A Woodland

A woodland is a place where trees have been growing together for many years.

As well as trees, there are other plants and animals in a woodland.

There are **four** different **layers** in a woodland.

The Canopy

The canopy consists of the leafy tops of the trees. These leaves get the most sunlight.
Birds build their nests here. Insects such as caterpillars, greenflies and leafhoppers live on the leaves.
Squirrels live on the branches.

The Shrub Layer

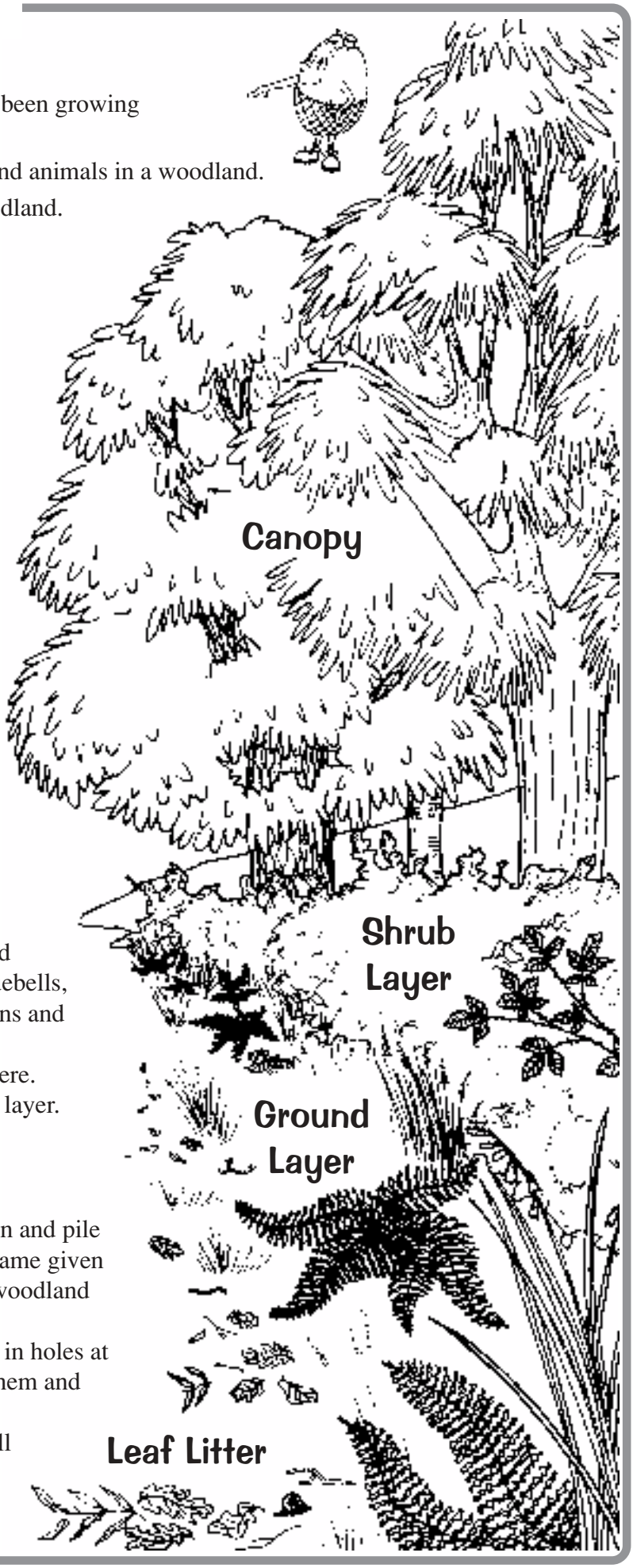
The shrub layer consists of smaller trees and shrubs. These include holly, laurel and rhododendron.
Bushes with berries such as hawthorn and blackberries are in this layer. These provide food for blackbirds, thrushes and other birds.

The Ground Layer

Small flowering plants live in the ground layer. Typical woodland flowers are bluebells, primroses, foxgloves and arum lily. Ferns and ivy also grow on the woodland floor.
Animals such as mice and shrews live here. Beetles and ants can also be seen in this layer.

The Leaf Litter

Leaves fall off deciduous trees in autumn and pile up on the ground under the trees. The name given to this collection of dead leaves on the woodland floor is leaf litter.
Hedgehogs gather up bundles of leaves in holes at the bottom of trees. They burrow into them and curl up to hibernate there until spring.
If you turn over heaps of leaves, you will find woodlice, millipedes, centipedes and earthworms underneath.



The Canopy Layer

Jay

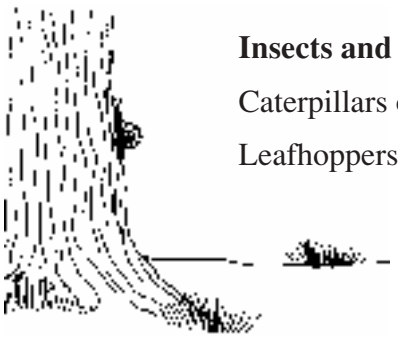
In a woodland, **trees provide food** for **insects, animals and birds**. The leaves, flowers and fruits of trees are food for many different animals.

Animals that eat plants are called **herbivores**.
Animals that eat other animals are called **carnivores**.

Bullfinch

Each layer of a woodland has herbivores and carnivores.

Birds eat flowers, nuts and berries. Bullfinches eat flower buds before they open. Blackbirds and thrushes eat fruit and berries. Jays eat acorns.



Snail

Insects and other small creatures eat leaves.

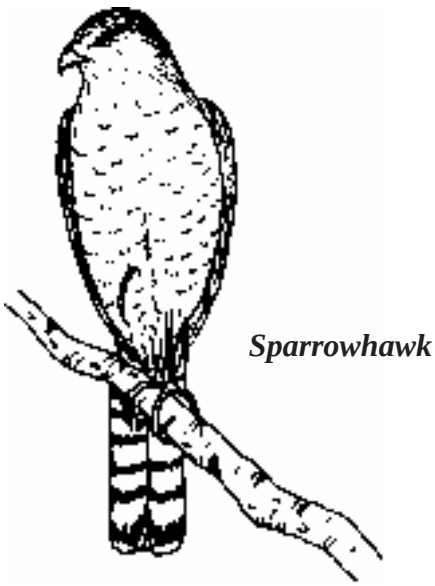
Caterpillars of butterflies and moths live on leaves.

Leafhoppers and greenflies suck the juices of leaves.

Greenfly

Slugs and snails climb up the trunks to eat the leaves at night and go back down again during the day.

Spider



Sparrowhawk

Carnivores

Here are some carnivores in this layer.

1. **Ladybirds** eat greenflies.
2. **Spiders** catch leafhoppers.
3. **Robins** eat caterpillars.
4. **Sparrowhawks** eat robins and caterpillars.

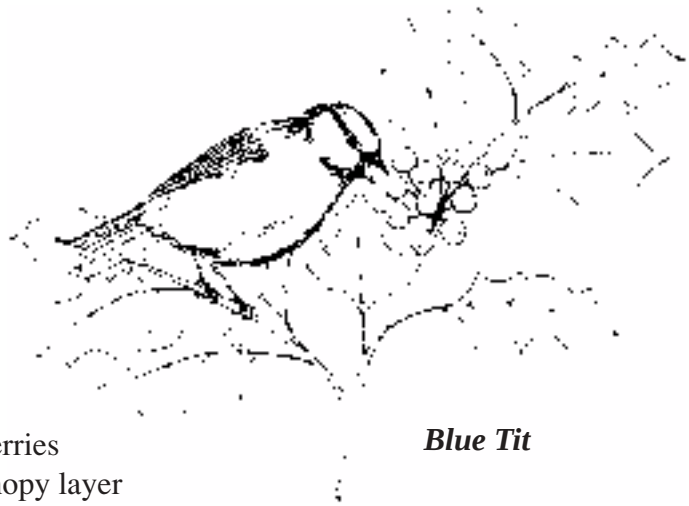
Ladybird

Robin

The Shrub Layer

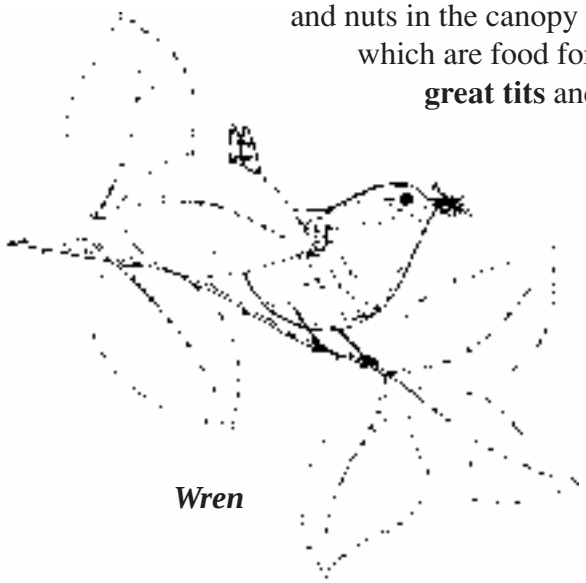
Finding Food

Many of the leaf-eating creatures in the canopy layer, such as **caterpillars** and **snails**, eat the leaves in the shrub layer as well.



Blue Tit

There are often more berries and nuts in the canopy layer which are food for **blus tits**, **great tits** and **chaffinches**.



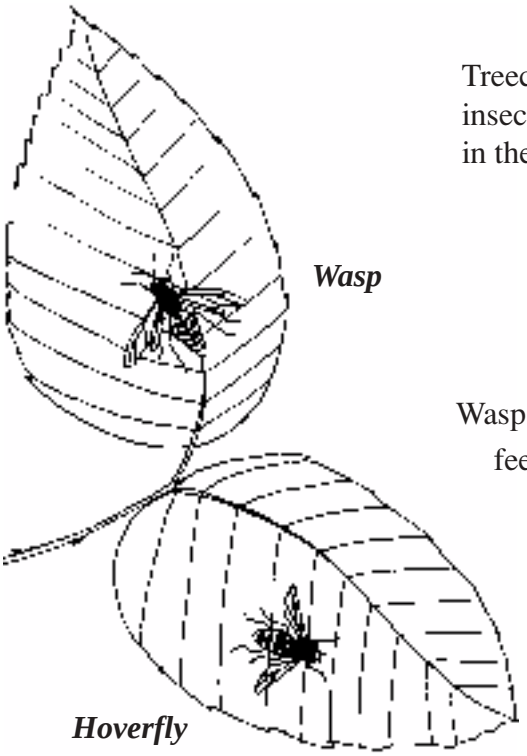
Wren

Insect Eaters

Insect eaters in this layer include **wrens** and **long-tailed tits**.

Treecreepers hunt for insects in the cracks in the bark of trees.

Treecreeper



Wasp

Wasps and hoverflies feed on smaller insects. They are carnivores. They are found in the shrub layer as well.

Hoverfly

The Ground Layer

Many animals which live in the ground layer come out at night to find their food.

Large insects such as **ground beetles** eat smaller creatures.

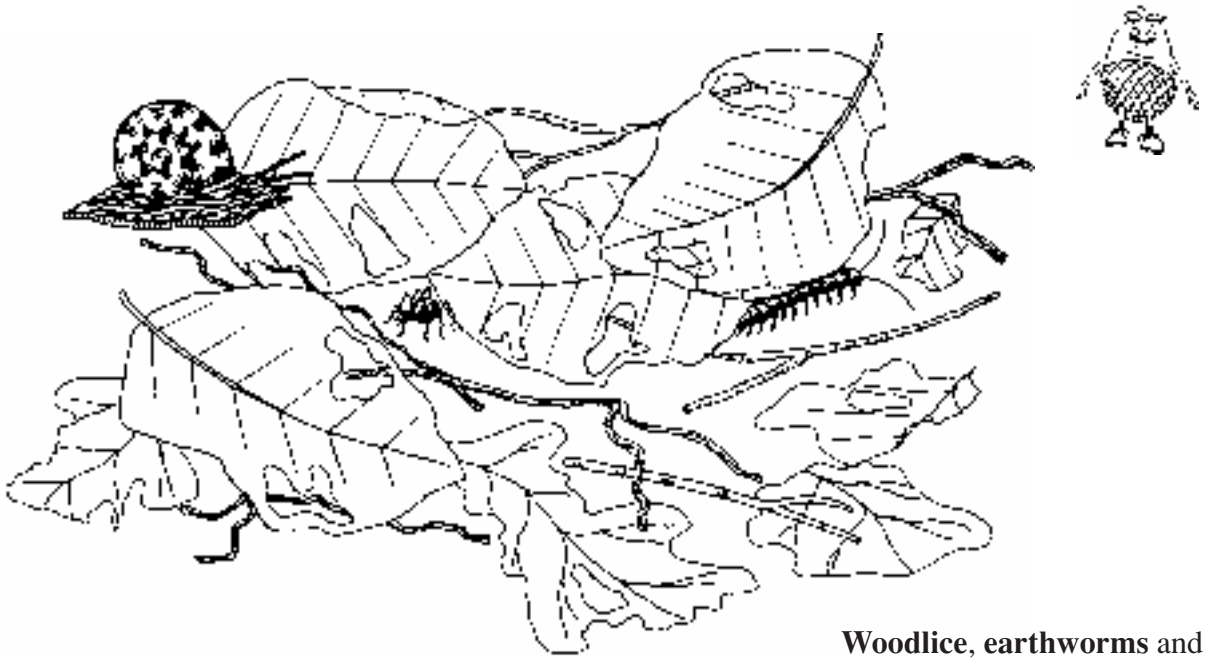
Pygmy shrews eat beetles.

Badgers come into woodlands to eat berries and mushrooms, as well as worms, slugs and snails.

Barn owls and long-eared owls hunt mice in woodlands at night.

Hedgehogs eat insects and slugs.

The Leaf Litter



Woodlice, **earthworms** and **millipedes**, inhabit this layer and eat dead leaves.

Centipedes and **spiders** are carnivores which feed on woodlice, and millipedes.

They run away very quickly when we turn over leaves to look for them.

Plants and Animals

This word bank contains the names of some **trees and plants** found in a woodland.

Decide in which layer each tree or plant belongs. Then write its name in the correct box.

Trees and Plants

oak	primrose
brambles	beech
holly	bluebell
ash	wild garlic
fern	ivy

This word bank contains the names of some **animals** found in a woodland.

Decide in which layer each animal belongs. Then write its name in the correct box.

Animals

blackbird	squirrel
caterpillar	ladybird
hedgehog	badger
beetle	robin
	wood louse
	mouse

The Canopy

Plants	Animals

The Shrub Layer

Plants	Animals

The Ground Layer

Plants	Animals

The Leaf Litter

Plants	Animals

Food Chains

Construct a food chain for each layer in the forest.

The Canopy

The Shrub Layer

The Ground Layer

The Leaf Litter

Food Webs

Every living thing is part of a **food chain**.
Some animals eat a varied diet and form parts of different **food chains**.
Food chains linked in this way are called **food webs**.

A Simple Food Chain

Owl

Mouse

Seed

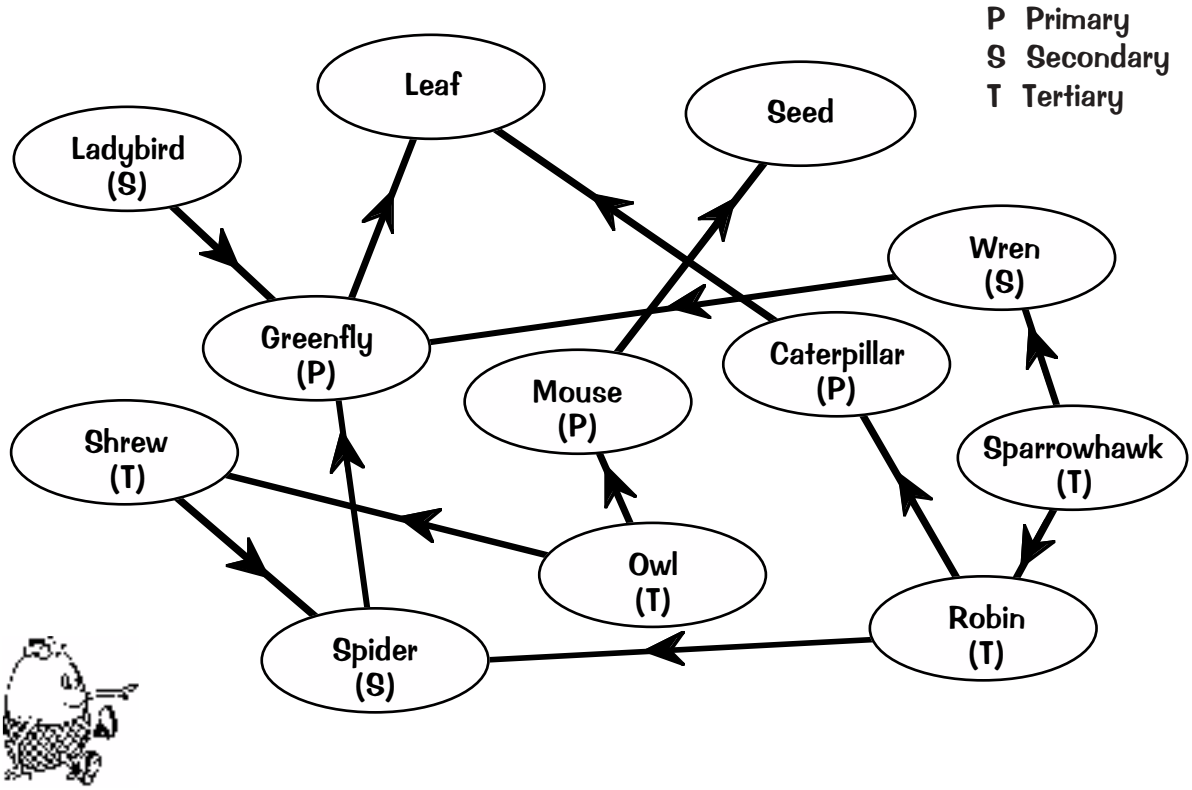
A Food Web

Herbivores are plant eaters.
They are known as **primary consumers**.

Carnivores eat other animals.
They may eat more than one type of herbivore and are called **secondary** or **tertiary consumers**.

Secondary consumers eat **primary** consumers.

Tertiary consumers eat both **primary** and **secondary** consumers.



Food Webs

Who eats what?

Draw your own food web on this page.
Use what you have learnt about the foods which birds and animals eat.

Remember

Herbivores – plant eaters – are primary consumers.

Carnivores eat other animals. They can be either **secondary** or **tertiary** consumers.

Secondary consumers eat primary consumers.

Tertiary consumers eat both primary and secondary consumers.






Pollination

Trees must produce **flowers in spring** so that they can make **seeds in autumn**.

Flowers contain **pollen** which is a very fine powder.

Pollen must be transferred from the male part of one flower to the female part of another flower so that seeds can form.

Horse Chestnut

Types of flowers

There are two types of flowers: **blossoms** (flowers with petals) and **catkins**.

Hawthorn

Blossoms

Blossoms attract insects such as bees and butterflies which visit these flowers to collect **nectar** (flower juice). While doing this they become dusted with pollen.

When they move on, the pollen they have picked up from one flower rubs off on the next flower. In this way, bees are very important in helping new seeds to develop and grow.

Bee on Hawthorn

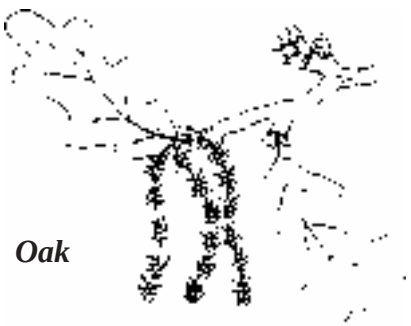
Horse chestnut, cherry, hawthorn, apple and mountain ash trees have flowers which are pollinated by insects.

Catkins

Some trees use the wind to blow pollen from one flower to flower. Some trees have long catkins. As the catkins shake in the wind, the pollen is blown from tree to tree.

Hazel

These trees don't need blossoms.



Oak

Instead, their flowers are long **catkins** which are easily shaken by the wind.

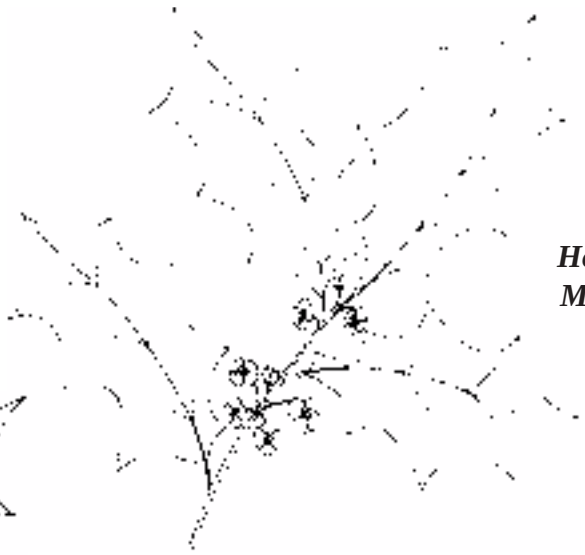
Hazel, birch, alder and oak trees have catkins.

Pollination

Male and female flowers

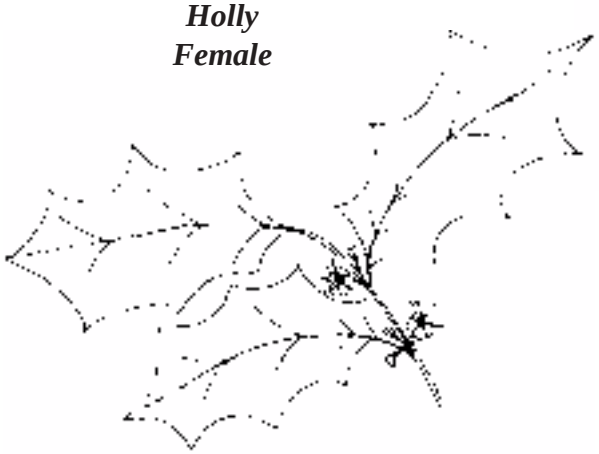
The flowers described so far have male and female parts in the same flower.

The male part produces the **pollen** and the female part makes the **berry** or **seed**.



Holly Male

Holly Female



Some trees have **male flowers only** on one tree and **female flowers only** on another tree.

Holly, willow and poplar have separate trees for male and female flowers.

The pollen from the male flowers is **blown by the wind** to the female flowers.

Poplar Female

Poplar Male

Coniferous flowers

Coniferous trees do not have flowers with petals.

Their flowers are **cones**.

The small male cones have the pollen. Thelarger female cones are **on the same tree**. The wind blows the pollen onto the female cones which is where the seeds develop.

It is easy to identify male and female cones in spring when the pollen is ripe and it is blown by the wind.

Male cones

Female cones

Pollination

To Do

1 Collect some flowers in spring.

Then look up tree flowers in a reference book on **Trees**.

✶ White flowers grow on _____ .

✶ Pink flowers grow on _____ .

2 Collect some catkins. *Beware of this activity if you suffer from allergies!*

Put the catkins in a vase. Put the vase on a sheet of white paper.

The pollen will drop out onto the paper.

✱ Name the tree from which you collected the catkins?

_____

✱ What colour is the pollen? _____

3 Some trees develop their leaves first, then their flowers.

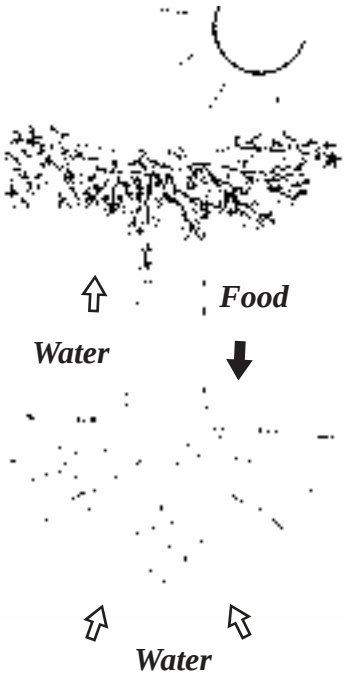
Some trees develop their flowers first, then their leaves.

What have you observed?

✱ _____ develops its flowers **before** its leaves.

✱ _____ develops its flowers **after** its leaves.

How Trees Work



Trees need **light**, **air**, **heat** and **water** in order to grow.
They need **sunlight** to make **food** and **oxygen**.
Humans need oxygen to live. We get it from trees and other plants.

Making food and giving off oxygen is called **photosynthesis**.
The oxygen is given off into the air by the leaves.
The food is sent down through the bark of the tree to the roots.
The bark is a very important part of a tree. If it is damaged, the tree may die.

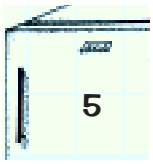
Leaves need **water** for photosynthesis. The water comes from rainfall. Trees need a lot of rain to grow and they cannot live in deserts. Water comes up from the roots, through the trunk of the tree under the bark, to the leaves.

Photosynthesis experiments

- ✔ Plants need **light**. Energy for photosynthesis comes from sunlight.
- ✔ Plants need **air**. Plants take **carbon dioxide** from the air and give off **oxygen**.
- ✔ Plants need **heat**. Plants cannot grow at very low temperatures.
- ✔ Plants need **water**. They take it in through their roots.

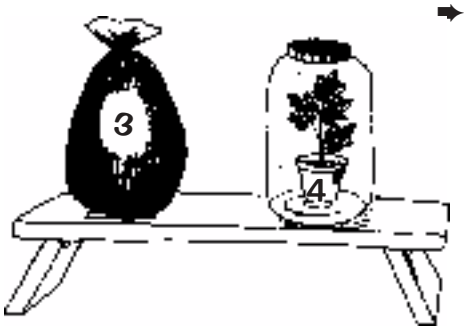
You will need...

- ✷ Five healthy potato plants in pots. Label the plants 1, 2, 3, 4, and 5.
- ✷ A black plastic bag
- ✷ A large, clear jar with a screw lid
- ✷ Access to a fridge



What you do...

- ➨ Place Plant 1 on a window sill in full light. Water it as required.
- ➨ Place Plant 2 on a window sill. Do not water it at all.



- ➨ Water Plant 3 and place it in the black plastic bag. Seal the bag.
- ➨ Put Plant 4 in the jar. Water it and then screw on the lid tightly.
- ➨ Water Plant 5. Then put it into the fridge.

This experiment is carried out over two weeks. Examine the plants at the end of each week.

Results: Week 1

Examine the plants **at the end of Week 1.**

Plant 1

Q What has happened to this plant?

_____

Q Why? _____

Plant 2

Q What has happened to this plant?

_____

Q Why? _____

Plant 3

Q What has happened to this plant?

_____

Q Why? _____

Plant 4

Q What has happened to this plant?

_____

Q Why? _____

Plant 5

Q What has happened to this plant?

_____

Q Why? _____

Results: Week 2

Examine the plants at the end of Week 2.

Plant 1

Q What has happened to this plant?

_____

Q Why? _____

Plant 2

Q What has happened to this plant?

_____

Q Why? _____

Plant 3

Q What has happened to this plant?

_____

Q Why? _____

Plant 4

Q What has happened to this plant?

_____

Q Why? _____

Plant 5

Q What has happened to this plant?

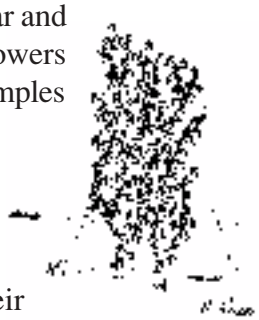
_____

Q Why? _____

Competing and Adapting

Plants and animals have to adapt to compete for food and light.

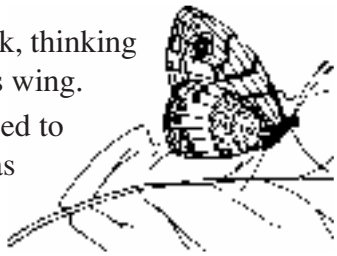
* All plants in a woodland need light to grow. Trees **compete** for light and the tallest trees get the most. So the fastest growing trees do best.
* Some plants are specially suited to growing in a woodland. They are **adapted** to make the most of the light they get.
* Ground flowers, such as primroses and bluebells, flower early in the year before the leaves come on the trees. More light gets through to the woodland floor at this time and there is enough light for these plants to flower.
* Some plants are adapted to climb up towards the light using other plants as props. They then have light all the year and do not have to flower as early. Honeysuckle, which flowers in August and ivy, which flowers in November, are examples of these plants.



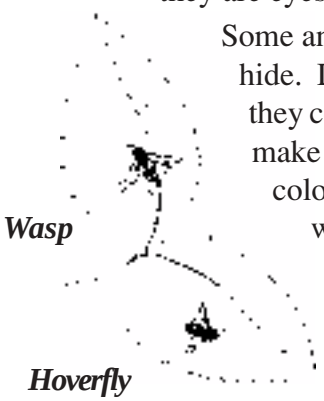
* Animals also compete and adapt in a woodland.

Herbivores that feed on leaves cannot move very fast to escape from their enemies. They use **camouflage** – being the same colour as their food – to hide from their enemies and they stay very still. Some caterpillars are green and can't be seen easily on green leaves. Other caterpillars are brown and look like twigs.

Some butterflies have eye spots on their wings which birds peck, thinking they are eyes, and the butterfly escapes with just a hole in its wing.



Some animals have an unpleasant taste so they don't need to hide. Ladybirds are red to warn birds not to eat them as they contain acid. Bees and wasps have stings which make them dangerous to eat. Their yellow and black colours also warn off birds. Hoverflies are the same colours as bees and wasps. Although they do not have stings, birds are afraid to eat them.



Wasp

Hoverfly

* Many woodland animals feed at night. Snails and slugs feed at night because they would get dried up in the heat of the sun during the day. Beetles and spiders hunt at night so they won't be seen by birds. Bats catch moths in woodlands at night. They have developed a **sonar system** which allows them to fly and locate their prey without crashing into trees. Like owls, bats are able to see in very dim light.

To Do

What is a sonar system? Can you find out?
(Clue: sound waves – very high pitch.)

What is an echo?

Discuss 'as blind as a bat'.

Is it likely that bats would fly into people's hair?

Recycling

When we walk through a woodland in October and November, we can kick through great mounds of leaves.

When we walk through a woodland in June, the mounds of leaves have gone.

What happens to the leaves?
Where do they go?

Dead leaves provide food for special kinds of plants and animals called **decomposers**.

There are both **plant** and **animal** decomposers.

Plant Decomposers

Plant decomposers are fungi.

Fungi are mushroom-like plants that grow on the dead leaves. They are not green, so they cannot make their own food Instead, they use the dead leaves as food. In doing so, they cause the leaves to decompose and disappear.

Fungi grow among the dead leaves all year.
In autumn time, they fruit and send up mushroom-like caps.

There are many different varieties of fungi and autumn is a good time to see them.

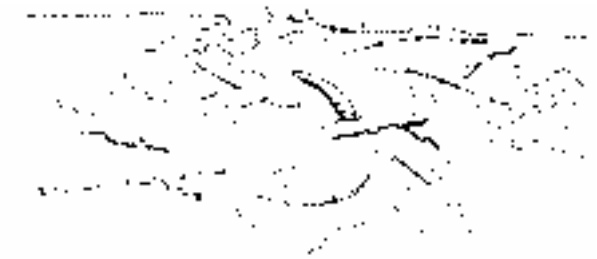
Fungi also grow on dead logs and under dead bark.

Material Recycling

Animal Decomposers

Animal decomposers are also hard at work in the leaf litter.

Woodlice and **millipedes** get all their food from dead leaves and dead timber.



Earthworms pull leaves down into the soil and eat them underneath the surface.

If you collect a handful of soil and dead leaves, you will see these animals at work.

Animal decomposers and **fungi** break leaves down completely.

The Cycle of Life

The food made by living leaves is used up by the decomposers. Leaves also contain nitrogen, phosphorous and other minerals.

These dissolve in rainwater and go back into the soil where they are taken in by the roots of nearby trees.

The minerals are sent up to the leaves and become part of the living tree once again.

Nutrients are sent to the leaves through the trunk.

Animals decomposers break down leaves.

Decomposers are very important in the woodland's **Cycle of Life**.

Nitrogen, phosphorous and other minerals return to the soil.

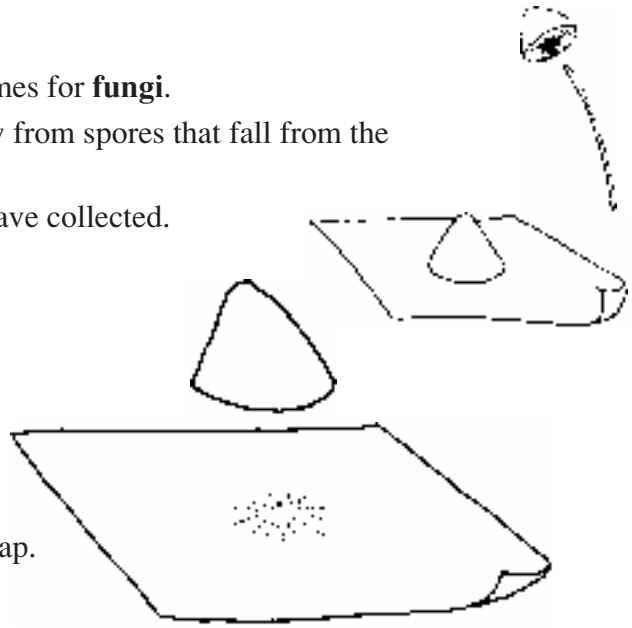
These nutrients are taken in by the roots.

To Do

Mushrooms and **toadstools** are common names for **fungi**.

These plants do not have flowers. They grow from spores that fall from the fruiting cap.

You can make a spore print from a cap you have collected.



You will need...

A mushroom-type fungus

A page of white or coloured paper

What you do...

- Carefully remove the stalk from the cap.
- Put the cap on your page.
- Leave for two days.

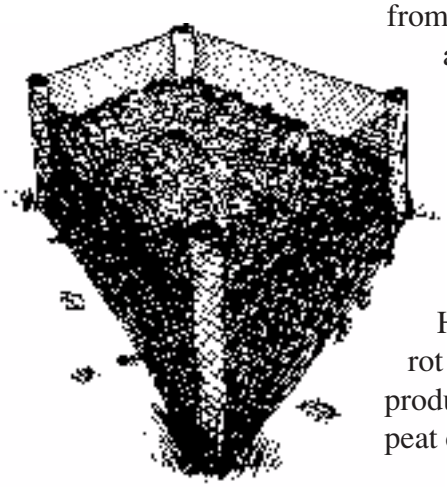
The spores will fall down onto the page in the same arrangement as they were in the cap. Remove the cap and you will see the spore print.

What colour were the spores? _____

Make your own Leaf Mould

Leaf mould makes excellent peat-free compost. It's free and easy to make and use. You can use it to improve the soil in your garden and as a seed compost.

- Hammer four posts into the ground. Make a cage by stretching a length of chicken wire mesh or plastic garden mesh around the four posts.
- You may also use a large black plastic bag, with a few holes in the bottom to drain away excess water.
- Fill the container with soggy leaves (collected after a rain shower). Push them down firmly to compact them. You may use leaves from any deciduous tree. Leaves from conifers and other evergreens acidify the leaf mould. This is an advantage if you have acid-loving plants.
- Add some grass clippings (not more than a quarter).
- Shred the leaves if you wish to speed up decomposition.



After a year, your pile will have sunk down considerably and the leaves will be partially rotted. This could be dug into the soil as it is.

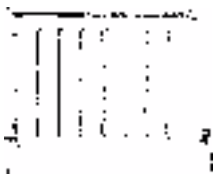
However, it is recommended that you leave the leaf mould to rot or decompose for another year. You will have a much finer product. You can use your own home-made compost instead of peat compost. You are now actively helping to conserve our bogs!

Conservation

It is important to **conserve** our woodlands. They are important in our lives for several reasons. If trees are needed for timber and firewood, they should be replanted so that new trees will take their place and the woodland will continue.

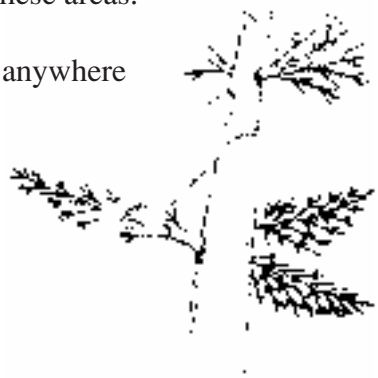
✷ Trees are a source of **timber** for **furniture** and **building**. They also provide the raw material for paper, cardboard, fibreboard and wood chip. In order to have a good supply of timber, forests of fast-growing trees are planted in Ireland. These are evergreen conifers such as sitka spruce, fir and pine.

✷ Trees are a source of **firewood**. People use firewood to keep warm and to cook. We do not use much timber in this way in Ireland. We use electricity instead, which is made from oil, coal, and water power, or we use natural gas.

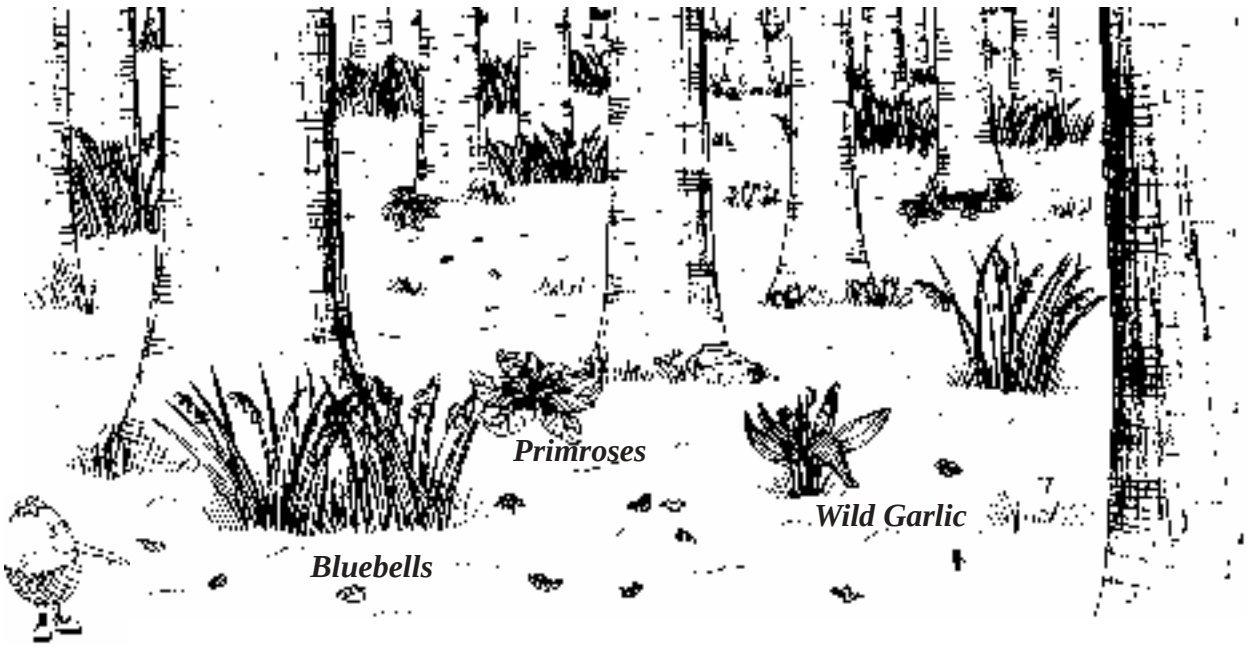


In many countries, people use timber for cooking as they have no other fuel. In Africa, Asia and South America, forests are being cut down for firewood and forests are very scarce around cities and towns. They are not being replanted in these areas.

✷ Woodlands are homes for **plants** and **animals** that cannot live anywhere else. In Ireland, squirrels, pine martens, jays, treecreepers and purple hairstreak butterflies live in woodlands only.



Deciduous woodlands are the most valuable for wildlife. Many plants such as wild garlic, primroses and bluebells are woodland plants. In order to keep these plants and animals in Ireland, we must have woodlands.



Conservation

To Do

The following is a list of the best and most important woodlands in Ireland.
They are mostly **deciduous** woods except for one which is **mixed**.
They are important because they are on sites that have been wooded since the Ice Age.
Animals and plants in these woods are typical of a native woodland.

Can you mark them on the map?

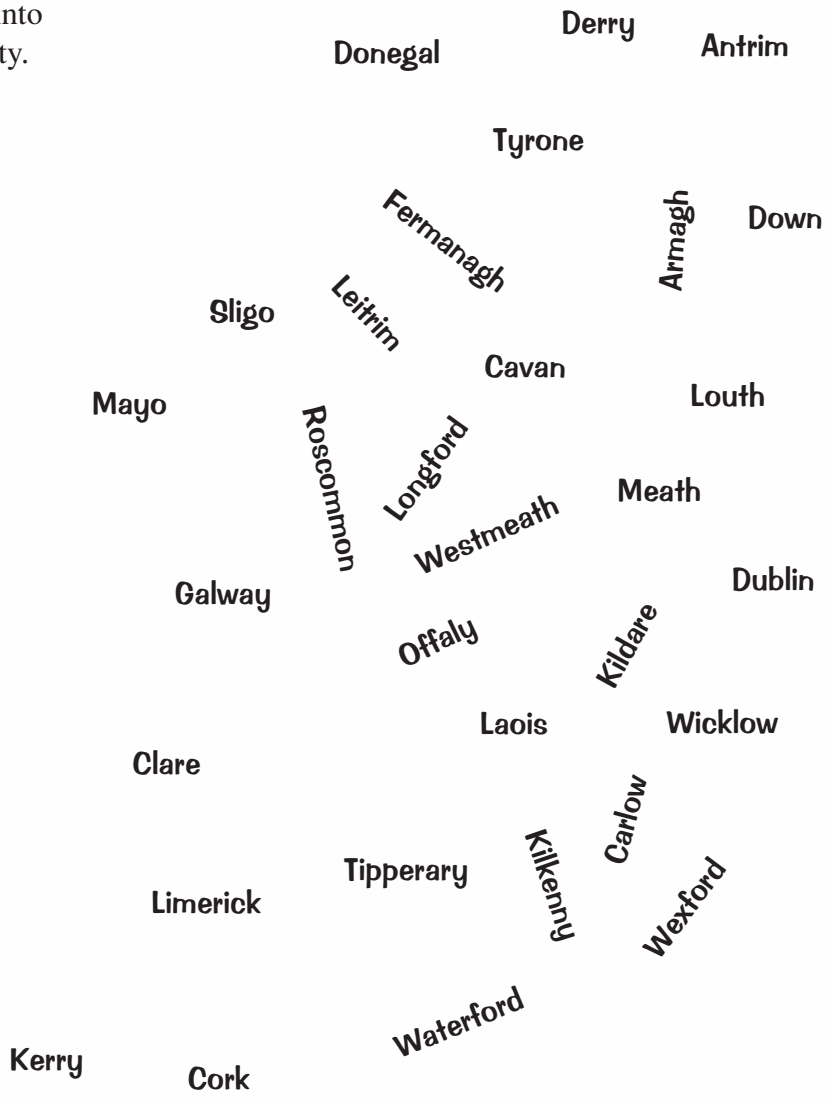
Use a detailed map of Ireland to find the exact location of each wood.

Put the number of each woodland into the correct county on Worksheet 22.

1 Glenomera Woods, The Burren, Co. Clare
2 Glengarriff Woods, Co. Cork
3 Glenveagh Woods, Co. Donegal
4 Ardnamona Wood, near Lough Eske, Co. Donegal
5 Derryclare Wood, Co. Galway
6 Killarney Woodlands, Co. Kerry
7 Uragh Woods, Co. Kerry
8 Corballis Woods, Co. Kildare
9 Abbeyleix Woods, Co. Laois
10 Lough Gill Woods, Co. Leitrim
11 Old Head Woodland, Co. Mayo
12 Rahugh Ridge Woods, Co. Offaly/Westmeath
13 Charleville Woods, Co. Offaly
14 St. John's Wood, Co. Roscommon.
15 Bonet Wood, Co. Sligo
16 Union Wood, Co. Sligo
17 Cornalack Wood, Co. Tipperary (**mixed**)
18 Knockasteen Wood, Co. Tipperary
19 Portlaw Woods, Co. Waterford
20 Nire Valley Woods, Co. Waterford
21 Crookedwood, Co. Westmeath
22 Long Hill Wood, Co. Westmeath
23 Killoughrim Forest, Co. Wexford
24 Glendalough, Co. Wicklow
25 The Glen of the Downs, Co. Wicklow
26 Powerscourt, Co. Wicklow
27 Rathdrum Woods, Co.Wicklow

Woodlands

Put the **number** of each woodland into the correct county.



How many of the woodlands are in

Leinster? ☐ Ulster? ☐ Munster? ☐ Connacht? ☐

How many counties have no important woodlands left? ☐