Mad about Trees

School Activities
## MAD ABOUT TREES - Summary

A number of activities related to trees. These can be used to find out about the trees in Wyre or your own local woodland.

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Activity - Seed dispersal - Seed and spoon race

You will need:
Bucket to collect seeds
Tree cards printed (2 x sets - or enough for 1 card each)
4 mats
2 spoons

Start by collecting as many different seeds as possible (approximately 6 of each). For example you could find Douglas Fir cones, Scots Pine cones and larch cones, acorns, beech mast, conkers, ash keys, sycamore wings, and sweet chestnuts. Place these on the first mat about 10m from the start line.

Use this link to the Wyre Tree downloads to help you.

Divide the group into 2 relay teams. On the starter call the first person in each team picks up a tree card then runs to the first mat to find a seed that matches the tree. They then carry that seed using the spoon provided to the second mat and put it down with the tree card. Then they run back to the team and hand the spoon to the second player. Repeat as before until all the team members have had a go. The game stops when the first team has finished.

At this point the teams are awarded or deducted points for speed and the seeds are collected.

Scoring:
First team back gets 10 points
2nd team back gets 5 points
Deduct 2 points for each wrong seed.
Activity - Life cycle

Everyone in class selects a tree. Try to get as broad a selection of trees as possible that you have access to easily all year round. The idea is to create a wall of images that show each of these trees in various stages through one year eg:

- **winter** - bark, twigs
- **spring** - buds
- **summer** - flowers and leaves
- **autumn** - seeds and dead leaves

This will require the students to take responsibility for their own tree and collect or make their own images. These could be sketches, paintings, photographs or montages of leaves and seeds etc to give texture. Everything that goes on the board should be annotated.

Find a board large enough to draw a 50cm diametre circle for every student. Paint it green. Fix it to the wall. Draw the circles in pencil and then in the centre write the tree name, the latin name and the student’s name in brackets. This should stay up all year for them to add their notes and images throughout the year. Everyone’s tree and therefore circle will be different.

They will need to do some initial research to find out the best times of year to get images. How is the tree pollinated? What do the seeds look like? Does it have flowers? How are the seeds dispersed?

Link to tree PDF downloads
Food provides a source of energy for living processes.

Animals are known as ‘consumers’ as they obtain their energy from the plants and animals that they consume.

Green plants are known as ‘producers’ as they ‘capture’ light energy from the sun, using the green pigment in their leaves called chlorophyll.

This energy is used to produce sugars, by the process called photosynthesis. The leaves on plants, including trees, are their food factories. Using energy from the sun, they take the water that the roots have sucked from the ground and mix it with the carbon dioxide in the air to make food for the plant (a sugar called glucose, which is either used in respiration or converted to starch and stored), and release oxygen. Plants are therefore said to produce their own food.

Look at the picture below and fill in the names of the processes involved in photosynthesis. Choose words from the list at the bottom of the page.
Activity 2 - Cryptic Clock

Use the cryptic clock below to decipher the code to find out what makes leaves green.

Code: 10 35 55 12 27 12 18 35 57 55 55

Answer: ______________________________________
Activity 3 - Photosynthesis game

You will need:
Green pads (enough for each pair of children)
CO\textsubscript{2} and H\textsubscript{2}O labels, with ‘food’ on the reverse
Bubble blowers
Blindfolds (optional)

Divide children into 2 groups and position groups at opposite ends of the room. Hand out CO\textsubscript{2} labels to one group and H\textsubscript{2}O labels to the other, and blindfolds if using. Give each CO\textsubscript{2} molecule a green pad to hold, and each water molecule a bubble blower.

Explain that the room is now a leaf and that air enters the leaf through tiny pores or stomata. CO\textsubscript{2} molecules enter room and stand around in leaf.

Water molecules enter through the stem and mingle with CO\textsubscript{2}

Explain that it is night, so either close eyes or put blindfolds on and then move around VERY SLOWLY. When molecules bump into each other, gently move on.

Tell children to open their eyes or remove blindfolds. Now when a water molecule bumps into a CO\textsubscript{2}, they stick together and stand still.

Run the dark/light scenario a few times until all are paired.

When all molecules are paired, tell them to put their green pad on the floor and jump onto it.

Explain that something magical happens when the sun rises. The light energy lets the molecules bind together and when they are on a green pad they make FOOD - turn labels around.

Explain that the green plants are the only things that can make their own food and thus food for everything on the planet. They also produce something else - OXYGEN. Use bubble blowers to fill the room with bubbles.

Collect bubble blowers.

The game can be developed by collecting in 3 of the chloroplasts, and leaving the others spread around on the floor.

Rerun the game, then hand out caterpillar cards to the spare children.

Caterpillars crawl around eating the leaf. Eaten children become part of the caterpillar and crawl around behind. Continue until all the leaf is eaten and has become part of the caterpillar.

Discuss what is happening. All the leaf is now gone - is this a good idea? What might stop this happening?

You could now rerun the game, introducing Blue Tits to eat the caterpillars and restore a balance.

TIP: You may need to remind the children occasionally that the room is the leaf and the pads are chloroplasts, not leaves!
Activity - Tannins in Oak

Background to local tanning industry

The presence of oak trees in the Wyre Forest provided a raw material for the Bewdley leather tanning industry from at least the 16th century. Bark peeling continued into the 20th century, but as tanning declined so did the need for bark.

Bark peeling served the needs of the leather tanning industry. Leather was in demand, not only for footwear, gloves and clothing, but for a range of domestic and industrial purposes. These included furniture, book covers, horse and carriage fittings, containers and bellows for the metal working trades. Bark, especially oak bark, was an essential part of the leather manufacturing process because it contained tannic acid:

• It prevented leather from putrefying.
• It helped leather retain its strength and pliability.
• It improved leather’s ability to resist water.

Activity

Tannin is water soluble. Take a lump of oak bark and place it in a bucket of water (to represent rain) See how brown the water goes. (This will begin immediately, but leave it overnight). This is the tannin being released from the Oak.

Is this alkaline or acid?
How does this affect the soil under the tree?
How does tannin protect the tree?

Link to Oak tree - uses
Hybridisation of trees in the Wyre Forest

Hybridisation occurs when members of two different species mate with one another and produce viable offspring that carry genes from both parents. When an invasive species is much more abundant than a native relative, they may hybridise so often that the invader’s genes “flood” the native species, such that no individuals contain the entire genotype of the native species, thus effectively driving the native species to extinction.


Hybrids of Wyre Crossword

Many trees will hybridise. Use the clues on the following page to find some of the trees capable of hybridising in Wyre.

Follow this link to the Trees of Wyre to help you.
http://www.forestry.gov.uk/wyreforest
Clues across:

1. Opposite of white; spikes on rose stems.

2.

3.

Clues down:

1.

2.

3. Tall thin tree, popularly grown in linear stands; liked by most without the ‘u’.

4.

5. A classic of riverbanks; often there is wind in.
Activity - Size matters

This activity uses different maths to measure aspects of an oak tree. Start by choosing a large Oak tree. Draw its basic shape on a piece of paper. As you find out information and start measuring, write all the information on this image.

You will need:
Paper
Pencil
String
Tape measure
Clipboard

How tall is the tree? (see following page)

How old is the tree? (see following pages)

(KS3)
What is the volume of the main trunk?
Draw a cylinder to represent the trunk. Use a tape measure to measure the actual tree to get a circumference and diameter. You can now work out the area of a typical cross section. Now estimate the height of the trunk by measuring your own height and then guessing how many of you would fit one on top of the other. You may need to get a friend to help you measure. It might also be helpful to use a piece of string to find out the circumference.

How heavy is the trunk?
Given that Oak is 720 tonnes/m3 can you now work out how heavy your tree trunk is? Can you think of something else that weighs about the same to compare it?

How much does it cost to buy Oak?
Assume the cost of Oak is £1050/m3 - what would a piece of Oak measuring 3m x 300mm x 100mm cost?

What other measurements can you make?

Can you estimate the number of leaves? (not possible in winter/early spring!)
How tall is my tree?

One way of measuring the height of your tree would be to climb to the top, and drop a measuring line down to the ground. But as this would be dangerous and in most cases impossible, we have to think of other ways. One way of doing this is shown below. You will need to work with a partner. One of you will be X, the other Y.

**Method**

X stands against the trunk.

Y stands away from the tree holding the bottom of a stick at arm’s length, then moves away from the tree until the stick seems to be the same height as the tree.

Y now turns the stick sideways as shown, keeping the hand in line with the trunk.

X walks to the place in line with the end of the stick. Measure from here to the trunk. This will give the approximate height of the tree.

My tree is about _________________ metres tall.
How old is my tree?

The only accurate way to measure the age of a tree is to count the rings in the trunk because a tree grows a new ring every year. However, as we don’t want to cut the tree down, we shall have to find another way.

Take the tape measure and measure around the trunk at shoulder height. This will give you the girth or circumference of the tree. Find the nearest number on the top of the chart below.

Now find the name of your tree down the side of the chart. Read across to find the age of your tree.

<table>
<thead>
<tr>
<th>GIRTH (CM)</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
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<tbody>
<tr>
<td>Oak or Beech</td>
<td>16</td>
<td>21</td>
<td>27</td>
<td>32</td>
<td>37</td>
<td>43</td>
<td>48</td>
<td>53</td>
<td>59</td>
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<tr>
<td>Sycamore</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>Holly or Yew</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
<td>56</td>
<td>64</td>
<td>72</td>
<td>80</td>
<td>88</td>
</tr>
<tr>
<td>Pine or Spruce</td>
<td>10</td>
<td>13</td>
<td>16</td>
<td>19</td>
<td>22</td>
<td>26</td>
<td>29</td>
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<td>35</td>
</tr>
<tr>
<td>Larch</td>
<td>15</td>
<td>19</td>
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<td>39</td>
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<table>
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<th>180</th>
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<tbody>
<tr>
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<td>64</td>
<td>69</td>
<td>74</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>96</td>
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<tr>
<td>Sycamore</td>
<td>48</td>
<td>52</td>
<td>56</td>
<td>60</td>
<td>64</td>
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<td>72</td>
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<tr>
<td>Holly or Yew</td>
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<td>Larch</td>
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The name of my tree is ________________________

The girth of my tree is _____________________ cms

My tree is about _____________________ years old

Which type of tree grows quickest? ______________

Which type of tree grows slowest? ______________
Activity - What's in a name?

This activity involves a bit of research.

Use the link to the Tree downloads to start your research.

Trees often have many different local names. For each of the trees found in the Wyre Forest how many different local names can you find?

Write them all down.

Invent your own names for each Wyre tree.

Describe why you have chosen these names.

Below is a tree with a lot of local history. Do you know what it is called?
Activity - Tree flowers

Though not always obvious, all trees have flowers. Can you recognise which trees these flowers belong to?

Download the Wyre Tree guides to help you.

This flower belongs to ____________________________

This flower belongs to ____________________________

This flower belongs to ____________________________

This flower belongs to ____________________________
This session aims to show how the local environment is subject to different demands. Guided by Forest Headline cards, the pupils take away and add trees from a forest which is represented by 100 acorns (representing broadleaved trees) laid out at the start of the session.

The pupils can then take part in a role play based on the last Forest Headline which reports on a public meeting to discuss the open-cast mining proposal. The session will involve group work, communication skills and encourage empathy and rational argument. This session will require an additional 30 minute lesson to be completed in full.

You will need:
100 acorns (to represent broadleaved trees)
30 cones (to represent coniferous trees)
A set of Forest Headline cards (17)
Role play cards and maps (9 and 2)

Suggested timing:
Set up: 5 mins
Forest Headlines: 20 mins
Role play introduction: 5 mins
Role play preparation: 10 mins
Role play: 35 mins
Follow up: 15 mins

Classroom/outdoor layout:
For Forest headlines, the tables need to be pushed together so that 100 broadleaved trees can be set out to represent the forest. (Leave conifers for now)
For the role play, pupils need to work together in 9 groups and then be seated in a horseshoe for the meeting.
Instructions

Forest Headline:
The pupils should be sitting around the forest. The cards should be given out in pairs of pupils. In numeric order, starting with card 1, the cards should be read out and the forest changed accordingly with the trees removed or replaced. Headline 17 introduces the role play which is based on an open-cast mining proposal.

Role Play Introduction and preparation:
Get the class into 9 groups and give out the role cards and maps - two maps for each group. Stress that they should try to place themselves in the position of the person that they are representing and dismiss personal opinions for now. Encourage the group to work out their arguments together.

Role play:
Welcome the audience to the ‘meeting’ and stress that there should be no shouting or interruptions. You could take the role of a planning officer responsible for recommending whether the mining should receive planning permission. Each group should present their case to the meeting. You may want to have some time at the end to allow further points to be raised or questions to be asked. You can finish the meeting by having a vote, or more realistically by saying that all points raised will be ‘considered by the Planning Department and the Councillors’. Some pupils can act as reporters to record the meeting for the pupil booklet activity.

Follow up:
Was it difficult to put yourself in the role?
Was the role play realistic?
Which argument was the most effective?
Why?
Did the role play help to understand the different points of view?
Is it possible for different demands to be met?

Lead the discussion to help the students understand that different groups are always going to have different demands but with careful management, conflict can be reduced.
1. Town bypass under construction
The end of the town traffic congestion is in sight, but part of the forest is removed to make way for the road - remove 15 broadleaved trees.

2. Timber required for new papermill
Trees are cut to supply the local papermill - remove 10 broadleaved trees. Area is replanted with fast growing conifers - plant 15 conifer trees.

3. County Council builds amenity carpark
The Council is providing a visitors carpark for 200 cars on the edge of the forest - remove 10 broadleaved trees.

4. Quarry re-opened! Jobs for local people
The Council has given permission for the local stone quarry to re-open in the forest - remove 5 broadleaved trees.

5. Farmer obtains grant for tree planting
Local farmer plants trees extending out from a woodland, to provide shelter for his pheasant rearing and cover for the pheasant shoot later in the year - plant 5 broadleaved trees.

6. Farmer improves land
A local farmer has received a grant from the Government to clear marginal land and extend his fields to increase his wheat crop yield - remove 5 broadleaved trees.

7. Popular Visitor Centre to be extended
The local Forest Visitor Centre is so popular that extensions are to be made to cope with the numbers of visitors - remove 5 broadleaved trees.

8. More jobs for local people
The District Council has given planning permission for a local business park to be developed at the edge of the woodland - remove 12 broadleaved trees.

9. More local land improvement
The Government's new subsidy system that encourages farmers to extend their arable land has led to Dormouse Coppice being cut down to increase the size of the neighbouring fields - remove 8 broadleaved trees.

10. Transport Department plants trees
Large numbers of trees are being planted alongside the new town bypass as a screen for local residents, to act as a noise barrier, and to protect the exposed roadway from strong winds - plant 4 broadleaved and 4 conifer trees.
11. Landowner grows his own fuel
   A local landowner has had wood-burning stoves installed in his large Georgian manor house as an effective way of heating his large property - remove 3 broadleaved trees.

12. For sale - popular new houses with forest views
   Since the completion of the new bypass, infill housing has been developed along the forest margin - remove 10 broadleaved trees.

13. Farmer prepares for Christmas!
   One of the local farmers has given up producing sugar beet and has planted a new crop. Hundreds of small Christmas trees have been planted in 2 large fields adjoining the forest. The first ones should be for sale in 2 years time - plant 5 conifer trees.

14. Toilet queues extend into the forest!
   The local Forest Visitor Centre toilets cannot cope with the numbers of summer visitors. This problem has arisen since the development of the new carpark and Visitor Centre extensions. New large toilet block is now being built - remove 2 broadleaved trees.

15. Local schoolchildren plant trees
   Children from the local school work with foresters to create a school coppice - plant 2 broadleaved trees.

16. Conservationists on the alert!
   The local conservation society has put out a red alert. A recent research project has shown that half of our local forest has been cut down in the last 5 years! They have launched a new tree planting initiative - plant 20 broadleaved trees.

17. Open cast mining meeting!
   Open cast mining is planned to start on the edge of the forest. There is a public outcry and a meeting has been arranged with the mining company so that interested groups might air their views.
You own the industrial estate at the edge of the forest. There are currently 6 small factories on this estate. You get rent from the companies using the factories. The mining company will need to build a road which would also improve access to your industrial estate. This would make your industrial estate a more desirable site for manufacturing. If the new road is built, you will probably be able to rent out some more industrial units on your estate. This would bring more jobs to the area and more rent money in your pocket!

You are a bit concerned about the noise and dust from the mining operations. This could put companies off, especially high tech industries which require a clean environment. You think every effort should be made by the mining company to reduce noise and dust pollution while they are working.

You will need to give a short speech at the meeting.

- Say who you are.
- State whether you think the mining should go ahead or not and give reasons
- Describe the things that you think the mining company should do to reduce the impact of the mining if it goes ahead.

USE THE MAP, THE DETAILS ABOVE AND ANY OTHER (REALISTIC) INFORMATION TO MAKE YOUR ARGUMENT CONVINCING!
Conservation Group

Over the last 20 years you have worked hard to raise the public's awareness of the environment. You have made regular surveys of the forest and have given talks and led guided walks. You know the forest really well. The mining company wants to work some land which presently has conifers growing on it. These trees are due to be felled for timber soon and you have persuaded the forester to replace them with native broadleaved trees. You plan to put up barn owl boxes nearby for barn owls to nest in. This would not be possible if the mining goes ahead.

You believe that the mine would damage the whole forest. It would break up the animals’ territories and their foraging routes. The noise and dust would affect a large area and disturb the animals. The heavy lorries would cause road deaths and you are particularly worried about badgers who would have to cross the new road on their way to and from their sett. (It has taken you a long time to get the badgers used to using the new underpass beneath the new by-pass). You don’t know if the badgers would cope with another new road.

You will need to give a short speech at the meeting.

• Say who you are.
• Explain how important the forest is for a wide variety of wildlife.
• Describe the damaging effects of the mining on the forest.
• Outline YOUR plans for the piece of land that the company wants to mine.

USE THE MAP, THE DETAILS ABOVE AND ANY OTHER (REALISTIC) INFORMATION TO MAKE YOUR ARGUMENT CONVINCING!
Forester

Your job involves thinking 60 years ahead. The mining company wishes to use an area of land growing mature coniferous trees. These trees are due to be harvested in 5 years and it is important that they are replaced so that future generations will also have a supply of timber. Before the plans for open-cast mining arose, you were thinking of planting a mixture of coniferous and broadleaved trees. The coniferous trees will grow quickly and produce timber while the broadleaved trees will be better for wildlife and look nicer. The forest is managed in a multi-purpose way so that timber, recreation and conservation are all as important as each other. This helps you to keep all the different groups of people, with different interests, happy.

The mining company says that it will restore the land after 5 years. It will be difficult to get broadleaved trees to grow well on the poor soil left after open-cast mining. The land would probably be replanted with coniferous trees. You are interested in the plans that the mining company has to make a mountain bike course on the restored land. This could get mountain bikes off the bridleways and other paths where several accidents have occurred between bikers and walkers or horseriders.

You will need to give a short speech at the meeting.
• Say who you are.
• State whether you think the mining should go ahead or not and give reasons.
• Describe the things that you think the mining company should do to reduce the impact of the mining if it goes ahead.

USE THE MAP, THE DETAILS ABOVE AND ANY OTHER (REALISTIC) INFORMATION TO MAKE YOUR ARGUMENT CONVINCING!
Farmer

Your farm borders the edge of the forest and some of your land would be used by the mining company. The mining company has offered you a good price for using the land and they have promised to restore it when they have finished mining. This money would be very welcome as times are hard in farming at the moment.

It is not very good land that they want to mine but you are worried that it will be in an even worse state when they have finished. You have heard of another farmer who just kept harvesting stones after her land had been open-cast mined!

You are also worried that the heavy lorries will cause problems on the narrow lanes which you use with your tractors. Some people have said that the mining will carry on into the evening. This could disturb your early nights which you need in order to be able to get up at dawn for the milking.

You will need to give a short speech at the meeting.

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Housing Developer

You have had a tough time recently trying to sell the houses that you build. If the mine opens, it should stimulate the local economy. Local people should get jobs. If people have wages in their pocket they might start buying houses again. New people should also be moving into the area and they will need to buy houses to live in. If you start selling more houses, you will start building more houses which would create even more jobs.

You think that if the mining goes ahead, it should be carefully controlled. Industrial sites can ‘blight’ an area with noise and pollution. You have a few new houses close to the area that they want to mine. If mining does go ahead, you will want compensation because you won’t be able to sell them for such a high price.

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Local Family

You go to the forest most weekends when the weather is good. You do not have a garden, so the family enjoys going to the forest for fresh air and the peace and quiet of the forest. You have just given your little girl an new bicycle and she loves to take it to the forest. It took a long time to save up to buy it because only one of you has a job and that is only part-time in the evenings.

You have heard that the mine will bring up to 250 new jobs to the local area and maybe you could get one of these jobs. You are worried that the mining will spoil the forest and that the heavy lorries will be dangerous for the children. If they are going to mine early in the morning, this could disturb your sleep after you have worked late in the evenings.

You will need to give a short speech at the meeting.
- Say who you are.
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The Mining Company

You have spent a lot of money carrying out surveys of the forest. You have found a good site to extract some coal using the cheap and quick open-cast method. You will make every effort to keep mining noise and dust to a minimum. You expect the mine to have a 5 year working life.

The site you want to mine is close to the recently opened by-pass. You will only have to construct about 0.5 mile of new road. This new road will also give better access to the industrial estate on the edge of the forest. More factories could be built as a result. The open-cast mine will create about 150 jobs and new factories could create a further 100 new jobs. This would help the local economy.

Some of the area which is going to be mined is farmland but most of the area is currently covered with coniferous trees which are due to be felled soon. You have offered the landowners a lot of money to compensate them for 5 years disturbance. After the mining has finished, you have promised to restore the land. The hole will be filled in and planted with grass and trees. You are hoping to make some of the site into a mountain bike course.

You are proud of your record in restoring derelict land. Some of the sites that you have restored have become good farmland, picnic sites or nature reserves.

You will need to give a short speech at the meeting.
- Say who you are.
- Describe your plans for mining and explain how you intend to keep noise, dust and disturbance to a minimum.
- Explain why we need coal.
- Highlight the benefits that the mine will bring to the local area.
- Describe how the land will be restored after the mining has finished.

USE THE MAP, THE DETAILS ABOVE AND ANY OTHER (REALISTIC) INFORMATION TO MAKE YOUR ARGUMENT CONVINCING!
You are a group of people that enjoys pheasant shooting. You rear the birds from eggs and then release them into the wild, ready for the shooting season. You employ a gamekeeper who has worked in the forest for 40 years and knows it better than any forester or conservationist!

You are very worried that the mine would destroy some of the cover that the birds need. You are also very concerned that the noise will disturb the young birds that you are rearing, and the shock could kill some of them. The heavy lorries will also be a hazard for the adult birds in the wild.

Many of the trees and hedges have been saved by people like you who care about the forest. People who hunt and shoot wild animals have fought to preserve the forest which provides the habitat for the animals. You are very careful to only shoot a few animals so they don’t become extinct.

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Mountain Bike Club

You are part of one of the fastest growing sports in the country. You enjoy getting out in the fresh air and tackling the terrain – the rougher the better! You use the forest a lot but many people have been complaining because a few accidents have occurred.

The mining company has said that it will make a proper mountain bike course on the land when it has finished mining. They have asked you to help design the course to give maximum excitement and enjoyment. This is a marvellous opportunity to get a purpose-built course in 5 years time and it could mean that you could host the British Championships.

You think that the mining should be carefully controlled so that the noise and dust are kept to a minimum. You are also worried about the heavy lorries being a danger to your riders.

You will need to give a short speech at the meeting.

• Say who you are.
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• Describe the things that you think the mining company should do to reduce the impact of the mining if it goes ahead.

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Can you find these things?

- a nibbled pine cone
- a leaf with holes in it
- an acorn cup
- a small chunk of rough bark
- a white downy feather
- a knobbly stick
- a yellow leaf
- a pair of pine needles
- a lichen covered stick
- a shred of silvery bark

Collect them in your bag and then come and show everyone your treasures.