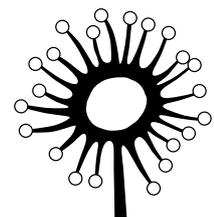


If you have old fashioned ideas about bogs being drab and dreary, then prepare to have your eyes opened! You are about to enter the real bogworld - a special place of stunning beauty, startling colours and spectacular wildlife.....



**WILD, WET and
WONDERFUL**

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Peat free products leaflet

SNH - Who we are and where we are and Country Code leaflets.



1. CURRICULAR LINKS



5-14 Curricular Links

This pack has been produced for use with upper primary/lower secondary.

The study of peat bogs has direct links to the Curriculum and assessment in Scotland National Guidelines for **Environmental Studies** 5-14. Whilst it would be wonderful to take a group of P1-P3 pupils to experience a peat bog the greatest value of a project of this type is probably with P4-S2.

The topic gives scope for fulfilling most of the attainment targets for level C and D in Science and Social Studies and some of those in Technology.

In particular this subject fits within **Science**: attainment outcome : Understanding living things and the processes of life and **Social Subjects** : attainment outcome : Understanding people in the past.

OTHER CURRICULAR LINKS

There are also opportunities in a project of this type for Mathematics, English language and Expressive Arts as well as Gaelic studies.

TOPIC PLANNERS

On the next three pages you will find topic planners which list the attainment outcomes that will be covered by each topic development with space for you to indicate whether the topic is to be covered as a class, group or individual project and space for your assessment comments.

The topic planners are set at level D. If your class is at a different level outcomes will be different, but the framework of the topic will be similar.

The curricular advice and topic planners have been adapted from the 'Torra Peatlands Teachers' Pack', written for Scottish Natural Heritage by Bob Black and based on a National Nature Reserve on Islay. Peat bog projects have been undertaken by many schools on Islay where peat is part of the landscape...and culture ! Schools undertaking a peat bog project may wish to contact schools on Islay or in Caithness and Sutherland for more local knowledge and exchange of ideas.



Topic: Peat Bogs Level CD

Outcome Emphases People and Place Science

ABBREVIATIONS
 C class
 G group
 I individual
 FS Fact Sheets
 AS Activity Sheet

TOPIC DEVELOPMENT	PUPIL ACTIVITIES/SKILLS DEVELOPMENT	C	G	I	RESOURCES	OUTCOME <i>N.B. Outcomes are at Level D unless indicated (C)</i>	ASSESSMENT COMMENT
1. Peat Bogs	Investigate how Peat Bogs are formed, the influence of glaciation and changing climate. Research FS, local geology guide books				1. FS	SOCIAL SUBJECTS People & Place Making & Using Maps <ul style="list-style-type: none"> extending the mental map applying conventional map reading skills Aspects of the Physical & Built Environment <ul style="list-style-type: none"> some theories of land formation & the timescales involved SCIENCE Understanding Earth & Space On Planet Earth <ul style="list-style-type: none"> the structure of the earth the structure & properties of soils 	
2. Peat	Determine the physical properties of peat through experiments Discuss the processes whereby peat is formed Research: site visit, FS reference books				FS	SCIENCE Understanding Earth & Space On Planet Earth <ul style="list-style-type: none"> the structure & properties of soils 	
3. Peatland Plants	Identify common bog plants and relate each species to its niche on the bog Construct simple keys Research: site visit for simple plant survey, Identification guides, FS				FS	SCIENCE Living Things & The Processes of Life Variety & Characteristics of Living Things <ul style="list-style-type: none"> the main distinguishing features of flowering & non-flowering plants similarities/differences within a group leading to concept of species Interaction of Living Things <ul style="list-style-type: none"> Creating and using classification keys responses of plants to environmental stimuli competition between things 	
4. Peatland mini-beasts	Identify common aquatic & terrestrial insects, spiders, etc. Draw a chosen mini-beast and write a story about it Site visit for pond dipping and examination of live terrestrial mini-beasts Research: Identification guides, FS				FS	SCIENCE Living Things & The Processes of Life Variety & Characteristics of Living Things <ul style="list-style-type: none"> similarities/differences within a group leading to the concept of species creating & using classification keys The Processes of Life <ul style="list-style-type: none"> structure & function of major body parts Interaction of Living Things <ul style="list-style-type: none"> food pyramids competition between living things with respect to food & space birth rate, death rate & factors limiting population responses of animals to environmental stimuli 	

Topic: Peat Bogs Level CD

Outcome Emphases People and Place Science

ABBREVIATIONS

C class
G group
I individual
FS Fact Sheets
AS Activity Sheet

TOPIC DEVELOPMENT	PUPIL ACTIVITIES/SKILLS DEVELOPMENT	C	G	I	RESOURCES	OUTCOME <i>N.B. Outcomes are at Level D unless indicated (C)</i>	ASSESSMENT COMMENT
5a. Peatland Birds	Study the life cycle of selected bird species found on Peat Bogs Visit RSPB reserve Research FS, identification guides, reference books, videos				FS	SCIENCE Living Things & The Processes of Life Variety & Characteristics of Living Things <ul style="list-style-type: none"> • similarities/differences within a group leading to the concept of a species The Process of Life <ul style="list-style-type: none"> • development, birth & parental care Interaction of Living Things <ul style="list-style-type: none"> • food webs & food pyramids • simple food chains based on energy from the sun (C) • competition between living things • birth rate, death rate & factors limiting population • responses of animals to environmental stimuli • the various ways in which humans can act on their environment • adaption to the environment over a period of time SOCIAL SUBJECTS People & Place Making & Using Maps <ul style="list-style-type: none"> • extending the mental map • making own sketch maps 	
5b. Amphibians Reptiles and Mammals	Research the life cycle of an animal and write a story or poem about it Research: FS, reference books,				FS		
6. Peat and Man	Imagine what living on a Peat Bog 7,000 years ago was like & illustrate Investigate traditional uses of peat & peatland plants Peat Bog site visit Compare how man uses peatland in different parts of Scotland or other countries Investigate the conservation value of peatland and role-play a conflict situation Research: FS, AS, reference books				FS AS	SCIENCE Living Things & The Processes of Life Interaction of Living Things <ul style="list-style-type: none"> • the various ways in which humans can act on their environment SOCIAL SUBJECTS People & Place Ways in which People affect place <ul style="list-style-type: none"> • landscape features as boundaries & barriers • how today's landscapes are the product of the interaction of people & places Making & Using Maps <ul style="list-style-type: none"> • extending the mental map • applying conventional map reading skills <i>carried forward to next page</i>	

Topic: Peat Bogs Level CD
Outcome Emphases People and Place
Science

ABBREVIATIONS
 C class
 G group
 I individual
 FS Fact Sheets
 AS Activity Sheet

TOPIC DEVELOPMENT	PUPIL ACTIVITIES/SKILLS DEVELOPMENT	C	G	I	RESOURCES	OUTCOME <i>N.B. Outcomes are at Level D unless indicated (C)</i>	ASSESSMENT COMMENT
6. Peat & Man	<i>Carried over from previous page</i>				FS	<p><i>Carried over from previous page</i></p> <p>SOCIAL SUBJECTS People in the Past</p> <ul style="list-style-type: none"> the values & attitudes which have shaped societies the circumstances which govern the motives & actions of people in particular circumstances <p>Time & Historical Sequence</p> <ul style="list-style-type: none"> extension of pupils' chronological framework <p>The Nature of Historical Evidence</p> <ul style="list-style-type: none"> the value of historical evidence <p>Considering the Meaning of Heritage</p> <ul style="list-style-type: none"> the background and issues in preserving an aspect of local or national heritage <p>Understanding People in Society</p> <p>Social rules, rights & responsibilities</p> <ul style="list-style-type: none"> how representatives are chosen & their role in decision making <p>Conflict & Participation</p> <ul style="list-style-type: none"> selected national & international disputes & ways of resolving them the influences of campaigns, media & pressure group activities on public opinion <p>TECHNOLOGY Understanding Technology</p> <p>Technology & the Demand for Resources</p> <ul style="list-style-type: none"> the tension between production & the care of the environment 	

Symbols demonstrate support for Outcomes and Strands e.g.

- = some;
- = considerable/major

Attainment Outcomes	Contexts and Content at Three Broad Stages						Strands					
	P1 P3	P4 P6	P7 S2	Knowledge and Understanding	Planning	Collecting Evidence	Recording and Presenting	Interpreting and Evaluating	Developing Informed Attitudes			
Science												
<i>Living Things and the Processes of Life</i>	●	●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●
<i>Energy and Forces</i>		●	●●	●	●	●	●	●	●		●	●
<i>Earth and Space</i>		●	●	●	●	●	●	●		●		●
Social Subjects												
<i>People and Place</i>			●	●	●		●	●		●		●
<i>People in the Past</i>	●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●
<i>People in Society</i>		●	●	●	●	●	●	●		●		●
Technology												
<i>Applying Skills and Presenting Solutions</i>												
<i>Technology in Society</i>		●	●	●	●		●	●		●●		●●
<i>The Design Process</i>		●	●	●	●							
Health Education												
<i>Taking Action on Health</i>												
<i>Health and Safe Living</i>		●	●	●	●		●	●				
Information Technology												
<i>Knowledge and Understanding</i>												
<i>Understanding and Using Information Technology</i>		●	●	●	●							

Secondary Curricular Links

The 5-14 curricular links outlined on sheet 1.1 apply also to S1 and S2.

STANDARD GRADE

The Study of peat bogs is most relevant to Science, Biology and Geography at Standard Grade, particularly in relation to the formation, preservation and conservation of these precious habitats.

For Standard Grade Geography there is a fully worked out exemplar of material on land-use conflicts in relation to "Forestry in the Flow Country of Caithness and Sutherland" which has been published by the Scottish Consultative Council on the Curriculum.



HIGHER GRADE AND CERTIFICATE OF SIXTH YEAR STUDIES (CSYS)

Higher Grade Biology and Geography also provide scope for the study of peat bogs ...particularly where there is an opportunity to analyse data, communicate facts and ideas and discuss their significance in context.



Project Plan

This is a sample project plan to assist teachers in organising their project.

FIRST THOUGHTS

What do the class know about peat and peat bogs? Make a poster with the comments the class make at this stage and ask them what they may wish to find out over the course of the project. You can continue to return to this poster as the project progresses. Similarly you may wish to ask the class to 'draw' their idea of what a peat bog means to them...revisit this activity throughout the project.

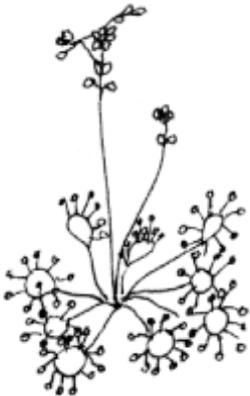
HOW PEAT BOGS ARE FORMED

Use the factsheets and any resources to assist the class in illustrating how a peat bog is formed. Compare and contrast the two types of bog - raised and blanket bog. Use local maps to indicate where local bogs are. Begin the timeline (Activity sheet 4.1). Make peat bog models (Activity sheet 4.2).

PEATLAND PLANTS

Use books (and the internet!) to discover what you can about specific peat bog plants and how they survive in this low nutrient, high moisture environment. Construct a simple identification key. Use the 'all about *Sphagnum*' fact sheet and the *Sphagnum* poster. Do some 'natural dyeing' or simply use the poster and green, yellow and red

paints for some boggy 'pointillism' (spotty!) posters.



PEATLAND MINIBEASTS

Use the factsheet and resources to identify the variety of minibeasts present on a peat bog, in drier hummocks, heath and in pools. Draw and write the life cycle...or a day in the life of...a chosen minibeast.

PEATLAND BIRDS, MAMMALS AND REPTILES

What are these, what are their life cycles, how do they interact with and adapt to the bog/each other? Use stories and poetry (See resource list) to stimulate discussion and write some of your own.

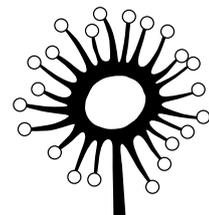
INTERDEPENDENCE

Use the information gathered about peat bog wildlife, factsheet 2.5: Webs and Chains and the activity sheet 4.6 to develop understanding of food webs, food chains and the importance of ecological balance. Construct a basic food web diagram and continue to add information to it. Make food chain mobiles.

PEAT AND MAN

Use resources and factsheets 2.3, 2.6 and 2.7 to study the history of man's association with and use of the peat bog. Contact schools in Islay or Caithness and Sutherland to assist in understanding the importance of peat in these parts of Scotland. Discuss life around the bog 7,000 years ago. Construct models of bog villages. Make your own compost and experiment with the variety of peat free alternatives (Activity sheet 4.4). Explain the value of peat as a source of information about climate/ vegetation change : radiocarbon dating and pollen analysis. Look at pollen through a binocular microscope if possible! Add more information to the timeline.

2. FACTSHEETS



**WILD, WET and
WONDERFUL**

What is a Peat Bog?

Peat bogs occur where waterlogged conditions slow down the decomposition process, leading to a gradual build up of dead organic material. Under these conditions a plant called *Sphagnum* grows.

Sphagnum grows continuously from a bud at the tip of its stem leaving layers of dead plant material below the surface. This forms an acidic environment, almost devoid of nutrients and without air, where the normal organisms which break down dead plant material cannot survive. Thus dead *Sphagnum* accumulates slowly into layers - often less than 1mm/year - forming a new soil which we know as peat.

There are two main types of peat bog in Scotland, **blanket bog** and **raised bog**. Together they cover more than one million hectares...or two thirds of the total bogland in Britain!

BLANKET BOGS

In some places the entire original landscape is hidden beneath a blanket of up to 7 metres of peat bog. These bogs are known as blanket bogs and form the major part of Scotland's boglands. A significant proportion of the blanket bog in Britain and Europe is found in Caithness and Sutherland. The area of the 'Flow Country' in Caithness and Sutherland has been recognised by international specialists as unique and of global importance. A place to visit a superb example of this is the RSPB reserve at Forsinard.

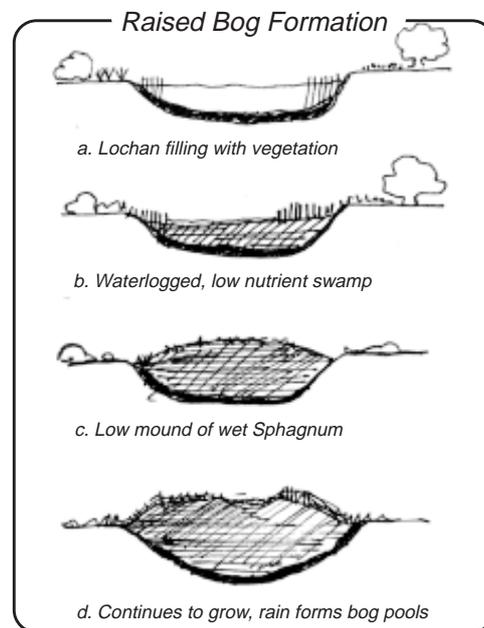
RAISED BOGS

In the lowlands a different sort of bog has formed. Small lochs, left after the last ice age on impermeable clays, gradually became filled with vegetation such as dead reeds. This swampy environment, combined with a loss of incoming nutrients to fringe vegetation, created just the

right conditions for *Sphagnum* to flourish, eventually fed only by nutrient poor rainwater. The peat deposit accumulated and slowly became raised above the surrounding vegetation - instead of drying out this formed a living mound - or raised bog!

Other *Sphagnum* facts: *Sphagnum* is the botanical equivalent of a sponge, absorbing water and nutrients through the surfaces of its leaves. The leaves are arranged along branches that occur in bunches along a simple stem. With a microscope it is possible to see that much of the leaf consists of cells like water storage flasks while the chlorophyll is squeezed into cells like thin strands. For such a plant to survive, conditions must be suitably damp throughout the year for these cells to be kept topped up.

Sphagnum can hold up to twenty times its weight in water. This, together with its unique 'sterile' properties made it useful as a wound dressing in the first world war. It has also been used for nappies and cot bedding.



Teaching points

Use a map of Scotland to indicate highland and lowland areas and to indicate the distribution of raised and blanket bogs in Scotland. Use a local OS map to identify any areas described as 'bog'. How much peat has formed in the lifetime of one pupil? Peat in raised bogs may be up to 10 metres deep... how long has this taken to form? Illustrate this on the wall showing the layers of peat from bare ground to living *Sphagnum* next to a timeline. Build on this as the project and the children's knowledge develops. Can you connect the timeline to other projects the children have done? (eg dinosaurs/ world war). Draw a cartoon time sequence to show the development of each type of bog and re-enact this story in the gym hall! Activity sheets: Timeline. Resources section: all about *Sphagnum*.

Life in a Peat Bog

Peat bogs are not lifeless places...look closely and listen and you will become aware of a rich and vibrant environment, full of life and colour, textures, smells and tastes!

GREEN CARNIVORES

Amongst the *Sphagnum* there are a variety of interesting plants which have adapted to life in extreme conditions. Several species of plant have developed the ability to trap and eat insects as a means of supplementing their meagre diet. The sundews (*Drosera* species) and butterworts (*Pinguicula* species) have sticky leaves which they use to trap unsuspecting insects which then slowly decompose...releasing much needed nutrients for the plant.

A CARPET OF COLOUR AND SCENT

Through the soft carpet of *Sphagnum* you will find bright splashes of colour from heaths and heathers (*Erica* and *Calluna*), fuschia pinks and ruby reds of the cranberry (*Vaccinium oxycoccos*) flowers and berries, the delicate white and pink frothy flowers of the bog bean (*Menyanthes trifoliata*), or the white rose-like flower of the cloudberry (*Rubus chamaemorus*) with its scarlet or orange fruit. The bog asphodel (*Narthecium ossifragum*) adds splashes of bright yellow, its scientific name: *ossifragum* means bonebreaker and this arose from the belief that the

plant caused the bones of grazing sheep to go brittle, but in fact all bog plants are low in calcium (see 'frog eating deer' below!).

The heather plants play host to a fungus which breaks down decaying plant material into the vital nutrients which allow it to thrive. As they grow in exposed places their leaves are inrolled at the edges to reduce the surface area and prevent water loss.

Bog myrtle (*Myrica gale*)...a sweet scented shrub...forms a partnership with bacteria in its roots to obtain extra nitrogen. It has been used to ward off midges and to make beer!

Common Bog Cotton (*Eriophorum angustifolium*) uses a snorkel technique, relying on air filled cells in its roots and leaf bases to survive the oxygen poor environment below the layers of *Sphagnum*. A family of tiny, brilliantly coloured 'jewel' beetles (*Donacia* species) use these air spaces as living quarters!

(Many of the plants mentioned have interesting interdependencies and folklore. For good places to find further information see the resources section).

Even in winter the bog is alive with colour, look closely at the lichens and mosses and you will find greens, reds and greys of every shade.

MAMMALS...

Red deer, the largest land mammal in Britain today, can be found wallowing in peat baths to rid themselves of flies and parasites. They will graze on a variety of bog plants and will eat frogs as they need the calcium for bone and antler growth! Otters and badgers occasionally venture out into the bogs in search of the eggs and chicks of ground nesting birds, water voles and frogs. You may also see pine martens, hares, stoats and weasels, and even (in highland areas) the very occasional wildcat. Bats will fly in from their roost sites in the evening, travelling as much as a mile to the peat bogs to feed on any flying insects....including midges!



BIRDS...

The songs of skylarks and meadow pipits provide constant background noise on the boglands. These birds thrive on a variety of insects and seeds.

You may also hear the sad 'wheep' of the golden plover, the drumming of snipe, the trill of a dunlin or the mournful cry of a red throated diver caterwauling in the evening sunset...this eerie flight call gives it the local name of 'rain goose' since people associate it with wet weather. Divers are also known as loons - based on the Scandinavian word for clumsy - due to their awkwardness on land. They arrive at their breeding grounds in April/May after spending the winter at sea. Their preferred breeding sites are in the North West of Scotland and always within reach of the sea or a large loch for fishing.





AMPHIBIANS...

Newts spend part of their year on land but many return, with frogs and toads, to bog pools in the summer to breed. The male common newt develops a speckled orange belly when he is ready to mate which warns predators that the newt tastes horrible. Newts, frogs and toads all thrive on the abundant insect life...

REPTILES...

Adders and lizards love peat bogs. You would be unlikely to see an adder but you may find shed skins in the heather. They prefer the drier parts of the bog and feed on small mammals, lizards and frogs, often eating as much as they can and then spending long periods inactive. Lizards can most often be found sunning themselves on a stone or mossy hummock. Like the adders they are cold blooded and depend upon the sun to maintain their body heat. They both hibernate in winter.

A MULTITUDE OF INVERTEBRATES...

Invertebrates (e.g insects, mites and spiders) are the most numerous creatures in any habitat. They help to break down plant material, pollinate the flowering plants and are an important link in the food web... often eating other insects and being eaten by birds, mammals, reptiles and amphibians!

Some of the most beautiful insects on the boglands are the dragonflies, damselflies and butterflies which live there. Dragonflies have two pairs of wings which move separately, like helicopter blades so it can hover, fly backwards and change direction at up to 18mph (30kph). Using this and their excellent eyesight they can capture other bogland insects in mid-air. Damselflies will also capture insects on the wing and the aquatic larvae of these two colourful flies are ferocious underwater

carnivores. Dragons and damsels rely on the shallow pools and poolside vegetation for the early part of their life cycle.

Large Heath butterflies lay their eggs on cotton grass...the food source for their caterpillars, and the adult butterflies feed on cross leaved heath. There are many different caterpillars on a bog - usually hairy and often large, growing for up to two years before becoming moths and butterflies.

Bog pools are thriving with invertebrate life including pond skaters, diving beetles, water spiders, whirligig beetles, water scorpions and a number of tiny water mites and water fleas.

There are over 150 species of biting midges! Thirty seven species occur in Scotland. The females suck the blood of various animals (mainly insects such as caterpillars and crane flies) because they need a meal of blood before they can develop their eggs. Only sixteen of these species attack humans, though it is sometimes hard to believe this out on a bog! However, various birds, amphibians, other insects and reptiles will make a tasty meal out of them.

INTERDEPENDENCE

Peat bogs support a variety of unusual plants and animals that have adapted to and are dependent upon this unique environment. In other words, some of these plants, spiders and invertebrates are not found anywhere else; and many of the birds and mammals do not occur in the same numbers elsewhere. Some examples of interdependence can be illustrated as food chains:

Heather -> grouse -> fox

Dead plant and animal material -> ant -> ground beetle -> skylark -> kestrel

Plankton -> frog tadpole -> dragonfly nymph

Plant debris -> midge larvae -> water boatman -> frog -> adder



Teaching points

Use the food web and cards to illustrate a bog food web. Collect some objects such as a tin of sardines, a toy 'frog', a bone or deer horn, helicopter and insect toys and some tartan etc. and play 'kims game'. The children must then connect the object to the bog story. Enact a web with string or wool and build a food pyramid with the plants and multitudinous insects on the bottom...what happens when one of the links is destroyed? Build a food chain mobile using a coathanger and some thread, you could suspend the prey inside the predator. Discuss, illustrate and enact a variety of life cycles such as the dragonfly. Activity Sheet: Web of Life 4.6

Why are Peat Bogs important?

Peatlands are a unique habitat in which many rare and endangered species of plants may be found. However, they are also a seriously endangered habitat in European and global terms.

In environmental terms they are as precious to the European heritage as the tropical rainforests are to world heritage. They play an important role in both the carbon cycle and the water cycle. They act as carbon 'sinks' (the plants 'mop up' carbon dioxide which is produced by our burning of fossil fuels like coal and oil) and by this they can purify both air and water. Drainage and destruction of peat bogs result in the stored carbon being released rapidly into the atmosphere in the form of greenhouse gases as the peat decomposes. Most of Scotland's drinking water comes from catchments which are dominated by peatland.



The blanket bogs of Caithness and Sutherland are important 'reservoirs' of water which feed many small streams and lochans. In addition peat-purified water forms a vital ingredient in Scottish Whisky!

As a result of damage and exploitation only 5.5% of the original raised bogs in Scotland remain in their natural state.

PEOPLE'S USE OF PEAT

Since at least Roman times there has been a steady but small scale cutting of peat for fuel, a practice which continues today. Stacks of peat, cut by hand using a special spade, are built during the summer and left at the peat face to dry and are then collected for use during the winter months.

Large areas of peat bogs have been regarded as wasteland to be drained and used for

agriculture or forestry. Draining and cutting of peat bogs destroys the balance that allows the peat to continue to slowly form and it is very difficult for us to recreate these conditions.

Peat was regarded as poor agricultural land but - once drained - was ideal for forestry. Following the first world war, Britain's timber resource was greatly depleted giving rise to a programme of planting conifer forests on peat. Since then very considerable areas of both raised and blanket bog have been planted, lost forever as peat bog habitat. Fortunately the rate of planting has declined significantly in recent years and forestry policies now take more account of the significance of these areas.

The water retaining properties and low nutrient content of peat make it an ideal growing medium. As a result many boglands have been subjected to commercial peat extraction. The horticultural industry uses large machinery to strip the layers of peat from the bog to be sold as compost or for use in potted plants sold at garden centres. With only a limited number of peatland areas left, the industry will have to move to peat-free growing materials in future.

In Ireland, Finland, Russia, America and other countries peat has been and continues to be used to fuel power stations. For example, most of Finland's inland cities are heated by peat-fired power stations and Russia opened its first peat burning power station as long ago as 1914.

Considerable areas of blanket bog are eroding, especially bogs lying at 300 metres or higher. The deep gullying and haggging may be, in part, natural, but it is clear that the process is being accelerated by practices such as burning and over grazing by both red deer and sheep.



More Peat facts:



Peat is made of partially decayed plant material and water.



Water accounts for most of the weight of wet peat.



Peat in the bog remains cool all year. The water in the peat is slow to heat up and the peatland is insulated by its skin of plants.



All the water in a peat bog comes from rainfall which is naturally slightly acidic.



Peat is very acidic because the remains of *Sphagnum* moss, the main species that forms the peat, are very acid. The peat has little or no contact with the rock or mineral soil below that the peat is really thick the plant roots don't make contact with the mineral soil and so are unable to benefit from their nutrients and lower acidity.



When you dry peat, it shrinks and hardens. Often it cracks as well.



When you burn dried peat, there is very little ash left. Virtually everything in a peat block is organic material and burnable.



Peat bogs have vast amounts of carbon locked up in them. Through their plants, bogs absorb carbon dioxide from the atmosphere. It is reckoned that Scotland's bogs store a total of 22 billion tonnes of carbon which would otherwise be in the atmosphere contributing to global warming.



Peat bogs can preserve wood, pollen, even bodies for thousands of years. For this reason, they have been called 'Living History Books'.

Information from 'Torra Peatland's Pack written by Bob Black for SNH see resources section

croak



croak

How can we save the Peat Bogs?

PEAT PROTECTION

Public awareness and campaigns run by conservation organisations - such as International Bog Day in July - as well as habitat management and site designations have resulted in the preservation of many important sites. For example lowland raised bogs are now regarded as rare and endangered wherever they are found . They have been identified as a conservation priority in the recent European Community Habitats Directive and also have their own Habitat Action Plan. Blanket bogs are similarly protected. Many bogs are also legally protected as Sites of Special Scientific Interest and landowners are given support to manage them for the benefit of wildlife.

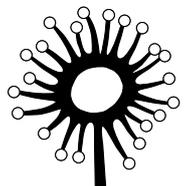
You can make a difference

There is a variety of high quality peat free garden composts available. If everyone, particularly the horticultural industry, switched to using these rather than peat based products many of our threatened bogs would be saved. Peatlands are areas of immense natural beauty and as such contribute much to the Scottish landscape. They are an important part of our cultural heritage too and deserve to be treated with respect.

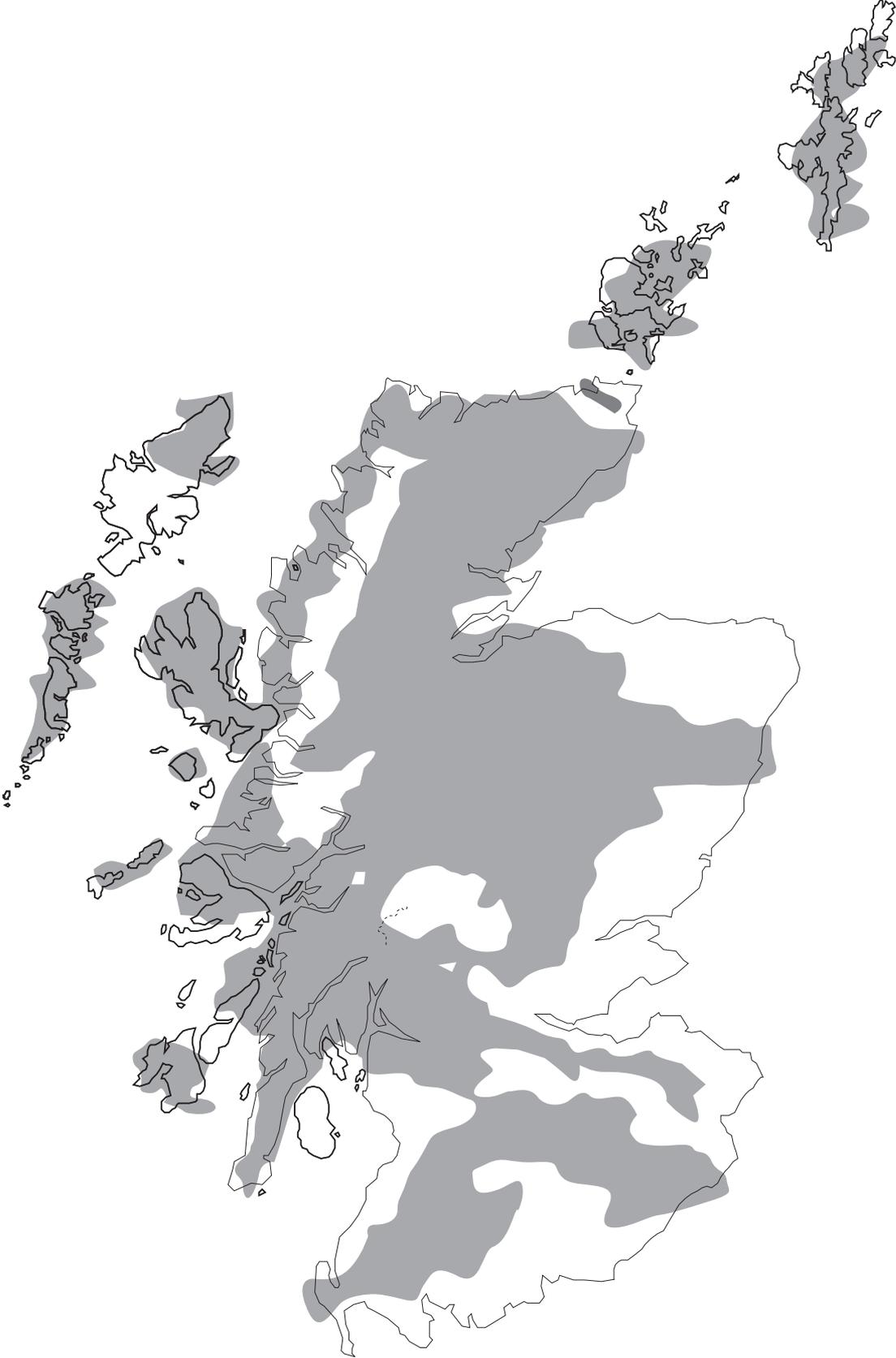


Teaching points

Discuss the roles of the horticulturist, bog scientist, nature lover and landowner and act out a debate. Draw posters to promote each person's point of view. Find out about alternatives to peat and do trial planting in the classroom. Make posters and leaflets advocating peat free products and contact conservation organisations in Scotland for advice. Use the Internet to contact schools in Islay or Caithness to discuss the cultural and landscape impact of peat on their lives. Activity sheets: Role Playing. Compost in the classroom. Resources sheet.



Distribution of Blanket Bogs in Scotland

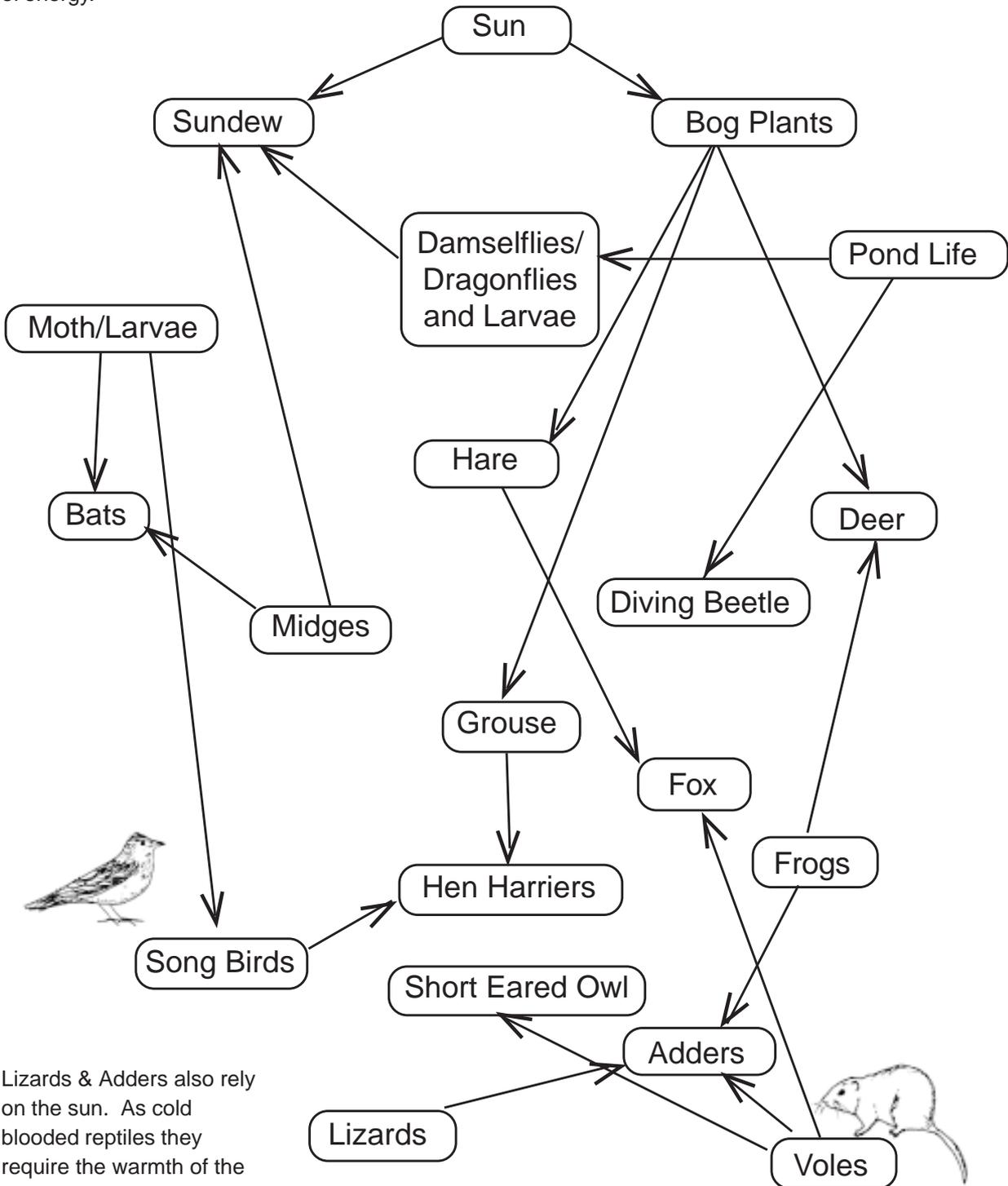


Distribution of Raised Bogs in Scotland



Webs and Chains

This is an example of a peat bog food web. There are many variations. The arrows indicate the flow of energy.



Lizards & Adders also rely on the sun. As cold blooded reptiles they require the warmth of the sun to give them energy.

Teaching points

Use this information and the activity sheet to develop understanding of the food web. The sun provides a source of energy for the plants...and therefore is the source of all energy! When one factor in the food chain is tampered with all other things are affected. Man is the only predator of foxes and deer now that we have no wolves. Should we reintroduce the wolf? Add other peat bog items to the food web as you develop the project.

History Books

Peat is a wonderful preservative. Acidic, but without the damaging effects of oxygen in an acidic environment, it acts like pickling vinegar on many of the seeds, plants and human artefacts and remains which rest there.

Palaeoecologists, interested in the history of plants and animals, have studied cores from peat bogs, discovering the history of climate and vegetation in and around the bogs. Pollen, preserved in the bog for thousands of years, indicates change in the local vegetation which may be brought about by climate change or by the arrival of people who cleared the forests and planted more 'domesticated' crops. Snapshots from a range of bogs have enabled us to piece together the small scale changes in climate which have occurred during the last 10,000 years.

In addition we can reconstruct the history of the Scottish landscape far back before written

records, almost to the end of the last Ice Age. We know from this record that the boglands have always been largely open areas in the landscape while around them a succession of forests have come and gone.

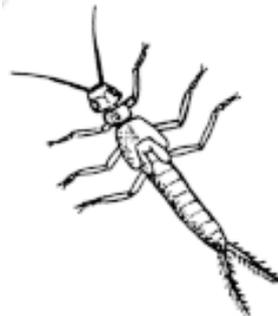
Human artefacts are often wonderfully preserved by the peat such as the magnificent bronze cauldron found buried in Flanders Moss, thought to be a votive offering. There are buried trackways, coins, whole villages, jewellery and even bog butter - a kind of soft cheese preserved by the acids in the peat.

Several bog bodies have been found in Scottish bogs, though none has been subsequently preserved. The best preserved are the bog bodies from Denmark, where Tollund man, skin blackened by the acids and tannins from the bog, appears to be asleep, even though he was sacrificed and buried in the bog almost 2,000 years ago.

Teaching points

What do the class think people in the past needed for survival? How did they build their houses? What foods did they eat? What threats did they have to defend themselves from? Design and build a 3D village. Draw pictures illustrating the changes in the Scottish landscape around the site of a peat bog such as Flanders Moss or Glen Moss, from Glaciation to the present day. If you have access to the internet visit the Natural History Museum's website and find out about remains from peat bogs in the UK. Use water, air, soil and vinegar in sealed and unsealed containers to preserve plant remains for 10 days then check the results. Demonstrate acidity by tasting a variety of foods and testing them using pH paper. How acid are fizzy drinks?!

Activity sheets: Natural dyeing, Timeline.



Glen Moss

Glen Moss is situated to the North East of Kilmalcolm in the 'Renfrewshire Heights'. It is a valuable wildlife site and has an interesting local history. The site covers an area of 19.45 hectares and straddles the border between Renfrew and Inverclyde.

FORMATION

Glen Moss is a 'mixed basin and valley mire' (mire is simply another term for an area where peat is forming) which began to form thousands of years ago when the glaciers gouged out soft rocks to form a shallow lochan. Retreating glaciers deposited boulder clays to the North of this loch and these, and other glacial features, can still be seen today. The shallow lochan, based on impermeable basaltic rock, gradually silted up and thus the peatland was formed. This particular type of peat (fen peat) depends upon a steady supply of groundwater to keep it waterlogged and thus it differs from the raised or blanket bogs described in factsheet 2.1 (page 10) which are largely rainwater fed.

LOCAL HISTORY

Prior to the 1800's there are very few accurate records of this area. Maps drawn up in the 1700's do indicate an area of water NE of Kilmalcolm but subsequent maps do not show this loch and it seems likely that it was drained, probably for arable use, sometime between 1787 and 1796.

The first edition Ordnance Survey maps produced in 1857 indicate that the site was 'rough heathy pasture' and 'moss' with no open water. By the second edition OS maps of 1896 the Moss is shown to be flooded to an extent of 40 acres by the introduction of a sluice.

The Kilmacolm Curling Club would seem to have been responsible for re-flooding the Glen Moss site by constructing the sluice gate and using the 'pond' for winter sports (skating and curling). It may then have been drained each Spring to allow for summer grazing. People came from all over the district to skate on the Moss. The Greenock Telegraph, 2nd January 1895, reports:

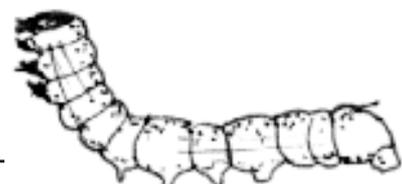
SKATING ON THE MOSS - ACCIDENTS AND IMMERSIONS

The keen frosty weather so long delayed came with the closing days of the old year and the first day of '95 saw the water at Glen Moss frozen over with a thick covering of ice. From an early hour in the forenoon skaters arrived in large numbers until there were several hundred people on the ice. Most of them - the number is estimated at between three and four hundred - hailed from Greenock while not a few came from Glasgow.

This is followed by a list of casualties!

The visitors to the area would have been making good use of the Glasgow and Southwest Railway line from Paisley to Greenock opened in 1869 which called at Kilmacolm.

After the first world war the water level management seems to have been abandoned and the area slowly reverted to the marshland found today, however the brick clubhouse and the sluice at the edge of the moss can still be seen.



AN IMPORTANT WILDLIFE SITE

Glen Moss now includes an area of shallow open water surrounded by sedge beds which provide nesting sites for a range of breeding ducks including shoveller and teal. Other birds found at the moss include grey heron, mute swans (one pair), water rail, snipe, cuckoo, tawny owl, skylark, meadow pipit, sedge warbler, spotted flycatcher and reed bunting. Sparrowhawks and kestrels have occasionally been seen hunting over the area.

There are two particularly valuable plants present at the site - mud sedge *Carex limosa* and greater Bladderwort *Utricularia neglecta*. Bladderwort is an insectivorous plant which catches its prey in tiny underwater bladders. Other interesting plants found at the site include Greater Butterfly Orchid *Platanthera chlorantha* (pollinated by night flying moths!), Coralroot orchid *Corallorhiza trifida* (has thick coral like roots which derive the nutrition the plant needs by association with a fungus which lives in the soil), Golden rod *Solidago virgaurea* and Common reedmace *Typha latifolia*.

Many mammals are also found at the Moss: Common Shrew *Sorex araneus*, Hedgehog *Erinaceus europaeus*, Fox *Vulpes vulpes*, Stoat *Mustela erminea*, Brown hare *Lepus capensis*, Field vole *Microtus agrestis*, Field mouse *Apodemus sylvaticus* and Roe deer *Capreolus capreolus*.

There are also many moths, butterflies, damselflies and dragonflies present and on a warm summers day the Moss is teeming with life from muddy pools to clear blue skies. The birdsong and buzzing insects coupled with the bogland scents and colours offer the visitor a unique experience of the natural biodiversity that makes Glen Moss an important wildlife site.

CONSERVATION

The site has been designated a 'Site of Special Scientific Interest' and the right to treat part of the Moss as a Nature Reserve was agreed between the Scottish Wildlife Trust (SWT) and Elderslie estates in 1991. The site is managed to maintain the variety of wildlife present (biodiversity) in partnership with the landowners by Scottish Natural Heritage and the SWT .

'DOCTRINE OF SIGNATURES'

In the sixteenth and seventeenth centuries people believed that God had indicated the use of a plant in the treatment of ailments by giving it a shape similar to a body organ or even the symptoms of a disease. The word 'wort' in a plants name usually means that it was put to some medicinal use. Bladderwort would thus have been used in the treatment of bladder disorders as a result of the tiny bladders found on its feathery aquatic leaves. Unfortunately there is little evidence to support whether this theory held any water!

Teaching points

Look at a map of the Glasgow area and identify the names of places associated with bogs. Indicate how large an area may have been covered with bogs and compare this with what has been left untouched. Compare the wildlife associated with a wet area and a dry area. Write a natural history column for the Kilmacolm News based in the 1700's, 1800's, 1900's, 2000's and 2100's! Imagine that the Glen Moss is to have houses built upon it for Glasgow commuters...mount a campaign to save the bog! Make a collage of the skating and curling there in 1895...dont forget the wildlife! use the information about Glen Moss species and the food web on factsheet 2.5 to draw a Glen Moss web. Make a leaflet encouraging these visitors to watch out for the wildlife.

Flanders Moss and the Moss Lairds

Flanders Moss is a raised peat bog which lies on the Carse of Stirling between Kippen and Thornhill. Intact raised peat bogs are rare and Flanders is the largest remaining in Britain, covering eight square kilometres.

It is believed that only 300 years ago the whole area from Stirling to Aberfoyle was peat bog. For 7- 8,000 years layer upon layer of *Sphagnum* moss had grown and died, building up the surface of the bog by nearly 1mm each year. In places the bog is over 7metres deep.

HUMAN IMPACTS: THE MOSS LAIRDS

Around 200 years ago, the landowner of a nearby peat bog - Kincardine Moss, on Kincardine Estate - Lord Kames, wanted to create more productive farmlands. He leased sections of the Moss, rent free, to highlanders made homeless during the Clearances. Each tenant was given 1 acre of bog, rent-free for seven years and, during that time they had to clear their area and plant crops. This was the start of the destruction of peat bogs in this area.

These 'Moss Lairds' cut houses out of the peat, stripped the thick layer of peat off their land by hand and threw it into specially cut channels (it took about one year to clear one acre). The peat then floated down the River Forth to the sea, and can still be detected in the sediments of the estuary. A similar pattern of events occurred in the area around Flanders Moss resulting in its present, unnatural shape.

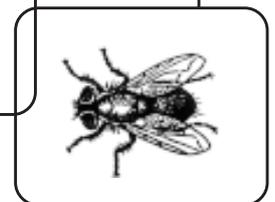
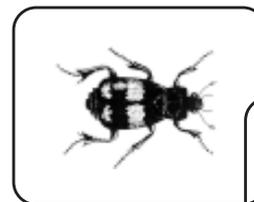
By the 1790s there were over 100 families employed, a mill wheel was constructed to lift water from the river Teith and reservoirs, brickworks, new houses and churches were also built. In 40 years almost the entire area of Kincardine Moss which lay between the Forth and the Teith, c.2000 acres in total, was stripped. The remaining area has now been designated a Site of Special Scientific Interest (SSSI).

The River Forth was polluted by the amount of sediment in the water, and fishing, upon which the people of Stirling depended, collapsed. This is known as the first environmental disaster in the world. Future use of rivers in this way was prohibited.

3000 YEARS AGO

People were living in the Flanders Moss area long before the time of the 'Moss Lairds' and they also used the resources which the peat provided. A number of finds were made during the clearing away of the peat that formed Flanders Moss and Blair Drummond Moss - in particular a situla, or bronze bucket, and cart wheel of between 2000 and 3000 years old were found. These may have been deposited as a result of the religious beliefs which were held by people at this time. People may also have been exploiting the wildlife of the bogs.

More recently, the bog has been further disturbed by drainage ditches being dug and trees being planted. This leads to a reduction in the water level within the bog and effectively the bog will begin to dry out.



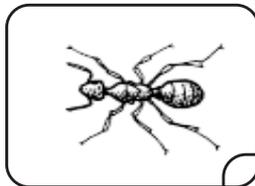
AND BEFORE THIS...

The remains of a 120ft stranded blue whale found in the sediments at Causewayhead in Stirling (its bones can be seen in the National Museum in Edinburgh) had human artefacts - antler bones and flints - lying alongside. This indicates that there were people living in this area **7,000** years ago...before the peat bogs formed.

CONSERVATION

Now Flanders Moss is being protected to preserve what is left. By undertaking reserve management work, such as blocking the unnatural drainage ditches and cutting down some of the woodland, the peat bog plants and associated wildlife can continue to thrive in their wet environment.

The management and protection of Flanders Moss is being undertaken in partnership with its owners by Scottish Natural Heritage and the Scottish Wildlife Trust with the help of conservation volunteers and others.

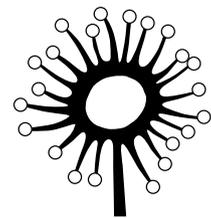


Teaching points

Look at a map of the Stirling area and identify the names of places associated with bogs. Indicate how large an area may have been covered by bogs and see if there are farm/settlement patterns that may indicate where the 'moss lairds' were prevalent. Imagine life in these difficult times. What did people need to survive? Imagine coming across a huge beached whale...write, draw and discuss your reactions. How would you preserve the meat for future use? What natural predators would you have to protect yourself from?

Imagine you are the owner of the last raised peat bog in Britain. How would you protect it? Where might you get advice and support from? Would you need money? Design a leaflet introducing visitors to your reserve.

3. ACCESS SHEETS



**WILD, WET and
WONDERFUL**

Peat Bog Code

Please take the following precautions when visiting a peat bog:

Access: Please ensure that you take expert advice about the best place for your class to visit. (see access sheet 3.2)

Ensure children are dressed appropriately. Wellies are essential and bring a spare pair of socks! Bogs are always wet places. Warm and waterproof clothing is always a good idea and plastic bags to sit upon are very useful.

Keep the children in groups. Do not let them wander away alone. Some bogs have deep pools hidden under vegetation.

Remember a first aid kit. Know where it is and who can use it.

You may wish to advise children/parents to bring their own midge repellent in summer. You may not need to use it!

Watch out for old drainage ditches. There are very few bogs which have not been interfered with by man. These may be overgrown with vegetation and hard to see. Look out for lines of vegetation which look different from the surrounding bog - these often mark the line of an old ditch.

You may be lucky enough to see an adder!

Your local contact will be able to tell you whether you are likely to come across adders at the site. Adder bites are very rarely fatal but can set up a serious allergic reaction in some people, especially children. Children should be on the look out for adders from spring time onwards, particularly in the drier areas. Adders will only bite if cornered or threatened so the best protection is to avoid them. In the unlikely event of a child being bitten keep the child calm and warm and take straight away to a doctor or the nearest hospital.

Follow the Country Code: See resource section for Code leaflet. Country Code teaching materials are available free from: Scottish Natural Heritage, Publications Section, Battleby, Redgorton, Perth PH1 3EW.

Sites to visit**FOR INFORMATION ON LOCAL BOG SITES SUITABLE FOR YOUR CLASS TO VISIT CONTACT:**

Your local Scottish Natural Heritage office.
(See enclosed 'Who we are and where we are' leaflet)

Your local Countryside Ranger Service.
Contact your local authority, usually Leisure and Recreation, Planning or Education section.

The Scottish Wildlife Trust:
71 Houldsworth St., Finniestown, Glasgow. Tel : 0141 248 4647

The Royal Society for the Protection of Birds
Dunedin House, 25 Ravelston Terrace, Edinburgh, EH4 3TP. Tel : 0131 311 6500

IN THE GLASGOW AREA:

For access and information about Glen Moss:
SWT Reserves Manager : Dean Howard 01387 248419

Kilmacolm Golf Course Manager : Ronnie Bunting 01505 872139

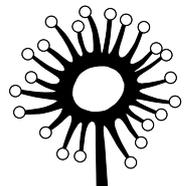
Glasgow City Ranger Service : 0141 632 9299

Kelvin Valley Countryside Project : Provan Hall House, Auchinlee Road, Easterhouse,
Glasgow, G34 9QN. Tel : 0141 771 4399

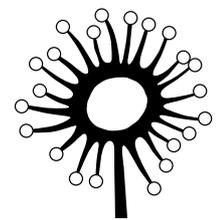
North Lanarkshire Council Conservation & Greening Unit : 01236 780636

Central Scotland Countryside Trust, Shotts : 01501 822015

Calderglen Country Park Ranger Service : 01355 236644



4. ACTIVITY SHEETS



**WILD, WET and
WONDERFUL**

Timeline

Use this information, plus any additional information which the children may know from previous projects, or by research to illustrate a time line on your classroom wall. Make the line vertical, if possible, to emphasise the depth of the peat. Ask the children to draw a timeline in the playground using chalk ...or using rope in the school gym. Older children may wish to experiment using a variety of scales.

Depth/Date metres	
0.....2000	<ul style="list-style-type: none"> - Millenium celebrations! - 1914-1918 First World War. 1770: Clearances - Battle of Hastings (1066)
1.....1000 A.D.	<ul style="list-style-type: none"> - 122/127 AD Hadrians wall built - Roman Empire (10-400)
2.....0 B.C.	<ul style="list-style-type: none"> - Tollund man - Period of Iron Age bog sacrifices (c.400)
3.....1000	<ul style="list-style-type: none"> - Stonehenge completed (1600)
4.....2000	
5.....3000	<ul style="list-style-type: none"> - Callanish built (3000BC) - beginning of Neolithic period (3750)
6.....4000	
7.....5000	<ul style="list-style-type: none"> - Britain becomes an island as North and Irish Seas form (5000-6000)
8.....6000	<ul style="list-style-type: none"> - Extensive blanket bogs begin to form (6000)
9.....7000	<ul style="list-style-type: none"> - Whales beached by Forth estuary (7000)
10.....8000	<ul style="list-style-type: none"> - Lowland raised bogs begin to form (8000)



Teaching points

Can you add more details to this? Ask the children what they may predict further into the future and draw their futuristic pictures for placing along the timeline. Will we lose all our peat bogs? Will they become over protected places which no-one may visit? Will they become places that are so unique people will pay to have a 'bogland experience'?

Bog Models

LOOFAH BOG

Make your own loofah bog to demonstrate the way raised bogs are formed.

You will need :

- A foil tray
- A dried loofah - available from chemists' shops
- Water
- A piece of kitchen roll or paper tissue
- Some cress, mustard or grass seeds

Loofah bog



Foil tray



Wet Loofah



Kitchen paper cress!

1. Use the foil tray to act as the hollow within which the raised bog is formed.
2. The hollows fill with water to form a pond, so fill your tray with water. The pond gradually fills up with vegetation which builds up as peat and eventually fills the hollow. To make your peat, take a new, flat, dry loofah and cut it to fit inside your tray. Float it on top of the water and see what happens. As the loofah soaks up water, it will expand and rise above the top of the tray.
3. Layer upon layer of *Sphagnum* grows on the bog surface to form a raised dome. Lay a piece of kitchen paper on top of the loofah to represent the growing surface of your bog.
4. With the *Sphagnum* mosses, heather and other bog species will grow on the bog. Sprinkle cress, mustard or grass seeds on top and leave the tray in a warm place to germinate. In a few days time you should have a mini bog, with the added bonus of something to add to your sandwiches!
5. Like a real bog, your bog will need a shower of rain from time to time to keep it wet and healthy!

(Loofah bog activity from 'Raised Peat Bog' Activity Pack by the Scottish Wildlife Trust, see resources section)

SIMPLE 3D BOG

Using plasticene, papier mache, or natural materials gathered from the school garden, the class (or groups) may wish to design and build their own 3D model of a bog including the wildlife they may encounter on a visit. A biscuit tin lid makes an ideal base.

Bog in a Bottle!

At last, a use for those wonderful large plastic fizzy drinks bottles!

RAISED BOG MODEL

You will need:

- Used 1 or 2 litre colourless mineral bottles
- crushed white chalk
- 2 Mugs of dark wet soil to represent the 'fen' peat
- 4 mugs of lighter soil (could mix the dark soil with sand)
- a few twigs to represent old bog logs
- some greenery such as moss for the top
- labels
- imitation bronze age artefact !

WHAT TO DO:

The diagram is based on a 1m long profile. The depth of each layer will depend upon the size of the bottle used. Maths geniuses can use this as a maths lesson !

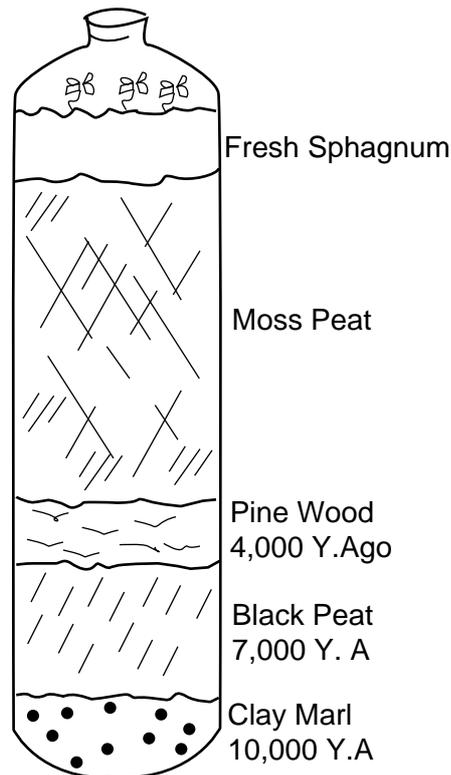
10% should be crushed white chalk representing the clays upon which raised bogs develop; 20% should be really dark soil representing the first 'fen' peat that develops in the lochan; 10% twiggy soil to represent the woodland stage; 50% lighter soil to represent the main peat of the raised bog and finally about 10% greenery to represent the *Sphagnum* surface.

Carefully cut off the top of the bottle. Mark on the outside approximately where each layer should be filled to.

Partially fill the bottle with crushed chalk, followed by the dark, wet, soil, and the twiggy soil in the proportions shown in the diagram.

Fill in one quarter of the lighter soil and bury the bronze age artefact so that part of it can be seen from the outside.

Fill in the remainder of the soil and the '*Sphagnum*'.



Seal the top with the lid taped back on, label each layer clearly....store upright!

A similar model illustrating a blanket bog could be made, replace the white chalk with sand and include a line of crushed brown chalk to illustrate the impermeable iron 'pan' found in the mineral soil beneath blanket bog. The proportions should be as follows : 10% sand, 5% wet, dark, soil, 10% twiggy soil, 70% lighter soil and 5% green layer.

From : Peatlands and the Primary School Curriculum, Catherine O'Connell, Irish Peatland Conservation Council (See bibliography).

Natural Dyeing

Many varieties of bog plants were used in the past as natural dyes to colour fabric such as wool. Any plant parts - including vegetables can be experimented with.

Heather (in flower), butterwort and bog myrtle will produce yellows and blaeberrries - pink, lichens will produce reddish brown. Ask your class to bring in some natural plant materials from their gardens...particularly heath/bog type plants if possible. Try to guess beforehand what colours they may make.

YOU WILL NEED:

- mordants : a mordant is a vegetable or a metallic substance which will fix the dyes. Some plants do not need mordants...see below. Alum (Aluminium Sulphate) will brighten the colour and Iron will tend to darken it, turning yellow dyes green;
- cream of tartar can be added to mordants to further brighten the colours;
- water;
- a suitably old pan! (enamel, stainless steel or ovenproof containers will not affect the colour of the finished wool);
- old wooden spoons;
- weighing scales;
- a cooker;
- rubber gloves.

method:

ALUM

Use 1oz alum to 4oz of wool plus a teaspoon of cream of tartar.

Stir this into just enough water to cover the wool. (Make sure that you don't put too much wool in the pan).

Mix in the plant material.

Heat the saucepan and bring it to simmering point. (This can take about an hour).

Simmer for a further hour stirring occasionally.

Leave the water to cool then gently squeeze out the wool.

IRON

Use 1 teaspoon iron to 4oz wool and add 1 teaspoon cream of tartar.

Simmer the plant material with the wool and a little water(as above) for about 30 minutes.

Remove the wool.

Add the iron and stir well before replacing the wool.

Simmer for a further 15 minutes.

Fir club moss from peat bogs can also act as a mordant and was probably used as such.

The following plant materials do not need mordants:

Blaeberrries	Turmeric
Onion Skins	Golden rod
Beetroot	Ragwort
Sloe berries	Walnut hulls
Elderberries	Avocado pear skins

method:

Wet the wool.

Put it in the saucepan and add the plant material.

Bring it slowly to simmering point.

Simmer until you achieve the desired colour (anything from 20 minutes to three hours).

Allow water to cool.

Squeeze out wool.

Rinse in clean warm water.

Dry in shady place.

Teaching points

You could use the dye water to create 'watercolour' pictures, or do tie dye tee shirts instead of wool. Make 'friendship bracelets' using cotton embroidery thread. What colours make up the clan tartans of your class. Find out what natural materials first made these colours. Find out about the history of tartans. Dye rough strips of sugar paper and weave them into unique or clan tartans. Plan this first using squared paper and coloured pencils, design outfits...and create a display of peat fashion!

Compost in the Classroom

This activity aims to demonstrate that there are alternatives to peat for growing plants....and that gardeners need not add to the destruction of peat bogs either in the UK or abroad.

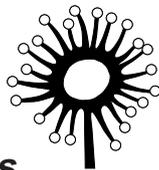
You will need some or all of the following materials:

- leaf mould (rotted leaves)
- garden soil
- well rotted garden compost
- sand (horticultural grade)
- grit(horticultural grade)
- cotton wool
- coir (peat free compost)
- other peat free composts from your local garden centre
- radish, lettuce, cress,mustard (seeds which will grow reasonably quickly)
- pots or seed trays

method:

1. Fill each of the pots with one of the materials mentioned above and sow the seeds evenly according to the manufacturers instructions.
2. Cover the seed trays with cling film or put into a propagator.
3. Keep the seeds warm and well watered until they germinate.
4. Put them on a windowsill or in a greenhouse to grow.
5. Water the seeds twice a week.

Compare the results as scientifically as possible...perhaps by weighing the crops.



Teaching points

You may wish to further vary the experiment by feeding some of the crops with fertiliser (liquid seaweed) , or by keeping some in the dark, or not watering them...be sure all other conditions are equal, use the same 'soil' for example.

Ask the children to ask relatives and neighbours for compost...every community has gardeners! Colleagues in the staffroom may also have good compost heaps! You may also wish to make compost in a bottle using a variety of ingredients to see which works best...or build a wormery to show natural composting at work. Bottle composts are a good way to demonstrate the biodegradability of playtime waste such as apple cores v crisp packets. Good bottles can be scrounged from sweetie shops.

Role Playing

Peat bog development and conservation has been a source of conflict in Scotland for many years. Newspaper reports sourced from your local library may help pupils to understand the strength of feeling in communities who have lived in association with boglands for generations.

Role playing is a popular way to dramatise how inevitable conflicts of interest over the development of natural resources can be resolved.

An imaginary conflict situation is proposed and the children are asked to take on the role of the various parties -

- a. the developer
- b. local business people
- c. politicians
- d. the man or woman on the street
- e. conservationists.

Each role player is given a position to adopt, e.g. the developer wants to make a living from the development, the business people see things in terms of jobs and productive potential, the conservationists want to protect a rare butterfly.

The book 'Fish farming, Tourism and Boglands', mentioned on page 32 develops the idea of development, conflict and role playing in a very clear way.

You may wish to ensure that a sensible debate ensues by following the usual format of :

- a. Main speakers for each point of view.
- b. Supporter speaks for each point of view.
- c. Comments and questions from the audience.
- d. Move to a vote.



Teaching points

Produce your own 'local' newspaper with interviews with all the relevant parties. Have an opinion poll around the class. Produce campaign leaflets and posters. Ask your local environmental campaigners along to contribute! Use the Internet to contact schools (e.g. in Islay where many schools have undertaken 'peaty' projects) who have experience of peat bog 'campaigns'.

WILD, WET and
WONDERFUL

The Web of Life on a Scottish Peat Bog

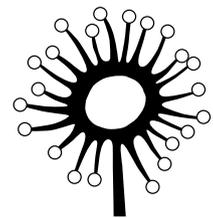
<p>Large Plants</p>  <p>We get our energy from the sun.</p>	<p>Carnivorous Plants</p>  <p>Some of our energy comes from insects.</p>	<p>Sun</p>  <p>I give energy to all green plants.</p>	<p>Damselflies</p>  <p>I eat other flying insects.</p>
<p>Caterpillars</p>  <p>We get energy from plants.</p>	<p>Foxes</p>  <p>We get our energy from voles, caterpillars, plants, hares and occasionally birds.</p>	<p>Bats</p>  <p>We get our energy from flying insects.</p>	<p>Ants</p>  <p>We get our energy from insects such as caterpillars and even other ants.</p>
<p>Song Birds</p>  <p>We get our energy from minibeasts and plants.</p>	<p>Lizards</p>  <p>We get our energy from minibeasts.</p>	<p>Hen Harriers</p>  <p>We get our energy from small birds and mammals.</p>	<p>Short Eared Owl</p>  <p>We get our energy from voles and other small mammals.</p>
<p>Adders</p>  <p>We get our energy from frogs, voles and other small mammals.</p>	<p>Deer</p>  <p>We get our energy from plantsand the occasional frog!</p>	<p>Voles</p>  <p>We get our energy from minibeasts and plants.</p>	<p>Frogs</p>  <p>We get our energy from minibeasts.</p>

WEBS AND CHAINS

Use this page to produce a set of cards. Sort them into mammals, birds, plants and minibeasts, draw and write about other peat bog dwellers. Sort them into carnivores, herbivores and omnivores...which are you? Create an identification key. Ask each student to choose an animal, plant or minibeast. Ask someone to be the sun, stand in a circle and

join the web together using string to indicate pathways of energy. What happens when one item in the web is destroyed (drop the string)...who is affected? Draw a variety of food webs. Can you include yourself in a foodweb? Can you draw a peat bog foodweb including the humans that lived there 5,000 years ago? Use the cards to encourage the students to find out more about each plant or animal.

5. RESOURCES



**WILD, WET and
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Bibliography

Boglands , Scotlands Living landscapes - SNH (1995).

Wild, Wet and Wonderful, report on scoping exercise by Jemima W Fraser for SNH.

Raised Peat Bogs, activity pack - Scottish Wildlife Trust.

Peatlands Forever? an education resource pack - Geraldine Macartney, Department of the Environment, Northern Ireland.

Peatlands and the Primary School Curriculum - Catherine O'Connell - Irish Peatland Conservation Council.

Torra Peatland Teachers' pack - Bob Black, for SNH, Islay.

Energy forever? geothermal and bio-energy - Ian Graham.

Sharing Nature with Children - Joseph Cornell 1979.

The Peatlands of Caithness and Sutherland and their Inhabitants - a Teachers Pack for Primary Schools by Meg Telfer and Trisha Matthews.

A box of peatland resources, which includes many of the packs mentioned above, can be borrowed by schools in the Stirling area from June Waley at Kippen Environment centre : 01786 870247.

This pack was prepared by Susan Webster, Gee Whizz (Tel. 01738 710625) for SNH, November 1999.

Additional Resource Materials

POEMS:

Don't step on that earwig - Rowena Somerville -Red Fox

Minibeasts - Robert Fisher - Faber and Faber

Single poems:

Bogland, the Tollund Man and Punishment by Seamus Heaney

Save the Peat Bog by Ian Lamont

BOOKS:

Spiders, Insects, Butterflies and Moths, Beetles - Dorling Kindersley

Caterpillar, Caterpillar -Vivian French - Walker Books

Eyewitness and Eye Openers series by Dorling Kindersley

Scotlands first settlers - C.R. Wickam Jones - Historic Scotland

Highland Folk Ways - I.F. Grant

Nature trail series by Usborne

TAPES:

Jamie and the Puddock - Moira Miller - Whigmaleerie

The Big Green Planet - The Singing Kettle - Kettle Tapes

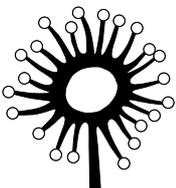
RSPB - various videos and teachers guides

PACKS:

Fish farming, Tourism and Boglands : Community and Development in Sparsely Populated Areas - CADISPA - project pack by WWF, Jordanhill

Western Isles Discovery Book - Alison Johnson and Bill Neill - SWT

The Central Scotland Discovery Book - David Wilson - SWT



Conservation Organisations

These organisations may be able to send you and your class additional information. They all produce priced publications suitable for peat bog projects.

DOE Environment Service
Calvert House
23 Castle Place
Belfast
BT1 1FY

Friends of the Earth Scotland
Bonnington Mill
72 Newhaven Road
Edinburgh
EH6 5QG

The Scottish Wildlife Trust
Cramond House
Cramond Glebe Road
Edinburgh
EH4 6NS

Scottish Natural Heritage
Battleby
Redgorton
Perth
PH1 3EW

The Royal Society for the Protection of Birds
Dunedin House
25 Ravelston Terrace
Edinburgh
EH4 3TP

The World Wide Fund for Nature (Scotland)
1 Crieff Road
Aberfeldy
Perthshire
PH15 2BJ

Irish Peatland Conservation Council
Capel Chambers
119 Capel Street
Dublin 1
Ireland

TEACHERS MAY ALSO WISH TO CONTACT THE FOLLOWING ORGANISATIONS FOR ADVICE ABOUT ENVIRONMENTAL PROJECTS:

Project Officer
Grounds for Learning
University of Stirling
Stirling
FK9 4LA

John Muir Trust
41 Commercial Street
Edinburgh
EH6 6JD