



Woodland Habitat Studies

Roe Valley Country Park

Photocopiable Resources for Teachers



WOODLAND HABITAT STUDIES

ROE VALLEY COUNTRY PARK

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INTRODUCTION

This booklet has been prepared as follow-up material to an educational visit to Roe Valley Country Park to study the woodland habitat. The booklet has been designed as reading material for children at upper primary and lower secondary level. Some of the concepts discussed would not normally be tackled until later in the secondary school curriculum. They are included here for the sake of completeness and in an effort to make the booklet a useful introduction for those students doing GCSE.

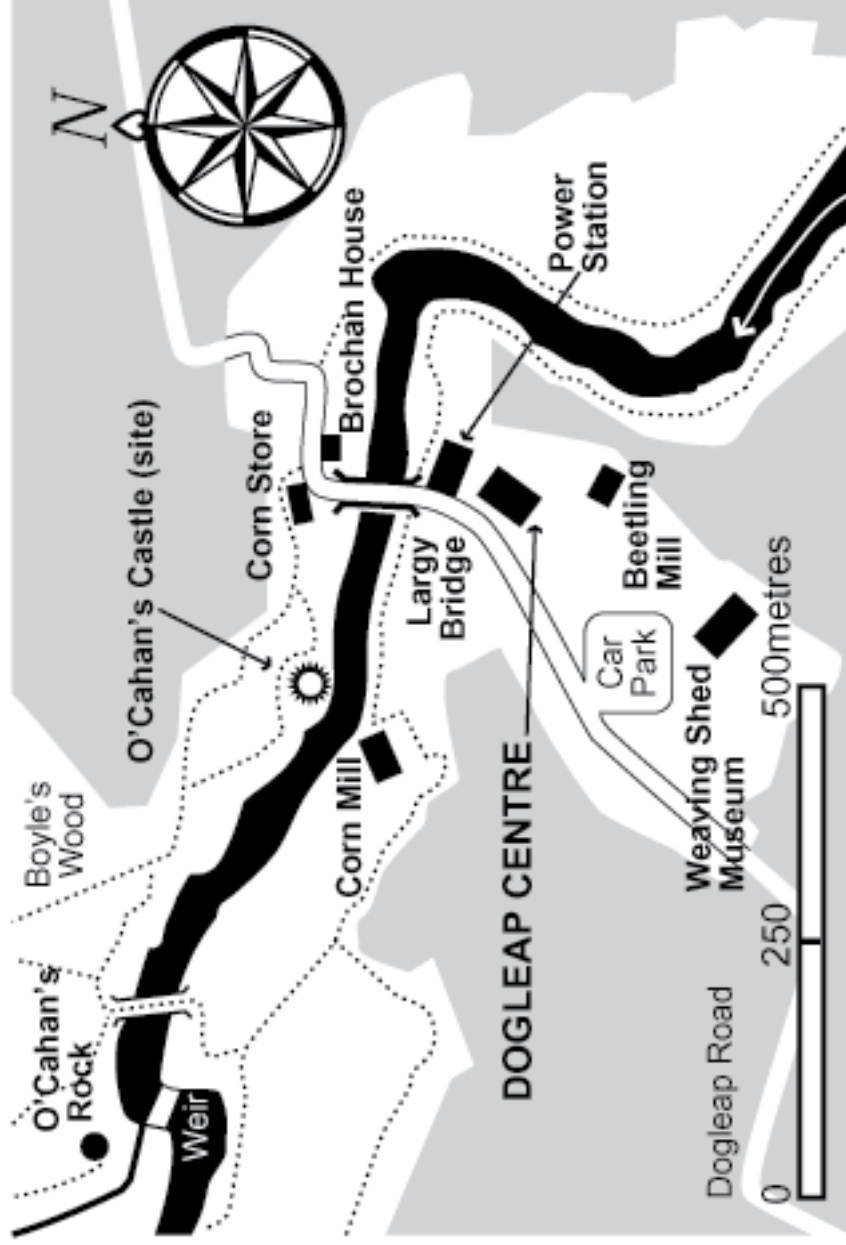
In trying to cover such a broad spectrum of pupils there must be some problems of understanding. However, the language used has been kept deliberately simple, even if at times the concepts themselves are fairly complex. The booklet has been designed to be photocopied and used by teachers. They may not wish to use the whole book. They may use only those sections which suit their needs.

The booklet is not designed to be a comprehensive guide to all the various species that anyone or group might discover on a visit to the park. Given that there exist so many this would simply not have been possible. For the beginner guides as to the various species already exist. However, by selecting just a few illustrations it is hoped that interest in wildlife and conservation will be encouraged. The booklet is designed to introduce broad concepts by using just a few species.

Most of the chapters have exercises and questions which are designed to reinforce the childrens' understanding of the material covered during their visit to the park. All the illustrations have been selected so that they can be easily copied. Certain words appear in bold type in the text. These are the key concepts the booklet is trying to explain. They appear in a glossary at the back of the booklet. This also serves as a resumé of the work explained in the booklet.

Michael Conway, RVCP, January 2000

ROE VALLEY COUNTRY PARK
MAP OF STUDY AREA



Acknowledgement: Map Tim Webster

CHAPTER 1: THE HISTORY OF TREES IN IRELAND

We usually think of history as the story of people and changing events from the past. The landscape also has its own history. It has not remained the same. It has been changed by nature and man down through time. It is possible for scientists to tell what grew in Ireland by examining plant remains held in the mud at the bottom of lakes.

The history of Irish trees begins at the end of the last ice age which was 13,000 years ago. Before this time the whole country was covered by ice sheets. These did not allow anything to grow. Gradually the plants trees and animals returned. The first trees were those which could tolerate cold and damp and whose seeds were spread by the wind, such as willow, alder and birch. However, these were eventually replaced by a oak forest which along with other trees covered 90% of the Irish landscape from the seashore to the mountain tops. The other 10% would have been wetlands.

It is hard to imagine that such a huge forest is what the first people who came to Ireland would have seen 8,000 years ago. It is said that a squirrel could have travelled from the top of Ireland to the bottom along the tree tops without ever having to put its foot on the ground. This is simply not true today as only 6% of Ireland is forested with mostly introduced **coniferous** forest. The original **deciduous** forest now only covers 1% of the landscape.

The disappearance of this forest is entirely due to the activities of people down through the ages. The first people to arrive in Ireland were hunter gatherers who arrived about 8,000 years ago. They came to fish and to hunt. They had little effect on the forest, except perhaps to exterminate the bear. They were followed around 6,000 years ago by the first neolithic farmers. They made huge changes to the landscape chopping down trees, making fields, planting crops and building their impressive monuments. The most famous of which is the passage tomb at Newgrange County Meath.

About 4,500 years ago, (during the Bronze Age), there is evidence that the climate of Ireland changed. It became colder and wetter. This led to the formation of much of the peat bogs which now cover 17% of Ireland. There formation is probably also linked to the removal of trees. Early man was able to live further up the hills than today. The wetter conditions led to the soil being washed away, (**soil erosion**). There were no trees to hold it in place. The hills were abandoned. Today the stumps of trees as well a field walls are often found when people dig for turf.

The forests in the lowlands was gradually removed by successive peoples. The Celts and the Normans used the trees for building and fuel. However, they were also prized in themselves as places to keep livestock in winter where they could eat the fallen acorns and other nuts. Major changes did occur at the time of the Plantation of Ireland around 1600 AD. The forests were exploited for more industrial purposes as building material for houses, ships and barrels as well as for metal smelting and tanning of hides. Tree planting schemes never properly replaced the trees which were removed. This had an obvious effect on wildlife as the wolf and wild boar were exterminated by direct hunting and loss of **habitat**.

By the time of the famine in 1847 the Irish landscape had few trees, except where the landlords had planted trees for commercial or recreational purposes. Almost all the original forests would have disappeared. This was made worse as during the famine years the weather was so bad people were not able to gather turf. They were forced to burn whatever little

wood remained. By 1900 the Irish landscape was virtually treeless except for hedges which had been planted to divide up the land and to stop cattle roaming about.

After 1920 the governments both North and South began to plant trees. Today 6% of Ireland is forested. Almost all of this is quick growing coniferous trees which were planted to provide timber. They do not provide the same opportunities for biodiversity as deciduous forests as they are all foreign imports.

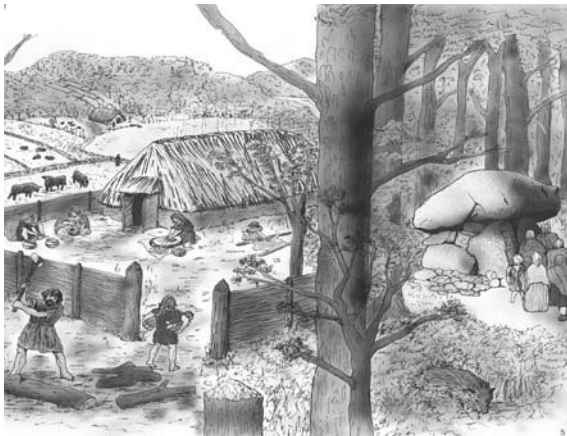
Ice Age - 13,000 BP



Hunter Gatherers - 8,000 BP



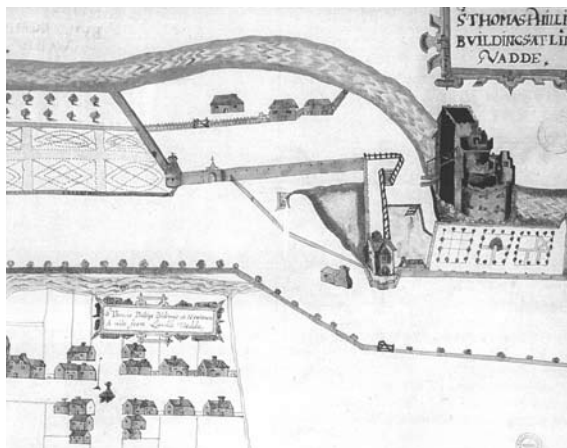
Neolithic - 6,000 BP



Celtic - 1,000 AD



Plantation - 1600 AD



Famine 1847



In modern times the landscape continues to change. Very few old forests remain. Modern agriculture is more like an open air factory than the traditional farm we imagine. One example of this is that even the hedgerows are being removed as bigger tractors need bigger fields to operate effectively. Barbed wire and electric fences are more effective and more easily maintained than the hedges. Hedges are corridors for wildlife. Removing them destroys many of the living things which depend upon them.

Today we pride ourselves on being more environmentally aware. Trees are the original habitat of Ireland. It is possible to see very few places which are in any way like the original landscape of Ireland. Roe Valley Country Park is one such place. It is important to conserve such places. Conservation also involves trying to develop our landscape. One such way is to plant as many trees as possible. We should do all we can to repair the damage done since the first farmers arrived 6,000 years ago.

The landscape continues to change as our economy develops. Towns grow bigger. Roads cut across the countryside. Farming methods change. Pollution has a big effect on the landscape. It is very important that we involve ourselves in conservation to preserve the landscape and its habitats for future generations. This is known as **sustainable development**.

Irish Woodlands Time Line

Human Activity	Date	The Woodlands
Nil	13,000 BP	End of Ice Age
Nil	10,000 BP	Birch and Willow Growing
Hunter Gatherers arrive	8,000 BP	Oak, Elm, Hazel Forest
Neolithic Farmers	6,000 BP	Forest Clearance begins
Metal Working	4,500 BP	Blanket bog develops
Celts	2,500 BP	Forest Clearance Continues
Christ Born	0	"
St Patrick	500 AD	"
Vikings	800 AD	"
Normans	1,200 AD	"
Plantation	1,600 AD	Forests Commercially Exploited Wolf exterminated
Famine	1,850 AD	Remaining woods cleared
Partition	1,920 AD	Coniferous woods planted
Present	2,000 AD	?

Roe Valley Country Park Woodlands

The history of the woodland within Roe Valley Country Park reflects changes which have happened in Ireland in general. The arrival of the first planter Sir Thomas Phillips early in the 17th century led to the exploitation of the forest of Glencoynekeen beyond the Sperrins. Phillips did, however, plant forests in what is now called Boyle's Wood as a deer park. Until the 1970's the park remained the property of Phillip's ancestors the Alexander Family. At this point the park passed into public ownership and is now administered by the Environment and Heritage Service of the DOE.

It is possible that the very steep parts of the park remained undisturbed, but the woodland on the flatter land has been exploited for timber at various times. The last major felling and replanting was probably during the First World War when the need for timber was acute.

There are few if any forests in Ireland which have remained undisturbed. Timber was far too valuable a commodity to be left unused. We take for granted that we can use plastic or metal today. This was not the case in the past and wood was of far greater importance than it is today. It is not surprising then that probably every single stand of timber has been subjected to disturbance at some point in our history. Roe Valley Park woods are no exception. However, they do allow us to imagine what the natural landscape of Ireland would have been like before man arrived.

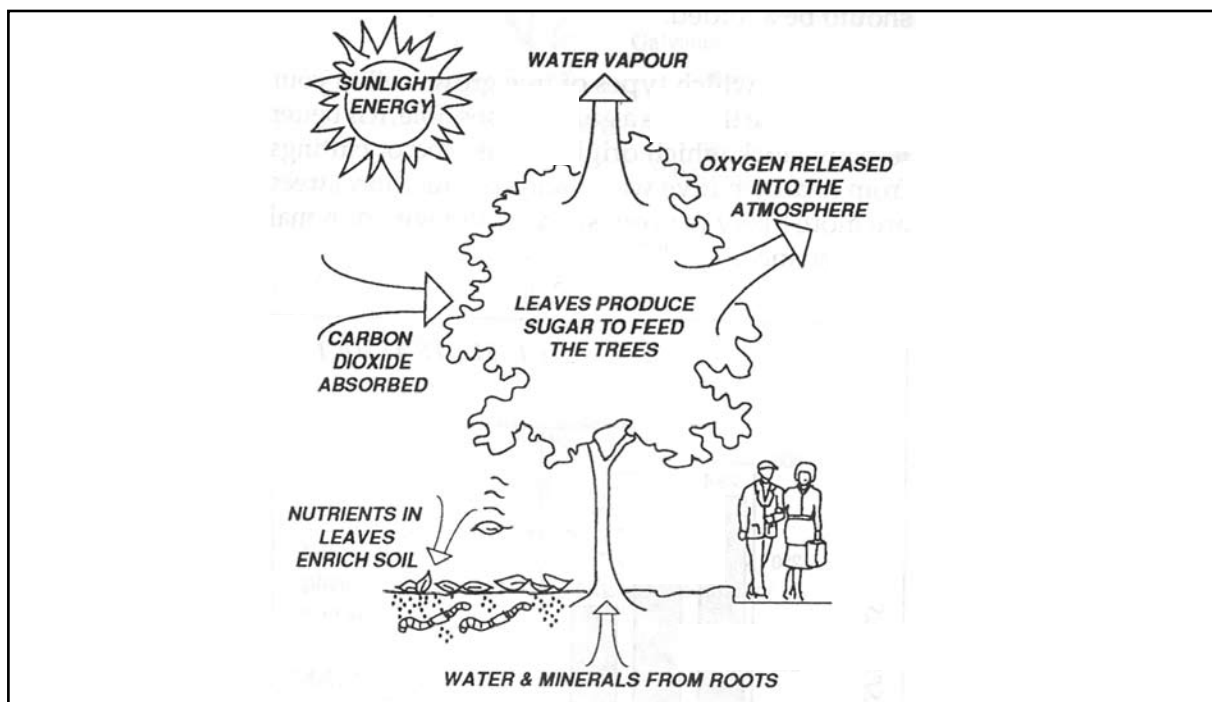
Discussion Points:

1. The wolf was exterminated in Ireland. What animals and plants are in danger now? What difference does it make if they become extinct?
2. Compare the loss of Irish woodlands in the past with the present day destruction of tropical rain forests.
3. Discuss the meaning of biodiversity and sustainable development. How would the preservation and replanting of deciduous woodlands help with these two concepts?
4. A farmer/factory owner/housing developer wishes to clear a small woodland on his land. Conservationists oppose him. Debate this question.
5. What practical steps can you take to improve your garden, school, area and country to encourage wildlife.

CHAPTER 2: TREES IN THE WOODLAND

Trees are not only beautiful they are also very important. All living things depend upon green plants which the trees are. They are able to produce their own food by absorbing the power of the sun through their leaves. The trees use the simplest of things to do this: water from the rain, a small amount of minerals from the soil, air and sunlight. The way in which they produce their own food is called **photosynthesis**. This is an extremely complex process which involves the action of a catalyst **chlorophyll** which gives plants their green colour and allows them to absorb sunlight. The minerals needed by trees for growth are returned to the soil. Falling leaves and dead trees are rotted away by bacteria, fungi and invertebrates which help return the minerals to the soil. In this way the fertility of the soil is maintained and the forest can continue to grow.

Photosynthesis and the Mineral Cycle









All animals including ourselves depend upon plants in two main ways. Firstly plants absorb carbon dioxide from the air and produce oxygen. We need oxygen to breathe and produce carbon dioxide as a byproduct. Normally the two are held in balance. Burning fossil fuels such as coal and oil also produces carbon dioxide. Plants such as trees are needed to reverse this. Scientists believe 'Global Warming' is primarily caused by the burning of fossil fuels and the production of too much carbon dioxide.

Secondly we depend on plants for our food. Plants are **producers**. Through photosynthesis they are able to produce their own food. We cannot do this, but eat plants directly or indirectly by eating animal products which themselves rely on plants. We are **consumers** not producers.

If we eat a burger, the bread of the burger will come from wheat. The meat of the burger will come from a cow which has eaten grass. Ultimately it is plants which keep us alive. The same is true in the woodland where all living things depend upon the plants, including the trees, to live. Energy is passed from the sun to the trees and then on to the animals through food chains which added together form a complex food or energy web.

TREES OF THE WOODLAND

There is a number of ways to divide trees. One can think of them as either deciduous or coniferous. Deciduous trees are broadleaved and lose their leaves in winter. An exception to this rule is the holly which is broadleaved but evergreen. Coniferous trees have needles rather than leaves and all but the larch are evergreen. Some trees are native. Others have been introduced by man. The easiest way to tell one tree from another is its leaf, but this can be tricky with deciduous trees in winter. Other clues are its flowers, fruit, bark and twigs. Here are some clues to help with identification. All trees are native except the sycamore and beech

<p>Oak: Rough bark</p> 	<p>Ash: Black buds in winter</p> 
<p>Holly: Only female tree has berries</p> 	<p>Beech: Smooth bark</p> 
<p>Apple: Crab apple not suitable to eat</p> 	<p>Sycamore: Non native</p> 

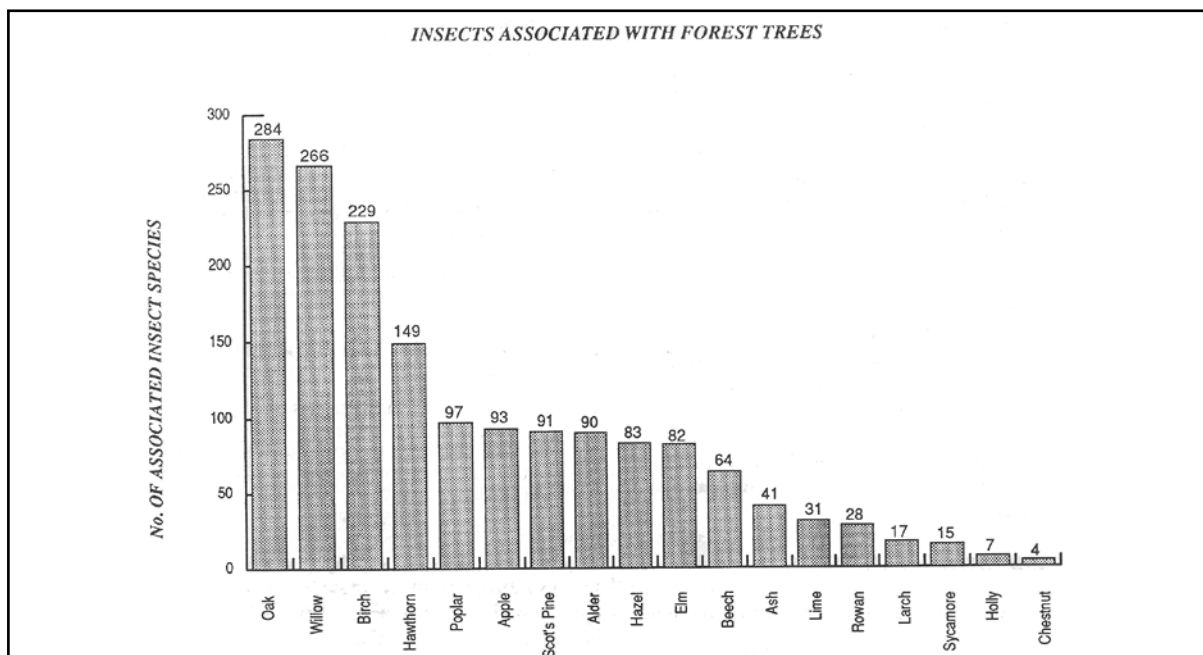
SEED DISPERSAL

Trees live for a very long time, but do not last for ever. Like all living things they need to be replaced. This is called **reproduction**. Trees are flowering plants. Their flowers produce many seeds which have the potential to produce other trees. There is no point in the seed simply dropping below the parent tree. It will not grow as the parent tree will use up all the light and minerals the young tree needs. The seed must find suitable place away from the parent tree. This is achieved in a number of ways by wind dispersal, bird dispersal or animal dispersal.

The sycamore has the familiar 'helicopter' wings which allow its seed to fly in the wind. The holly berry will be eaten by birds. The hard pip inside cannot be digested by the bird and will pass through it falling to the ground far from the parent tree. Oak trees depend upon squirrels and jays to spread their acorn seeds. The squirrel or jay stores acorns in the ground as a winter larder. Sometimes they forget where their larder is and the acorn can begin to grow in the spring time. We can see that the trees birds and animals depend upon one another. Without nuts and berries birds and animals would starve in winter. Without the birds and animals to disperse the seeds the trees would not reproduce.

NATIVE TREES AND INTRODUCED TREES

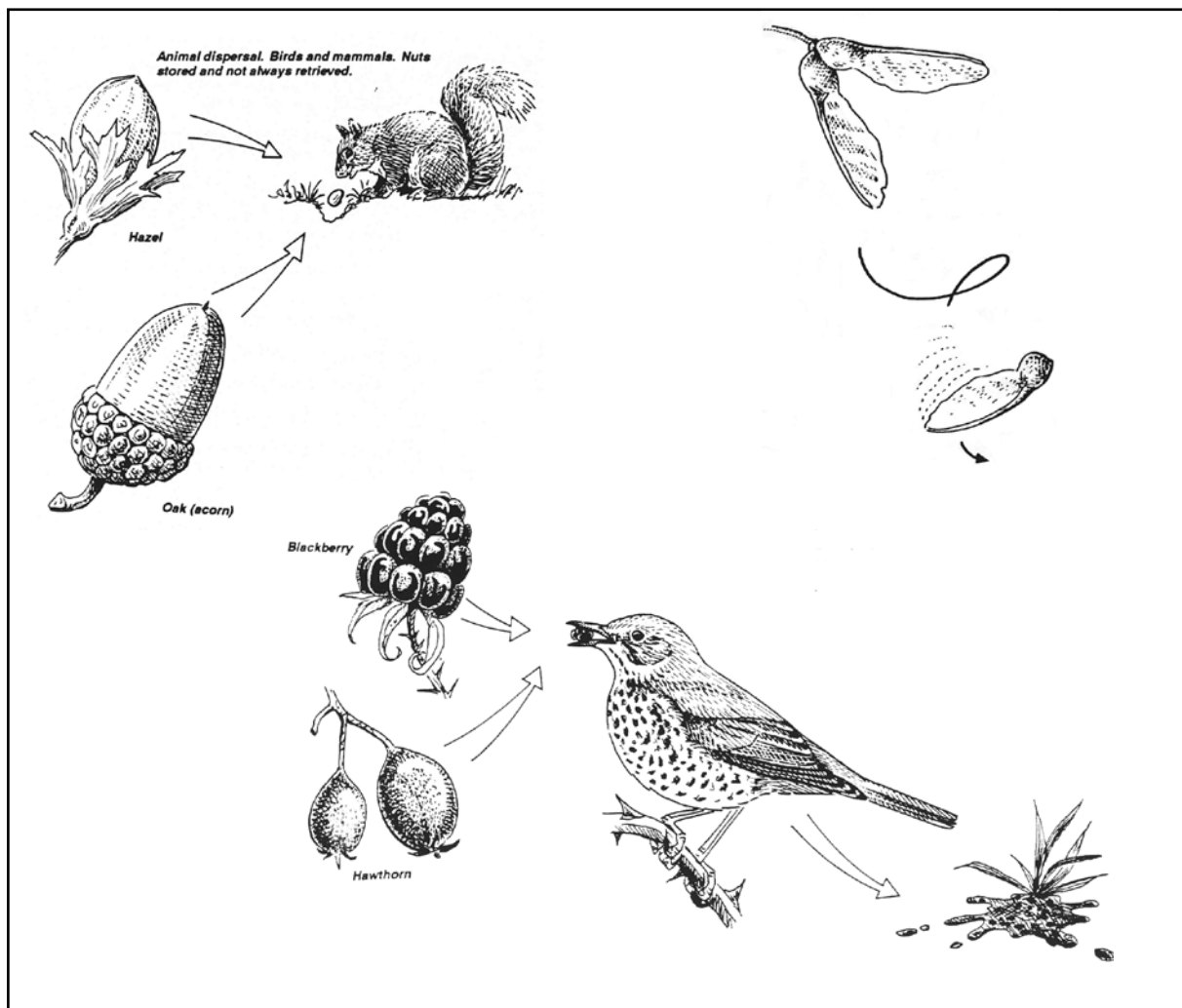
Some trees have arrived in Ireland by normal seed dispersal after the ice age. Others have been introduced by man. The differences between them are best understood by comparing the oak, a native species, and the introduced sycamore. Introduced trees do not have the same number of **invertebrates** associated with them as native trees.



Less invertebrates means that there are less birds and mammals further along the **food chain**. In spring the sycamore also puts out its leaves a month before the oak. It is difficult for spring flowers, such as snowdrops, daffodils and blue bells to flourish underneath the sycamore. Its canopy of early leaves blot out the light the flowers require. Introduced trees do not encourage the same **biodiversity** as native trees. It is better to plant native trees, if you wish to improve the whole environment.

Some questions about trees:

1. What four things do trees/plants need to grow?
2. Trees can make use of energy from sunlight. What is this process called?
3. What chemical gives plants their green colour?
4. What gas do trees take from the atmosphere during daylight and which gas do they produce?
5. What does the burning of fossil fuels help to cause?
6. Trees are energy producers. Animals are energy consumers. Explain these two sentences.
7. Name six deciduous trees.
8. Name three ways in which trees spread their seeds.
9. Look at the graph on the previous page. Which tree is the best one to plant to encourage wildlife?
10. What is meant by biodiversity?



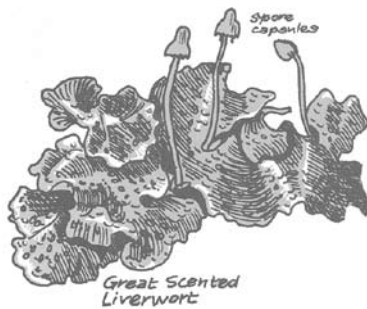
CHAPTER 3: THE PLANT KINGDOM IN THE WOODLAND

There is a bewildering number of different kinds of plants within the forest. The world of living things is divided into different groups by biologists or life scientists. The most basic divisions are the kingdoms one of which is the plant **kingdom**. This kingdom is further divided into **orders**. Different **species** of plants fit into these orders. Each different kind of plant is called a species and each fits into an order. They can be divided into different groups depending upon their structure.

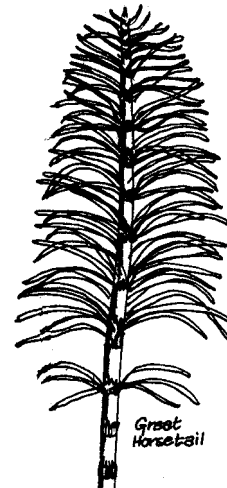
What they all have in common is that they all have true cells. They also contain chlorophyll which allows them to photosynthesise. They are all producers. Below is a table of the various orders of plants. The illustrations are of species commonly found in the woodland.

Order of Plants	Description
Mosses and Liverworts	Usually found as a thin mat on rocks and trees. They have simple stems, no transport system and reproduce by spores.
Horsetails Ferns	These have true roots and stems. They have true scale like leaves in whorls. They reproduce by spores in cones.
Flowering Plants	They have true roots and stems. They have true leaves divided into tiny leaflets. They reproduce using spores found on the underside of the leaves.
Conifers	
Flowering Plants	These have needle like leaves. They are generally evergreen. They produce their seeds in cones.
	This group includes the trees. They are generally deciduous and produce seeds, berries or nuts.

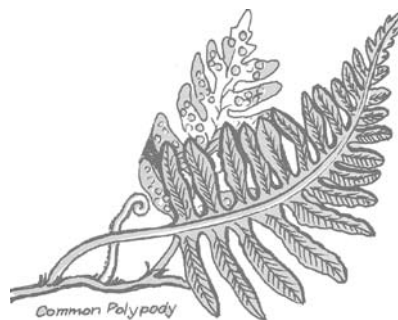
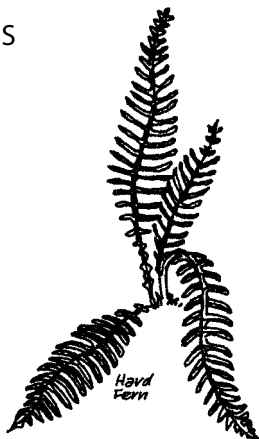
MOSS & LIVERWORT



HORSETAIL

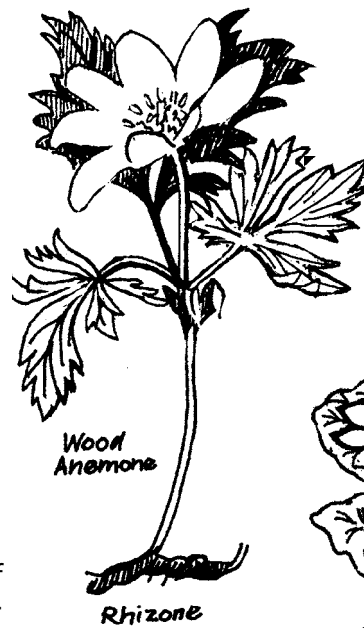


FERNS



FLOWERS: As with all efforts to recognise living things it is best to begin with the most common examples and gradually build up knowledge. Flowers are best observed in spring and summer, but few last throughout this period

Wood Anemone: A spring flower which forms dense carpets of white flowers. The flowers grows from rhizomes which develop below the surface of the soil. Not to be confused with the wood sorrel which is not as common and has a clover like leaf

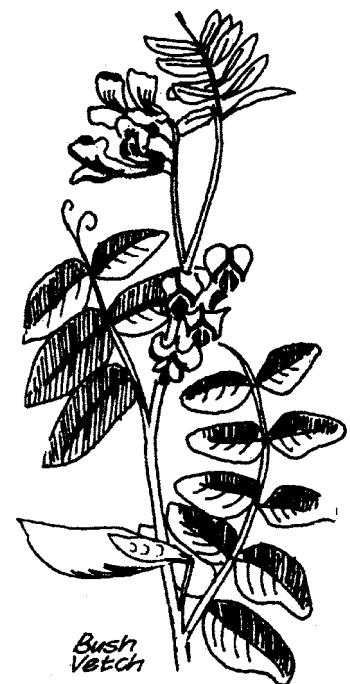


Lesser Celadine: Forms dense carpets of yellow flowers in late spring. The lesser celadine has tubers which allow it to spurt in growth.



Blue Bell: Developing later than the two above flowers, the blue bell relies on its bulb to give it a growth spurt. The blue bell is indicative that the woodland is of considerable age

Bush Vetch: A straggling purplish flower which uses its tentacles to attach itself to other vegetation. It lasts from late spring into early winter. It produces distinctive seed pods. Easily confused with other vetches which are also very common.



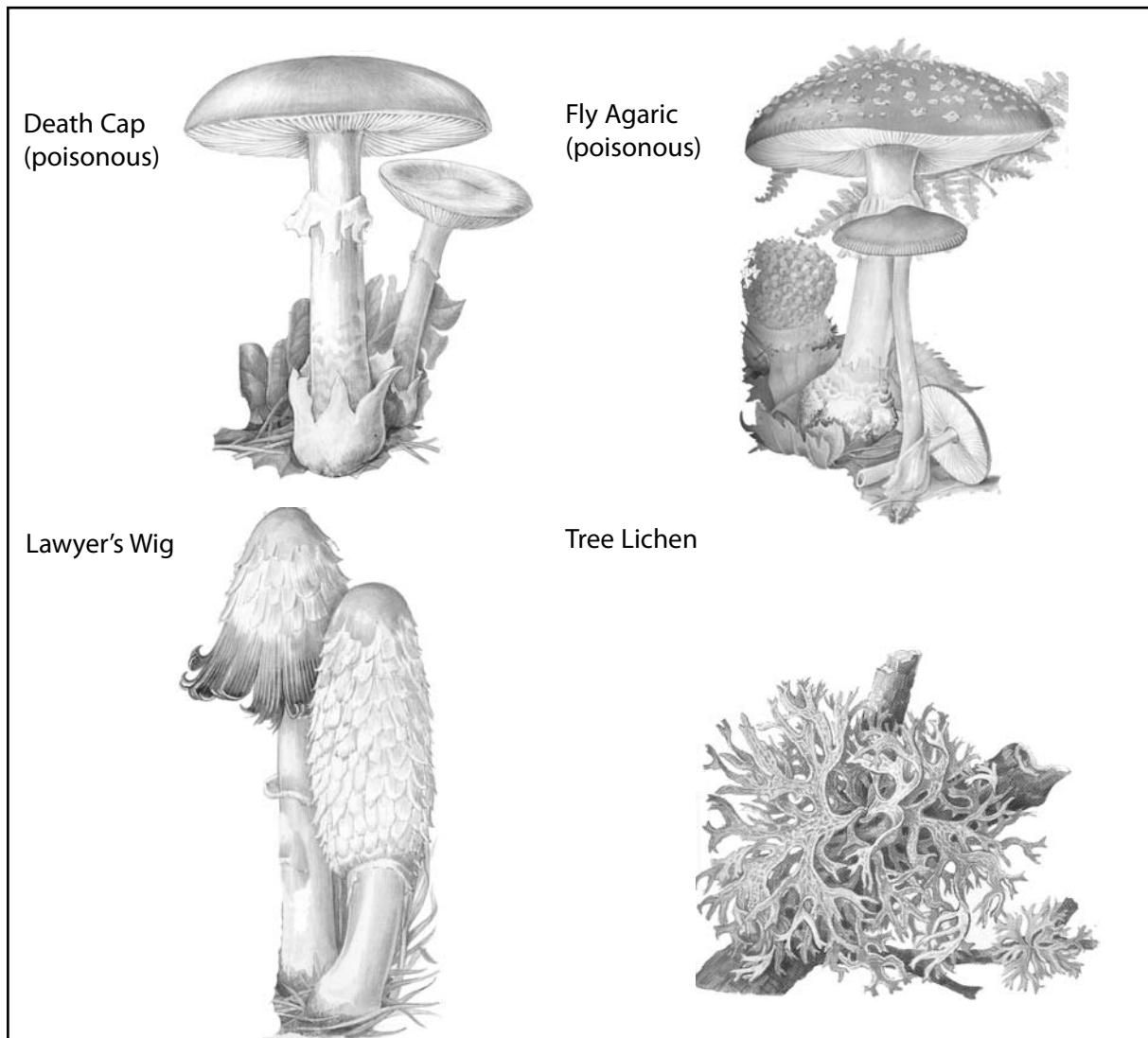
Other organisms are not considered plants, although they share some of their characteristics.

Algae: These are single cell organisms living in water. They contain chlorophyll and are therefore capable of photosynthesis. They are not regarded as plants as they have no structure.

Fungi: These may look like plants, but lack true cells and have no chlorophyll. They are specialised consumers or decomposers. What is generally thought of as the fungi, a mushroom, is merely the fruiting body. This only appears at certain times of the year. The main body of the organism is below the surface. It consists of threadlike **hyphae** which form the network or **mycelium** which allows the fungi to absorb its sustenance. In this sense it is more like an animal than a plant. Reproduction is through spores produced by the fruiting body. Fungi are of two types: mushrooms/toadstools whose fruiting bodies have gills and other fungi which have no gills. Some fungi are edible while others are deadly poisonous.

Lichen: These are a combination of algae and fungi. The algae are able to photosynthesise which the fungi cannot. The fungi provides a home for the algae and feeds off the food it produces. This is called a symbiotic relationship. Meaning it is of benefit to both.

FUNGI



CHAPTER 4: MINI-BEASTS

The scientific name for mini-beasts is **invertebrates**. This means that they lack a backbone like the higher animals. They do form a very important part of the woodland as they help return minerals to the soil. In this way the forest can continue to grow. They also form an important part of the food chain. **Mammals** are rarely seen because they are afraid of humans and hide when we come close. The woodland is not the best place to begin studying birds as the trees make them difficult to observe. Invertebrates are more easily studied as they are always there and are easy to catch. By studying them we can understand better how the whole woodland works. This is what is called an **ecosystem** and the study of it is called **ecology**.

RECYCLING

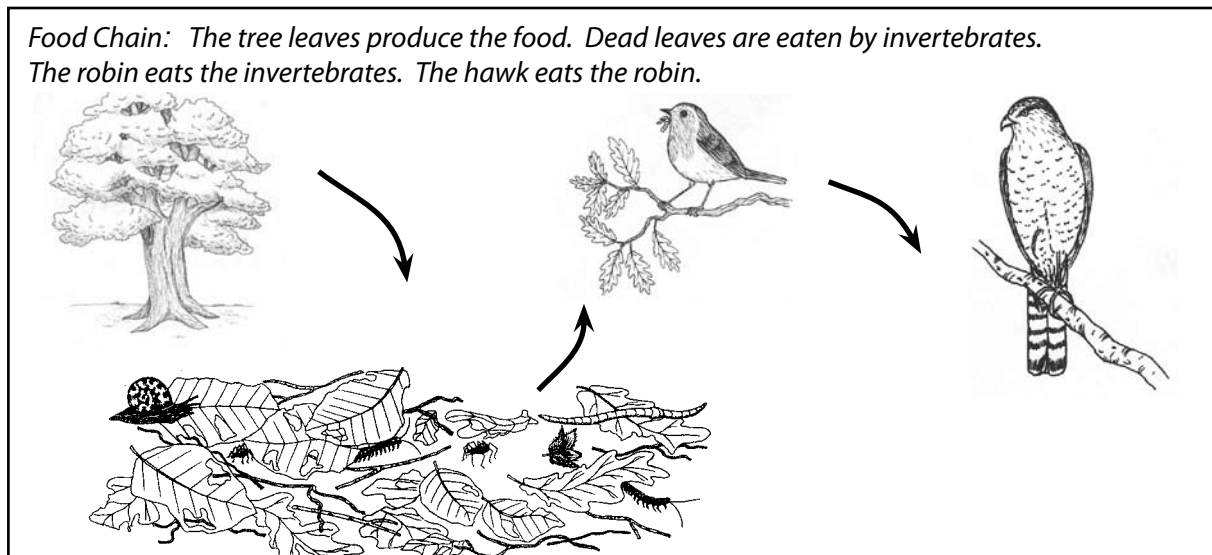
Many invertebrates can be found in the leaf litter, (they can also be found at all levels of the forest and also burrowing below the forest and flying above it). They recycle the leaves returning the minerals to the soil. Along with bacteria and fungi they can be seen as **decomposers**.

By eating the dead leaves the invertebrates do a very important job. They return essential minerals to the soil and keep it fertile. If minerals were not returned to the soil in this way, the forest would cease to grow. Farmers and gardeners do the same thing when they spread manure. The manure returns minerals to the soil which have been removed by harvesting crops. This recycling process happens continuously in the forest and relies upon the invertebrates. This process is much slower in coniferous forests. The mini-beasts find the pine needles harder to eat.

FOOD CHAINS

They can also be seen as part of the food chain. The idea of a food chain helps us to understand how energy is used in the woodland ecosystem. Energy coming from the sun is used by the trees to grow. The trees and other plants form the first link of the chain. This energy is then used by the invertebrates which eat the fallen leaves. Small birds then eat the invertebrates. They small birds themselves may be eaten by hawks.

Below is a typical food chain.



FOOD WEBS

We could fairly easily think of a number of food chains:

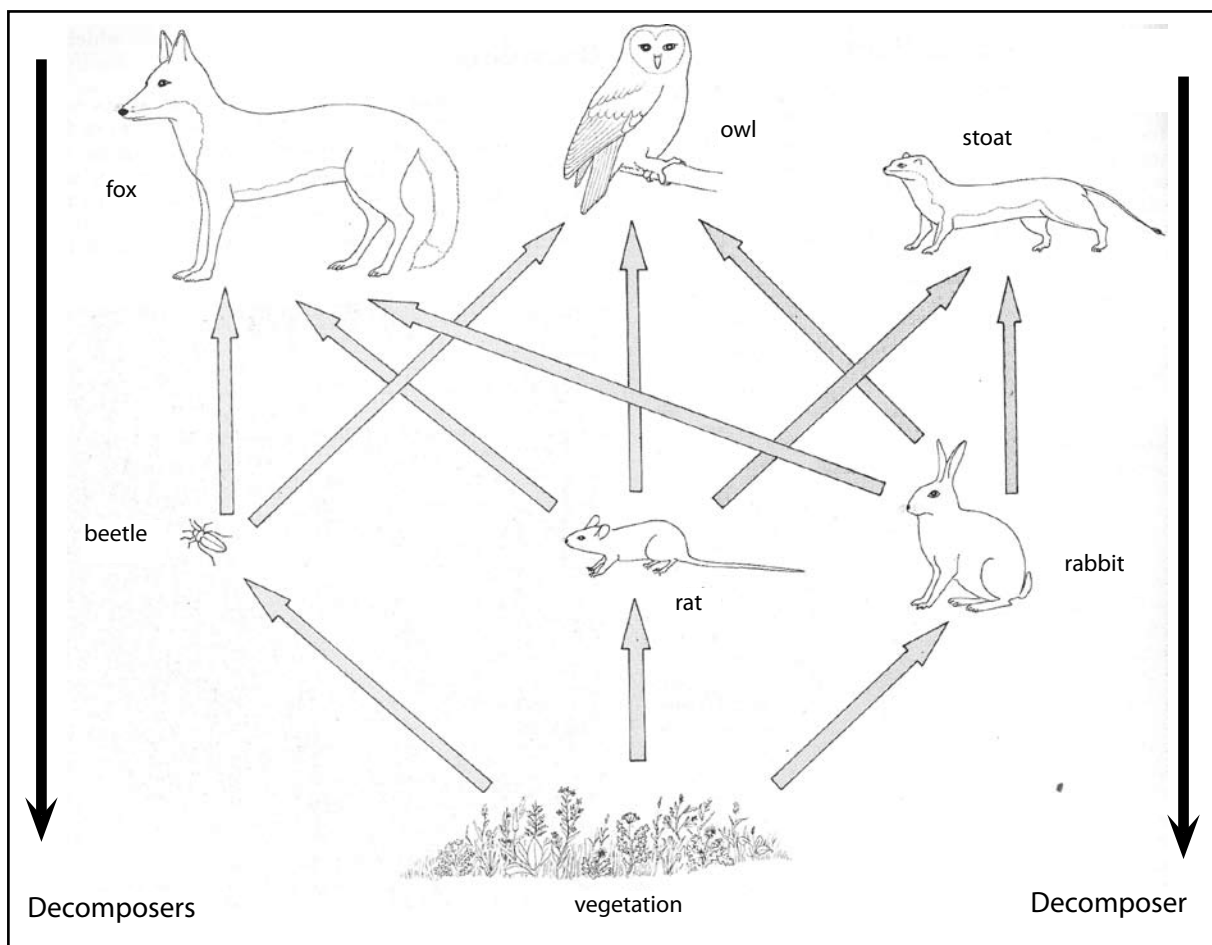
LEAF - CATERPILLAR - BLUE TIT - HAWK

GRASS - RABBIT - FOX

DEAD LEAVES - MILLIPEDE - SPIDER - ROBIN - HAWK

Many others exist within the woodland. It must also be remembered that each living thing is subjected to decomposition by bacteria, fungi and invertebrates. The resulting pattern is far more complex than a chain and forms a complete web where each part is interdependent.

Simplified Food Web



Human Interference and **Bio-indicators**

This web can be interfered with and the whole balance of nature upset, usually but not always by man. Rat poison has been partly responsible for the near extinction of barn owls in Northern Ireland. If squirrels and jays disappear, it is difficult to see how acorns would be spread. Chop down hedges and the numbers of thrushes drops dramatically as their nest sites disappear. Kill all the foxes and birds of prey and the result is a plague of rats and rabbits. Use too much pesticide on crops and many song birds die out as they are poisoned by the toxins in the invertebrates they eat.

We do not fully understand our surroundings. Unfortunately we only realise our mistakes when it is too late. It is useful to take note of bio-indicators. Otters and salmon warn us about river pollution. Thrushes could tell us if too much pesticide is being used or that our landscape is being altered as hedges disappear. Lichen indicates that the air is clean.

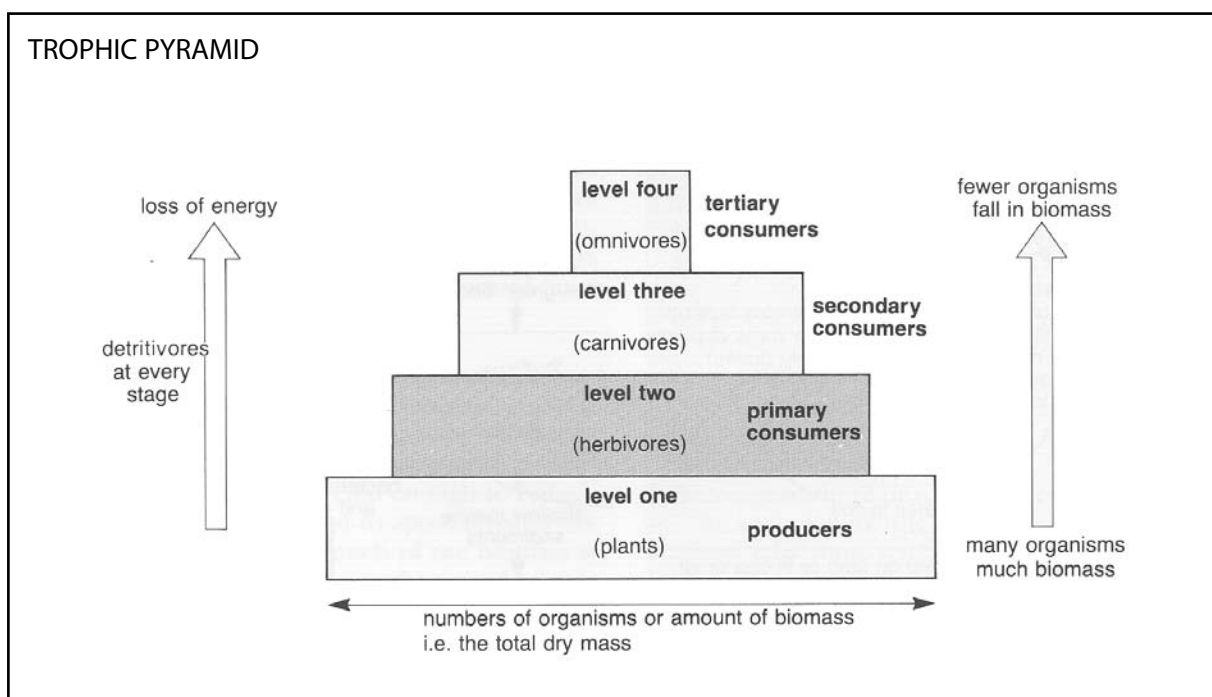
TROPHIC LEVELS

To understand the idea of **trophic layers** we must examine the way in which the life of the forest works. All life depends upon energy. The energy required by all the living things in the forest comes from the sun. Plants are able to use this energy through the process of photosynthesis. The plants are then able to grow and store food for themselves. They are in this sense **producers**. The plants provide food for a variety of living things which all depend upon the plants. Every living thing except the plants are consumers.

There are different levels of **consumers**. Those which depend upon the plants directly are herbivores or plant eaters, e.g. woodlice and rabbits. The herbivores provide food for the carnivores or meat eaters, e.g. centipedes and foxes. There are other animals such as badgers and human beings which are **omnivores** which are able to eat both plants and animals.

Nothing lives for ever. Dead plant and animals become food for the **detritivores**, bacteria, invertebrates and fungi which help with the process of decay.

We can represent these relationships with the following diagram:



The diagram is a pyramid showing the different trophic levels. Trophic levels explains the way energy is used. The volume and weight of life, its **biomass**, decreases as one passes up the pyramid. There is a far greater volume of plants than badgers for example. The reason for this is that animals do not convert plants entirely into their own body weight. Energy is lost through their staying alive in breathing and producing waste. The different species of living things also decreases as one passes up the pyramid. There are far less omnivores than plants for example. The following table of Irish life confirms this:

NUMBERS OF KNOWN TERRESTRIAL AND FRESHWATER SPECIES IN NORTHERN IRELAND COMPARED WITH UK AND GLOBAL ESTIMATES OF DESCRIBED SPECIES

GROUP	NI species	UK* species	World * species
Bacteria	Unknown	Unknown	>4,000
Viruses	Unknown	Unknown	>5,000
Protozoa	Unknown	>20,000	>40,000
Algae	Unknown	>20,000	>40,000
Fungi	7,500	>15,000	>70,000
Bryophytes	584	1,000	>14,000
Lichens	812	1,500	>17,000
Ferns	48	80	>12,000
Flowering plants	950	1,500	>250,000
Non-arthropod invertebrates	Unknown	>4,000	>90,000
Insects	12,000	22,500	>1,000,000
Arthropods other than insects	Unknown	>3,500	>190,000
Freshwater fish	11	38	>8,500
Amphibians	1	6	>4,000
Reptiles	1	6	>6,500
Breeding birds	96+	210	9,881
Wintering birds	80+	180	-
Mammals	13	48	4,327

It is obvious from this table that there are far less mammals than birds. These are in turn outnumbered by plants, fungi and invertebrates. This pattern is true for whatever ecosystem we choose to examine. On the African grasslands for example, we would find a great deal of grass, some antelopes eating the grass and very few lions eating the antelopes.

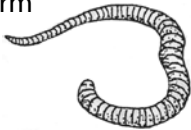

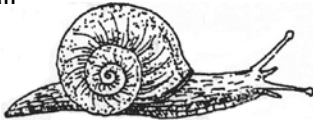

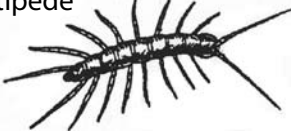
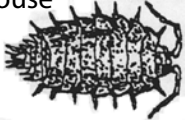


The whole collection of species is known as **biodiversity**. It is important that we look after as many species as we can. We call this **conservation**. This can only be achieved by protecting not only the individual species themselves but the **habitats** on which they rely.

As we have seen with respect to the reduction of the Irish forests from 90% of the country to a mere 1% the main problem is the impact of man's activities on the environment. It is not possible to turn the clock back and return to Ireland the way it was before people arrived. However, we are becoming more aware of the need to balance the development of our prosperity: jobs, industry, housing, transport etc. with the need to conserve what remains of our natural heritage. This need for balance is called **sustainable development**.

CLASSIFICATION

Part of science is to divide animals into different groups. This is called the **classification** of living things. Scientists divide animals and plants into different groups. They use the structure of their bodies to do this. It is possible to do this in a simple way with the invertebrates collected from the leaf litter. Clues as to which group they fall into can be found by counting their legs and parts. It is also useful to consider whether they eat the dead leaves or eat the other invertebrates. The leaf eaters are **herbivores** the invertebrate eaters are **carnivores**. The chart on the next page uses a simplified classification of the animals you might find in the leaf litter.

CLASSIFICATION OF INVERTEBRATES

Name	Number of parts and legs	Herbivore or Carnivore	Classification
Earth Worm 	Many/0	Herbivore	Annelid: This means it is segmented. Each segment has the same structure. The earth worm lives by eating leaves which it pulls underground.
Slug 	1/0	Herbivore	Mollusc: This means it is a soft bodied animal with a shell. Its shell is within its body. Its eggs are often found in the leaves.
Snail 	1/0	Herbivore	Mollusc: Much the same as the slug except its shell is more obvious. Related to sea creatures: oysters, mussels and octopus.
Millipede 	100/400	Herbivore	Myriapod: Differs from a worm in that its segments have four legs. Has eyes and antennae. Name means having lots of legs.
Centipede 	12/24	Carnivore	Myriapod: Obviously a carnivore as it is much quicker than the other invertebrates.
Woodlouse 	7/14	Herbivore	Crustacean: Relatives live in the sea: crabs, lobsters & shrimps. The woodlouse requires dampness to be able to breath.
Spider 	2/8	Carnivore	Arachnid: Spiders, mites and scorpions. Not all spiders weave a web, some simply chase their pray.
Beetle 	3/6 with 2 or 4 wings	Herbivore or Carnivore	Insect: Most familiar group with many species. Take note that their life cycle means that eggs, larva and pupa may also be found in the leaves.

1. Here is a list of ten animals. Five are invertebrates and five vertebrates. Divide them into the two groups:

Lion, frog, whale, crocodile, wasp, octopus, starfish, salmon, earwig and slug.

2. Here is a list of ten animals. Five are herbivores and five are carnivores. Divide them into the two groups:

Tiger, horse, cow, owl, seal, worm, centipede, slug, spider and woodlouse.

3. Name three kinds of decomposers

4. Here are three food chains which have been muddled up. Sort out the correct order placing the producer first.

man - cow - grass

owl - tree - cherry - mouse - bird

otter - salmon - small fish - plankton

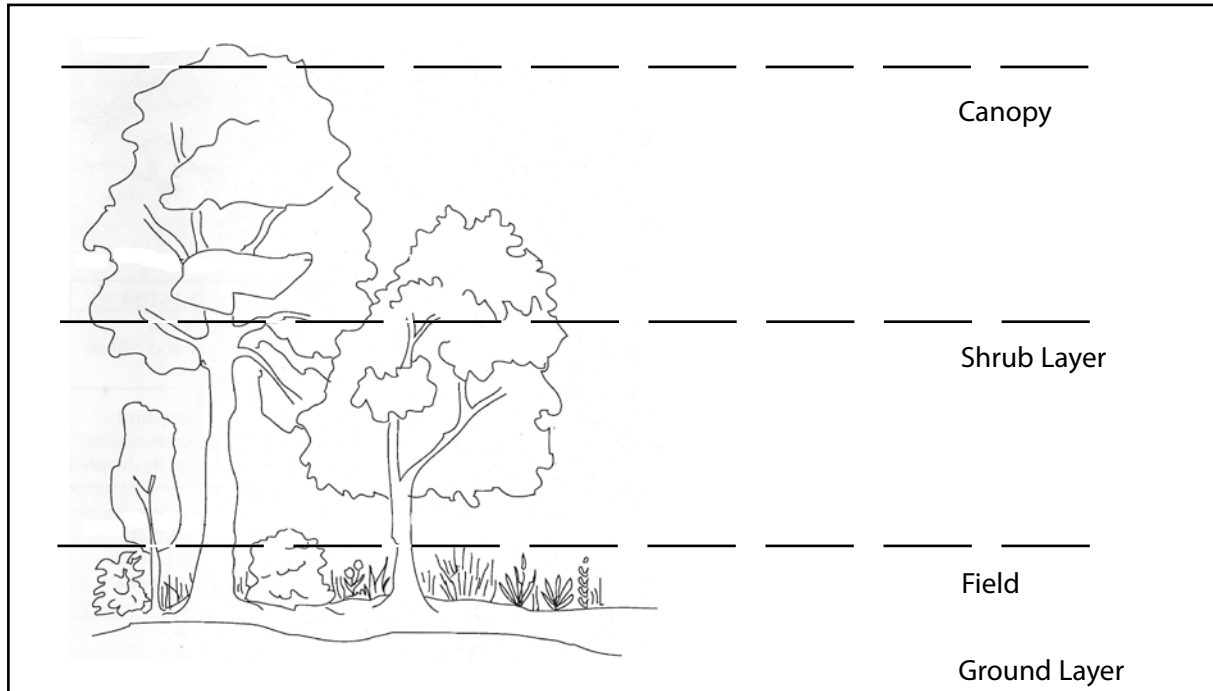
5. Look at the picture of the simplified food web. Imagine what would happen if any item became extinct. What consequences would the end of one creature have for the others.
6. It is said that St. Patrick drove the snakes out of Ireland. Look at the chart which lists the various species in Ireland and offer another explanation for the figures which does not involve St. Patrick.

CHAPTER 5: BIRDS IN THE WOODLAND

INTRODUCTION

Seventy six different kinds (**species**) of birds have been seen in the Roe Valley Park. We will concentrate on just a few. The woodland itself is not the best place to start studying birds as the birds can so easily hide in the trees. Probably the best place to begin is near your house or school where birds are more easily seen.

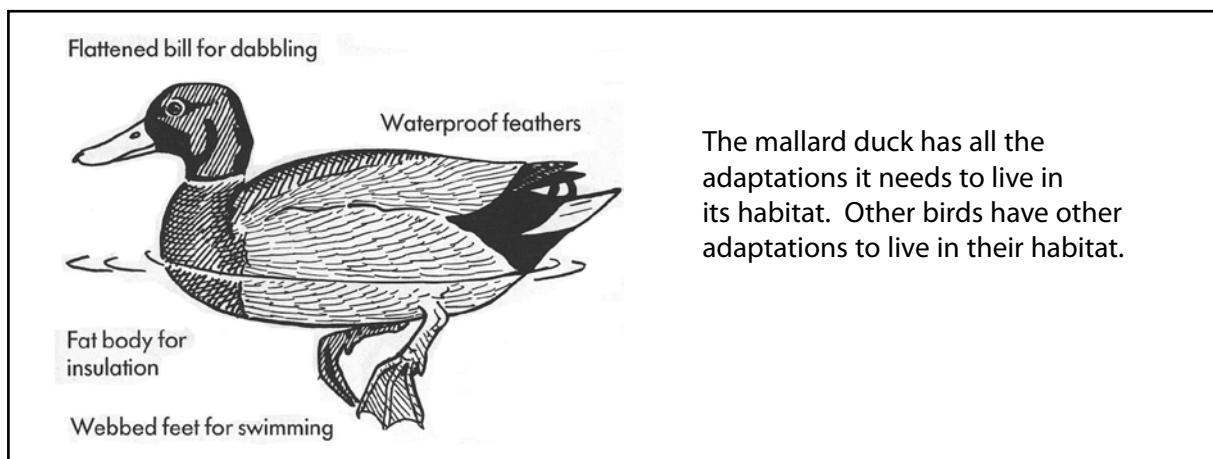
WOODLAND LAYERS:



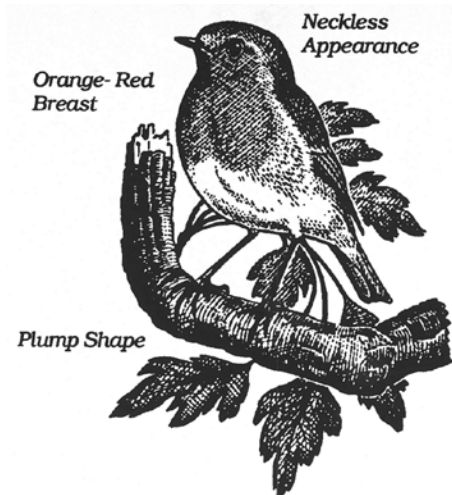
The structure of the woodland can be viewed as containing a number of layers

Different birds can use food available at different layers, e.g. blue tits in the canopy layer, jays in the shrub layer, wrens in the herb layer and thrushes and robin use the ground layer. They all eat different things in the woodland and so live happily together.

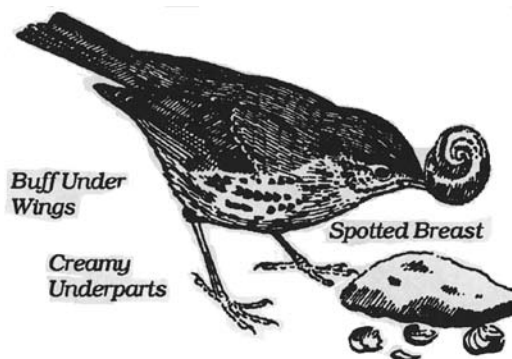
ADAPTATIONS: **Adaptation** means the different body types each bird has to allow it to survive by finding food. A good example is the duck found in the pond outside the centre.



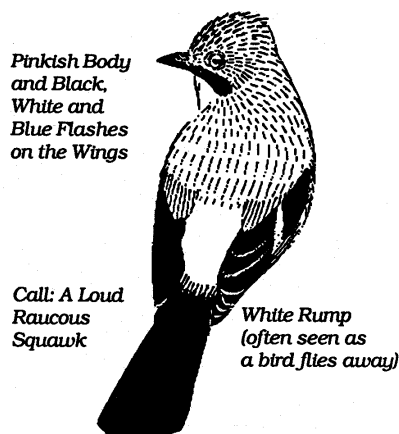
BIRDS OF ROE VALLEY PARK - THEIR ADAPTATIONS, HABITS & HABITATS



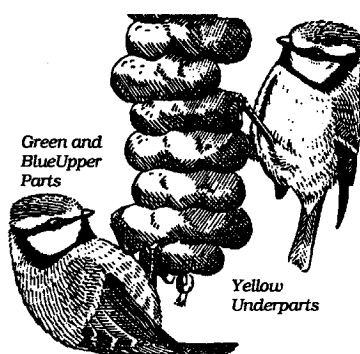
ROBIN Length 13 cms
 Like all the birds on this page the robin is a perching bird. It has feet adapted for gripping twigs. The robin normally visits us during our mini-beast hunt. It is doing exactly the same as ourselves, looking for ground layer mini-beasts, which it eats. The tiny mini-beasts we find can be a substantial meal for a small bird like a robin. The robin has a slender beak adapted for eating small invertebrates. The robin searches in the ground layer. The robin sings all year round to protect its territory



THRUSH Length 23 cms
 The thrush is about twice the size of the robin. It has a brown back and spotted breast. It is also a ground feeder but concentrates more on slugs and snails. It will also eat berries in the autumn and winter. Numbers of thrushes have dropped very badly which makes it a good bio-indicator. It tells us that farmers may be using too much pesticide or cutting down too many hedges.

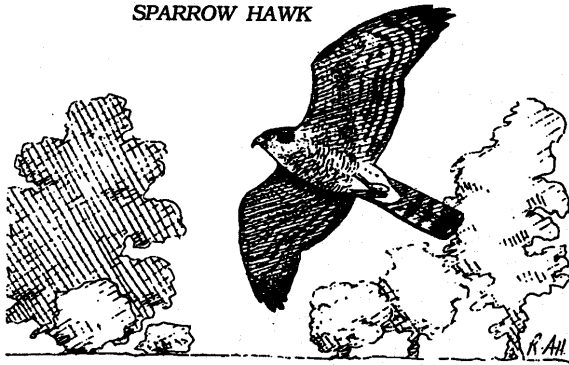


JAY Length 35 cms
 The jay is about twice as big as a thrush. It is a member of the crow family, but is more brightly coloured than rooks or jackdaws with a bright blue stripe on its wings. Its bigger beak allows it to eat almost anything: invertebrates, acorns and it will even eat meat especially in spring time when it takes eggs and young birds from the nests of other birds. The jay is choosy about its habitat only living in deciduous woods



BLUE TIT Length 12 cms
 Even smaller than a robin this bird lives in the topmost branches of the canopy, but will also be seen lower down. Unlike the robin it is normally seen in pairs or small groups. It uses its little chisel like beak to eat invertebrates in the spring and summer. In winter it changes its diet to seeds. When it visits bird tables in winter it will eat nuts.

SPARROW HAWK



SPARROW HAWK Length 35 cms

The sparrow hawk is a typical bird of prey. It has sharp claws called talons for gripping its prey. Its hooked beak is for tearing flesh. Its eyes face forwards to focus on the small birds it chases through the trees. Although no bigger than a jay, the sparrow hawk can kill birds as big as wood pigeons. The sparrow hawk is at the top of the food chain. So there are not so many of them in the forest.



LONG EARED OWL Length 37 cms

The owl is also bird of prey. It has the talons, hooked beak and forward facing eyes. Being nocturnal, hunting at night, it needs other adaptations. Its eyes can see much better than ours in semi darkness. In complete darkness it uses its ears, which are set at different levels on its head, to pinpoint the sounds of its prey. It has specially adapted feathers which allow it to fly silently. Owls swallow their prey whole. Then regurgitate pellets of bones and fur which they cannot digest. Examining these pellets allows us to tell what they eat, mostly mice, birds and frogs.



THE BUZZARD Length 60 cms

This is a larger bird of prey. Bigger than a hawk, but smaller than an eagle. It builds its nest in the trees of the forest and roost there at night. By day it soars high in the air using its binocular eyes to look for its prey. It can hunt, but prefers dead things called carrion. Until recently it was shot and poisoned by farmers, who believed it killed their lambs. They now leave them alone and their numbers have increased.



THE HERON Length 100 cms

Usually seen standing motionless beside the river, it is not a bird of prey, but one of the group of birds called waders. They have long legs and toes which allow them to wade in water. The heron uses its long dagger of a beak to catch fish, frogs and rats. Surprisingly it uses trees to build its nest.

ADAPTATIONS

Adaptations are what birds have on their bodies to allow them to find food and avoid being killed. The main difference between birds and other living things is their feathers. These keep them warm and also allow them to fly.

The difference between one bird and another can best be understood by looking at the beaks and feet. Most of the forest birds have feet made for gripping twigs, but the birds of prey have special sharp claws called talons which they use for grabbing their prey.

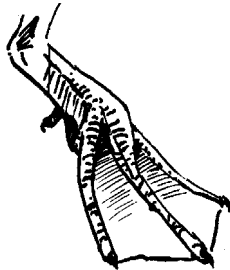
Beaks can also tell us what birds eat. The robin's beak is thin and delicate, it eats invertebrates all year round. The blue tit has a stouter beak which it uses to eat invertebrates in summer and seeds in winter. The jay has a general purpose beak which allows it to eat almost anything. The thrush uses its long beak to eat worms, slugs, snails and berries. The hawk has a hooked beak it uses to tear up the birds it catches.

Make the correct links between these pictures and the name.

HAWK



BLUE TIT



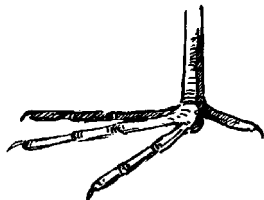
DUCK



OWL



HERON



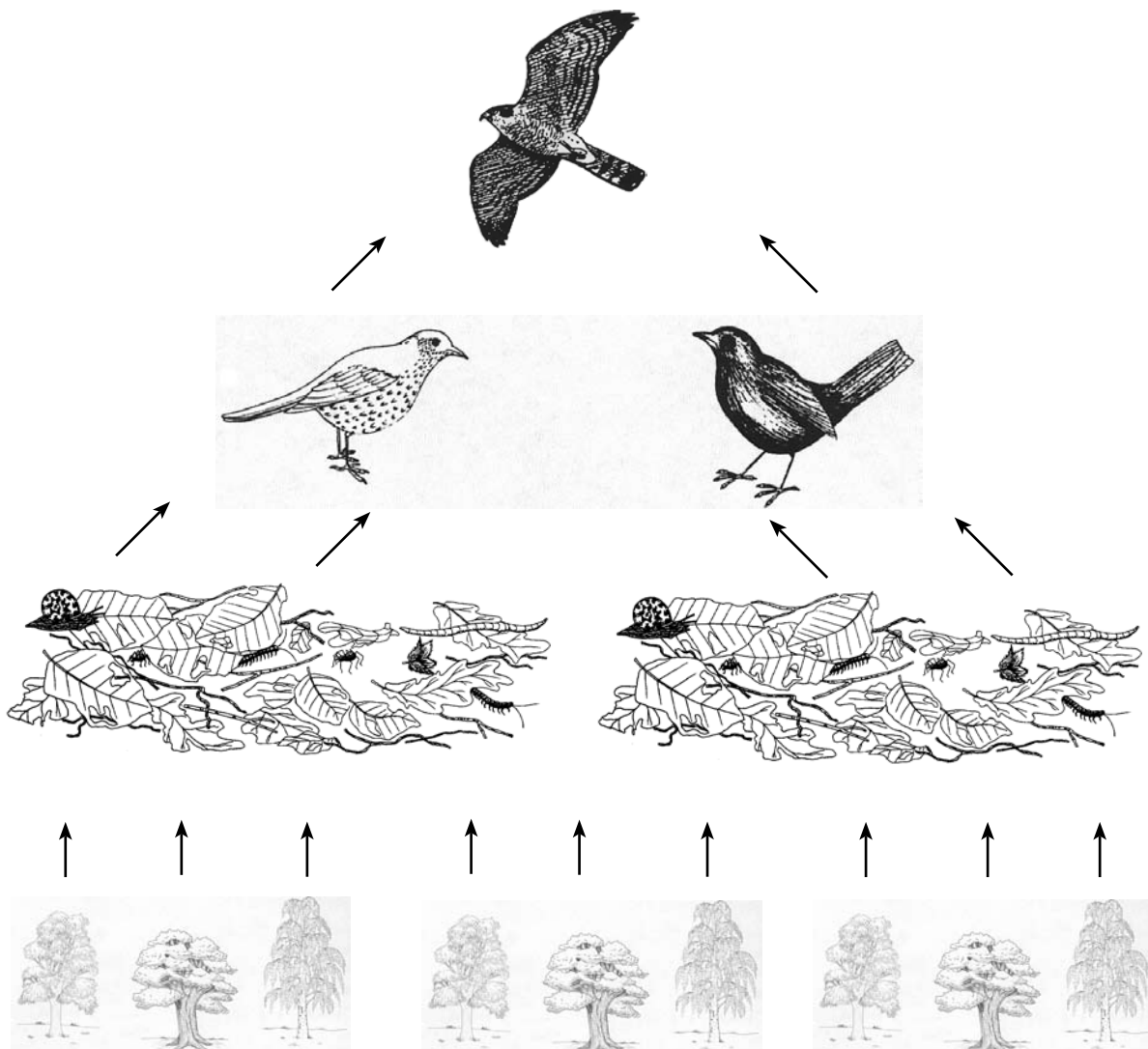
BIRDS AND THE WOODLAND ECOSYSTEM

SEED DISPERSAL

There is an interdependence between birds and the woodland. Birds help spread the seeds of the trees. Many birds rely on the seeds of the trees for winter food. Blackbirds and thrushes eat cherries, hawthorn and holly berries. They digest the soft part, but the seeds pass through drop to the ground and may grow into new trees. Jays will bury acorns as winter food. If the jay forgets the burial places, the acorns may grow into oak trees. The birds benefit by getting food from the tree. The trees reproduction depends upon birds.

FOOD CHAINS

There are many examples of food chains in the woodland. The whole system is based on the food produced by the plants. One example is where the tree produces leaves which fall to the ground in the autumn. Here they are eaten by the invertebrates. The invertebrates are food for the small birds which are in their turn eaten by hawks. As one moves along the food chain both the volume, number and variety of living things decreases: many plants; fewer invertebrates, fewer small birds and very few hawks. At each stage dead things are decomposed by fungi, bacteria and invertebrates.



ROE VALLEY COUNTRY PARK - BIRDS IN THE WOODLAND

Answer these questions:

1. What is the scientific name for different kinds of birds?
2. All birds have something in common what is it?
3. Name the five different layers found in a woodland.
4. What does adaptation mean?
5. Why do robins sing?
6. Why might the number of thrushes have fallen so badly?
7. To which group of birds does the Jay belong?
8. In which level of the forest do blue tits normally live?
9. Name the three special adaptations the sparrow hawk uses to catch its prey?
10. Which one word means 'being active during the night'?
11. What does carrion mean?
12. Where do herons build their nests?

Fill in the missing words. Use the words listed below

There are 76 different _____ of bird in Roe Valley Country Park. The birds use the different levels in the woodland. All birds have _____. Different birds have different adaptations. The duck for example has _____ feet to allow it to swim better. The robin's feet allow it to _____ twigs. The thrush eats slugs and _____. The jay will only live in _____ woods. The blue tit will eat _____ in winter. The sparrow hawk is at the top of the food _____. The owl can fly _____. The _____ eats dead things. The heron has long _____ like all wading birds. Birds help trees to grow by _____ their seeds.

Missing words: spreading, species, legs, feathers, buzzard, webbed, silently, grip, chain, snails, seeds and deciduous.

CHAPTER 6: MAMMALS

Introduction:

Mammals are special kinds of animals. They are distinguished from other living things by having live young, feeding them on milk and by having hair or fur. We humans are mammals, which is probably why we find them so interesting.

Ireland lacks the **biodiversity** of its near neighbour Britain. This means that there are less species of living things. This difference is very obvious with regard to mammals. There are comparatively few species of wild mammals in Ireland. There are only 13 wild mammals in Ireland as compared with Britain which has 48. This is due to a combination of reasons: Britain is bigger, Ireland lies to the far West of Europe and it is an island.

There is fierce debate as to how these mammals ever reached Ireland. Birds can fly, but mammals must walk or swim. Some scientists argue that the mammals reached here after the ice age when there may have been a land bridge between Ireland and the rest of the continent of Europe. Others argue that all the mammals were introduced by man either on purpose as a food source, as in the case of the rabbit, or accidentally, as in the case of the rat.

The park and the surrounding countryside has a wide variety of Irish mammals: badger, fox, rabbit, mouse, rat, weasel, hedgehog, grey squirrel, pygmy shrew, mink, otter, hare and various species of bat. The park was originally planted as a deer park early in the 17th century, but these have long since disappeared. Other Irish mammals are now extinct, the wolf and the wild boar for example.

Mammals appear to have very few interests. As far as we can guess they are only interested in two things, getting enough to eat and not being eaten themselves. These two can be called survival. At certain times of the year they will also be interested in breeding. We rarely see the mammals in the park. This is because mammals are afraid of humans.

Mammals have two ways in which they survive, their adaptations and their habits. Adaptations are what they have on their body. Habits are what they do. They are also dependent on their **habitat**, where they live.

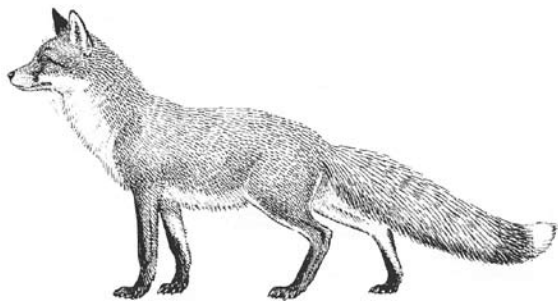
They are originally forest animals. Before the first farmers arrived in Ireland 6,000 years ago 90% of Ireland was forest. This has gradually disappeared so that today only 1% of Ireland is deciduous forest. Some mammals failed to adapt to these changes, e.g. the wolf and the wild boar. Most of the others can live happily in proximity to man and his activities.

All these animals have different **adaptations** and **habits**. However, what they do have in common is very acute senses which allow them to find their food and avoid danger. They are also camouflaged which helps them avoid being seen. We are normally only aware of their presence by looking for the signs they leave behind: droppings, holes, footprints and food remains. We will look at some of them in more detail.

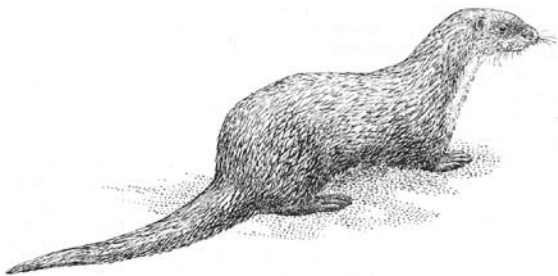
WOODLAND MAMMALS



Badger: Length 90cms. The badger is the same size as a medium sized dog but has shorter legs. His main adaptations are his sharp claws he uses for digging. The thick grey coat keeps the badger warm and dry and acts as camouflage. The badger digs a complicated series of tunnels and chambers known as a set. The set might be home to a dozen badgers. In this it is safe until it comes out at night to forage for food. It is nocturnal. He will eat almost anything and is, therefore, omniverous.



Fox: Length 130 cms. The fox is the same size as a small dog, but more lightly built. The fox has very keen senses which it uses to hunt. Mostly carnivorous it will also eat carrion and fruit. The fox uses an earth or den for breeding during the spring, but for the rest of the year finds shelter wherever it can. Its camouflaged coat helps in avoiding detection. Unlike the badger the fox lives a solitary existence. Male and female only come together in the breeding season. Some foxes live in towns.



Otter: Length 100 cms. The otter is a land animal which spends much of its time living in water. It needs special adaptations: a long shape, webbed feet, muscular tail, a double coat of hair which traps water and keeps the animal warm. To hunt fish it uses specially adapted whiskers which allow it to hunt even in darkness. Otters live in a holt which often has an underwater entrance. Otters are rare in most of Britain. They are common in Ireland. Otters are bio-indicators, telling us that the complicated food chain on which they rely is complete and that our rivers are not polluted.



Hare: Length 56cms. The Irish hare is a subspecies of the mountain hare. It is twice the size of a rabbit. It is a herbivore. It does not dig a burrow. It relies on speed for defence. Its young, called leverets, are born in a 'form', a slight depression in long grass. This makes them vulnerable. Farming methods have changed. Silage is now cut far earlier in the year than the hay. Leverets are destroyed by these new methods. Once common, there are only 2,000 left in Northern Ireland.



Hedgehog: Length 27 cms. The hedgehog is a peculiar mammal. It is the only Irish mammal which hibernates. It has only one relation in Ireland the pygmy shrew. Both eat invertebrates. The hedgehog will also eat fruit and carrion. Its odd spiky body provides this creature with a tough defence against predators especially since it rolls into a ball when attacked. This, however, is no defence against the claws of the badger or lorries when it crosses roads during its nocturnal ramblings.



Weasel: Length 30 cms. The Irish weasel is known as the stoat in Britain. The weasel is the same size as a rat, but has a furry tail. The weasel is a carnivorous animal feeding largely on rabbits which it pursues into their burrows. It also eats mice, rats, birds and their eggs. Like most predators, it has special adaptations such as sharp teeth and muscular body. This gives it a good power to weight ratio. This makes it capable of killing prey such as rabbits and hares which are much bigger than itself.



Grey Squirrel: Length 50cms. A very attractive animal to look at the grey squirrel is not a native mammal. It was introduced 100 years ago. Grey squirrels have only recently been seen in the park. They normally use deciduous forests. It is difficult to estimate the affect they have on the native red squirrel. Being slightly bigger, they may drive them out or eat their food. Whatever the reason the number of red squirrels is now much reduced.



Wolf: The wolf was once common in Ireland. Such a powerful predator could not easily co-exist with man and his animals. The last wolf may have been killed at Drumsurn near the park around 1760. The wolf driven to extinction by direct killing and by the loss of its habitat. The gradual disappearance of Ireland's forests was accelerated after the Plantation. Wood was a valuable resource used in all manner of ways: houses, furniture, ships, barrels and in the tanning of leather. This exploitation is very like what is happening in developing countries today. The wolf's extinction illustrates the problems of sustainable development.

MAMMALS

Answer these questions:

1. Name three features common to all mammals.
2. What does biodiversity mean ?
3. Why does Ireland have fewer mammals than Britain ?
4. Which Irish mammals are now extinct ?
5. What does adaptation mean ?
6. When did the destruction of Ireland's forests begin ?
8. What signs let us know that there are mammals living in the forest ?
9. What helps mammals to get their food and avoid danger ?
10. Why did the wolf disappear?

Here are twelve clues. Sort them out to fit three animals. Four for each mammal.

My home is called a set.

My home is called a holt.

My home is called a form.

I have sharp claws.

I have webbed feet.

I run very fast.

I am carnivorous.

I am herbivorous.

I am omnivorous.

I am nocturnal.

If I disappear, you know there is something wrong with the river.

I am close to extinction in Northern Ireland.

CHAPTER 7: THE LEGEND OF DOG LEAP

Our walk through the park takes us past O’Cahan’s rock. There is a legend attached to the rock. Long ago the rulers of the area were the chieftains of the O’Cahan clan. They ruled an area which stretched from the Waterside in Derry to Coleraine. The site of their main fortress lies within the park. Their enemies were the McQuillans who lived on the other side of the Bann.

One day the McQuillans attacked the O’Cahans. They forced them up against the rock and were about to push them to their deaths in the River Roe many feet below. In desperation the O’Cahans tied a message to a dog’s neck. It jumped the river and ran to Dungiven to raise the alarm. The Dungiven O’Cahans raced to the rock and drove the McQuillans away.

The legend gives its name to the area. In Irish it is ‘Leim an mhadaigh’. This is English for the ‘Leap of the dog’. ‘Leim an mhadaigh’ does not have to change its sound very much to become Limavady.

Many place names in Ireland are taken from the Irish language. A thousand years ago everyone in Ireland would have spoken Irish. Before the Great Famine in 1847 more than half the population would still have had Irish as their first language. After that time it began to be spoken by less people. Today it is the first language of few people.

However, we all use Irish every day as many place names are taken from the Irish. Limavady is only one example. There are many others. Some are related to legends, but most describe the landscape in some way, e.g. the shape of the land or what grew there. Here are some further examples.

Derry	= Doire	= An oak wood. (There are over 1,500 of place names which include Doire. This indicates that woods were more widespread than today.)
Coleraine	= Cuil rathain	= The place of the ferns
Strabane	= Sráith ban	= The white land beside the river.
Maghera	= Machaire ratha	= The plain of the fort.
Dungiven	= Dun gaimhean	= The fort of the skins.
Ballymoney	= Baile mona	= The town of the bogland.
Ballymena	= Baile meadhonach	= Middle town.



The Dogleap Legend

GLOSSARY

Bio- indicator:	A living thing which acts as an early warning system as to the health of the environment, e.g. salmon can warn us about river pollution
Biodiversity:	The total of all living things which we need to conserve.
Biomass:	The total volume and weight of living things
Camouflage:	Hiding by using colour
Carnivore:	A meat eater.
Chlorophyll:	The green chemical which allows plants to photosynthesise
Classification:	The scientific way of dividing living things into groups.
Coniferous:	Means cone bearing. Refers to trees which are mostly evergreen.
Conservation:	The process by which we preserve our environment.
Consumer:	A living thing which relies upon plants for food.
Deciduous:	Refers to trees which lose their leaves in winter.
Decomposer:	A living thing, bacteria, fungi and invertebrates which helps with the process of decay.
Detrivores:	Things which consume dead matter.
Ecology:	The study of an ecosystem.
Ecosystem:	A collection of plants and animals which live in together in a mutually dependent way in a particular habitat, e.g. a woodland.
Habitat:	A place where an animal or plant lives.
Habits:	What an animal does to stay alive, e.g. badgers dig holes.
Herbivore:	A plant eater.
Hyphae:	Tubes used by fungi to absorb food.
Invertebrates:	Animals without a backbone.
Kingdom:	The most basic division of living things, e.g. plants, animals.
Mammals:	A class of animals distinguished by having live young, producing milk and having fur or hair.
Mycelium:	Network of tubes used by fungi to absorb food.

Omnivores:	Animals which can eat both plants and meat, e.g. blue tit
Order:	Further division of living things from kingdoms, e.g. Kingdom = animal, phylum = vertebrate, class = mammal, order = carnivore, genus= mustelus, species = badger
Photosynthesis:	The process by which the energy of the sun is absorbed by plants
Producer:	A living thing which can produce its own food. A plant.
Reproduction:	All living things eventually die. Reproduction is the word used to describe how the species survives.
Soil Erosion:	Where soil is washed away leaving bare rock where little will grow.
Species:	A kind of plant or animal. The most particular part of a classification.
Sustainable development:	A difficult idea to define, but refers to the balance between economic development and conservation. Includes the idea that economic development should not cause problems for future generations.
Symbiotic:	Where two living things rely on one another for life without doing each other harm, e.g. algae and fungi combine in lichen
Trophic Layers:	The way in which energy is distributed among living things.

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