Province of India. Apples and pears will generally be our largest locally grown tree fruits.

Questions on this topic for your pupils

Why do trees need to disperse seeds rather than just drop them to grow in the same place?

Ask your pupils to find out if there are other birds or mammals that collect and store acorns and the seeds of other trees.

Why are berries usually brightly coloured?

What do you call an area where apple or other fruit trees are grown?

It is time to plant a tree

Your pupils will have learnt a lot about trees: how they grow, what benefits they bring throughout their lives and how they perform an important function for nature in Britain.

Holding a tree day, culminating in the planting of a rowan tree that we will send you, is an opportunity for your pupils to share what they have learnt with other children in the school and with some of their parents.

The idea of the day is to go through a range of connected activities on the theme of trees to celebrate the value of trees, starting with morning assembly and culminating in a tree planting ceremony. As there is an ideal time of year to plant a tree – in November – it would be wonderful if most of our Breathing Places Schools held their tree day on the same date, Tuesday 10 November. You will be given plenty of notice when your tree will be delivered direct from the nursery.

Activity

Find the best place

Your pupils may have done the Breathing Places Schools 'Look Around' observation activity to find out about your school grounds. If so, they could use the information that they gathered to decide on a good place to plant a rowan tree. If not, then this is a good opportunity to get the children outside, using the 'Look Around' activity, which can be downloaded from bbc.co.uk/breathingplaces/schools to build a picture of the grounds with the objective of deciding the best place to plant.

Here are some things to think about when looking for the best place:

- For a rowan tree, stay at least 8 metres away from a building to avoid possible damage from roots and to limit risks associated with a falling tree when it is old.
- Avoid areas that have utility pipe runs, such as electricity, gas, water or sewerage. Consult the site plans.
- Avoid areas which are used for sport or other activities which require a lot of movement of pupils and staff.

- Agree the location with the landowner (which is probably your local council).
- The rowan tree is a very adaptable tree and will grow in the early years in a pot. An ideal size would be a half-barrel which will allow a number of years of growth.

When you have decided on the location, get your pupils to make a sign to mark the spot.

If you are not able to plant a tree, there are still activities that will allow your pupils to celebrate the importance of trees.

Tree Day

A programme for a **tree day** and an **essential tree planting guide** can be downloaded giving a full day's activities leading to the planting of your tree. Not all schools will be able to do all of the activities but do not worry – there are enough different things to provide something for everyone.

This day is also an opportunity to celebrate the other activities that your pupils have contributed to in the creation of a Breathing Place in your school.

Protect your tree

You will need to protect your young rowan tree from rabbits, deer and children. The best way to do this is to surround it with a protective barrier that will also identify the location and prevent accidental destruction by a lawnmower.

This protection can be a fun art project. Collect some sticks 60–70cm long and decorate the tops using some of the leaves, twigs, nuts and berries that have been collected. If you do not have sticks, you can use garden canes.

After the rowan tree has been planted, get the children to push the decorated sticks into the ground around the tree, close together, leaving a 30cm gap in the middle for the sapling.



Create a natural work of art

Create a work of art using leaves, twigs, seeds and fruits. This could be created in your grounds near the location of your rowan tree. Your pupils could illustrate the themes of Breathing Places by showing flowers, minibeasts, birds, mammals, water and trees. As this will be a short-lived work of art, make sure that you take some photographs. We would like you to send your pictures to us to breathingplaceschools@bbc.co.uk and we will show a selection on the Breathing Places website. Here are some important tips to remember:

- **Submit your images electronically** in a **high resolution**, digital format – for example as a jpg (preferably at least 300dpi or 1,800 pixels in width).
- **You must have written parental/guardian consent before you submit photos of children under the age of 16 or vulnerable people.**
- By submitting images/video, you confirm you have **permission from the copyright owner** to publish them.
- In submitting images/video you **grant the BBC permission to reproduce** across all media.
- Please ensure you **name your image(s)** so that they are easy to identify. We suggest something along the lines of: "name of project_title of picture_date" – for example: "turnersgreen_fence_oct 2008.jpg".
- Photos that capture **action, emotion, people, places** and **overall vision** are ideal. It's great to see broad shots of the project, as well as close up shots of the most interesting parts.

Decorate a tree

Tree decoration has been carried out through the ages right up to today. Many families will have a Christmas tree decorated to match the festive season. The children could dress a tree in the school grounds using things that they have created representing the aspects of nature that they have learned about.

Interesting facts

The rowan tree

The rowan tree is a very popular tree and has been seen traditionally as a protector. Many old cottages have a rowan tree planted near their doors to keep evil away. "The Rowan Tree" is a famous Scottish traditional song, by Carolina Oliphant, Lady Nairne (1766–1845). The words show the affection that the Scots have for this tree.

Rowan berries

Rowan berries are bright red and attract many birds in the autumn. The berries carry the rowan seeds, which pass through the birds and are distributed in the birds' droppings. Sometimes they fall in the fork of another tree where the rowan somehow manages to grow, creating what is called a 'flying rowan'. Raw berries picked from the tree are unpleasant to the taste and are not good for people. However, rowan jelly can be created from the cooked berries. It retains a sharp flavour and this jelly is traditionally eaten with game, such as pheasant, grouse or partridge.

Questions on this topic for your pupils

Can the children find out more stories about the rowan tree?

What has the wood of the rowan tree been traditionally used for?