

Dear Teacher,

This pack has been created to assist you to make the most of 'Mynydd Marian Local Nature Reserve' as a local teaching area. We have compiled resources and ideas for teaching history, geography, environmental work, and for developing this work into role play, drama, language and maths. It is not intended as a 'project' for a single year group within a school, but rather as a resource for use on a regular basis by all ages.

This is by no means a stand alone or complete resource. The ideas and worksheets are not aimed towards a particular age group. The teachers' notes are comprehensive, and can (and should) be adapted to suit all ages. The CD contains all resources, in order that teachers can make copies, change sizing, use in worksheets of their own etc.

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Contents

	Page Number
Introduction	3
Site Map	4
Suggested Activities with Curriculum Links	5
Teachers' Notes: Land Use	6
Teachers' Notes: Fossil Hunting	9
Teachers' Notes: Butterflies	10
Teachers' Notes: Wildflowers	14
Teachers' Notes: Who Uses Mynydd Marian?	16
Teachers' Notes: Foodchains	20
Children's sheets	
Butterfly Identification Sheets	21
Butterfly Key	25
Minibeast Identification Sheets	26
Minibeast Key	27
Minibeast Survey Sheet	29
Wildflower Identification Sheet	30
Mynydd Marian Foodchains	32
Mynydd Marian Quiz	34



Introduction to Mynydd Marian

Mynydd Marian forms part of a range of low limestone hills extending from Prestatyn to Anglesey. It is located on the outskirts of Llysfaen between Colwyn Bay and Abergele. At 208 metres it is one of the highest points locally and offers panoramic views. It is one of 23 countryside sites in Conwy County Borough Council that are managed by the Countryside Service for informal recreation and nature conservation.

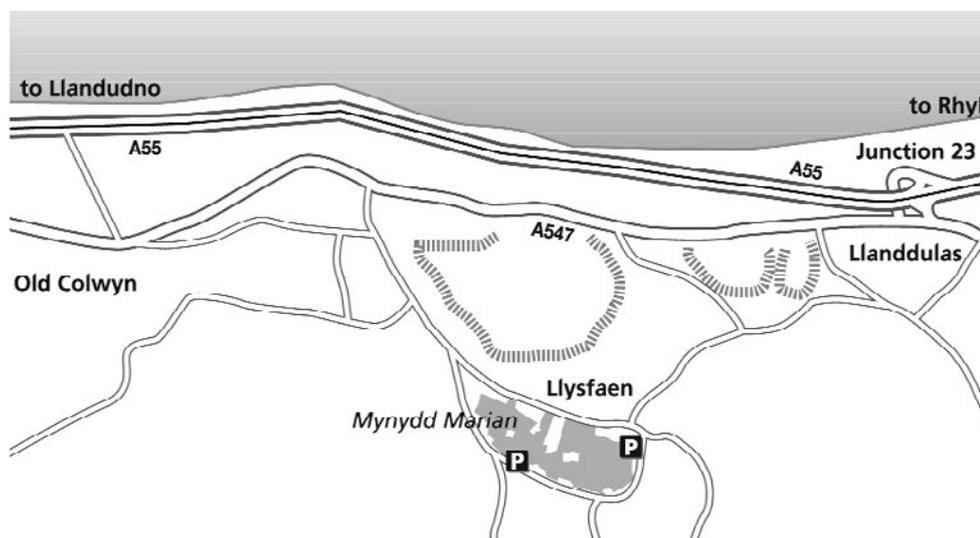
There is open access across the whole site, which is threaded with paths and most of it is easily accessible. However, the cliffs at the southern end of the site, accessed from the Castle Inn car park, are very steep and care must be taken with school groups in this area. We do not recommend that primary groups ascend or descend by this route. Access from the car park off Bron y Llan Road is recommended for school groups arriving by coach or car.

Flora and Fauna

A rich variety of wildflowers thrive on the thin limestone soils, including a mass of orchids in the early summer. They provide food for a myriad of butterflies, other insects, birds and small mammals. These in turn, attract larger predators such as buzzards, badgers and foxes. The site was designated as a Site of Special Scientific Interest in 1997 in recognition of the richness of its limestone grassland and as a Local Nature Reserve in 2001. Many rarities are found here, including hoary rockrose and the tiny silver studded blue butterfly, but it is the wonderful array of commoner plants and insects that provide the best opportunities for environmental education.

Geology

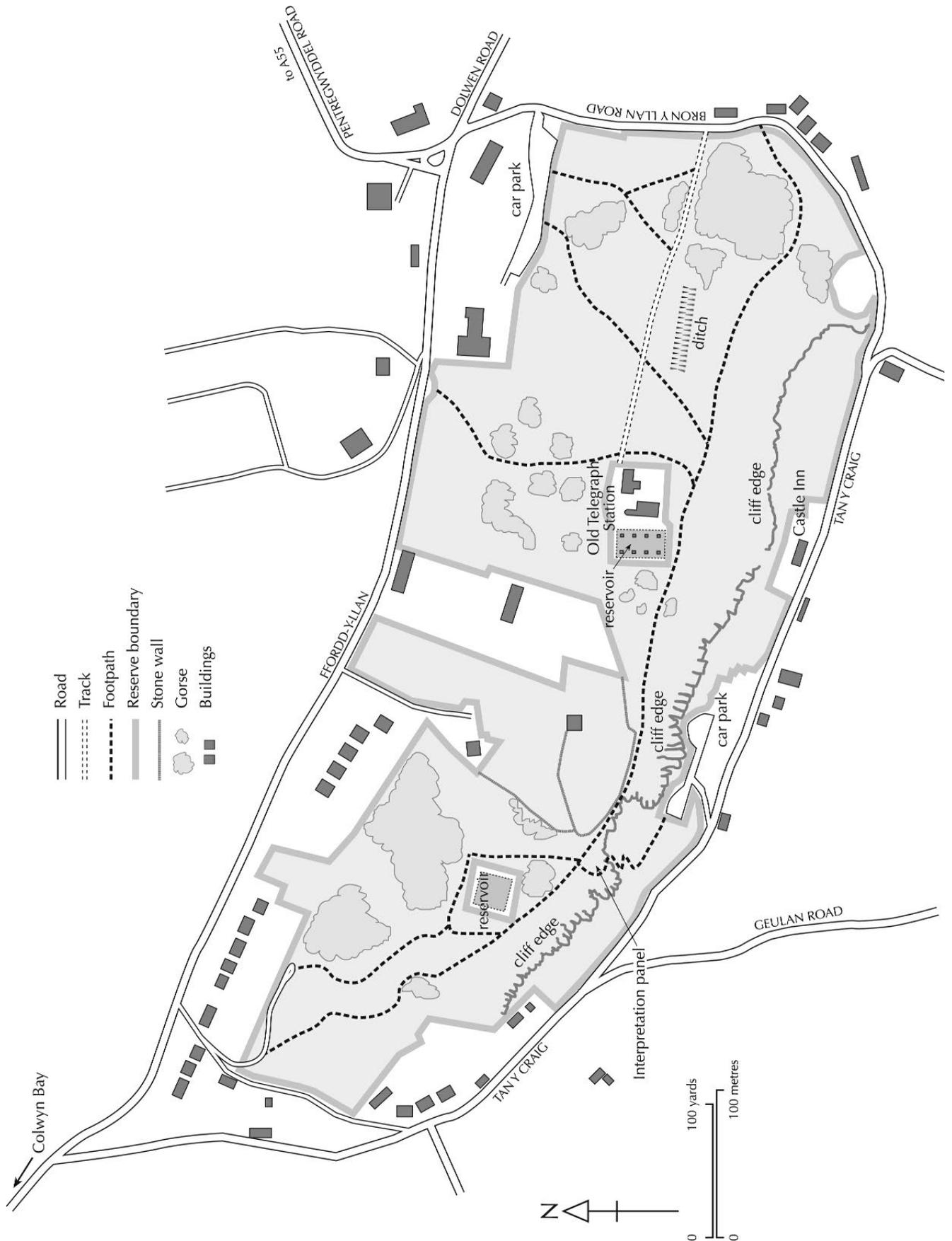
The limestone here was formed about 300 million years ago from the compressed shells of marine invertebrates. Children will love to hunt for the fossilised remains of these creatures on the exposed rock faces and stone walls. The valuable limestone has been extensively quarried for building stone and to produce lime for agricultural use. The steep rock faces on the southern boundary of the site were worked by Castle Inn Quarry. Several larger disused quarries are close by and Raynes Quarry, which is still a working quarry, is visible from the site, providing further teaching opportunities.



Location Map of Mynydd Marian Local Nature Reserve



Site Map of Mynydd Marian





Suggested Activities

Name of Activity	Best time of year	Curriculum links
Butterfly / minibeast walk	June /July	Science: Life Processes and Living Things
Land Use walk	anytime	Geography, History, Curriculum Cymreig
Wildflower walk	June/July	Science: Life Processes and Living Things
Rocks and Fossils	anytime	Geography, Science
Who Uses Mynydd Marian?	In school	Geography, English: speaking and listening, Citizenship
Mynydd Marian foodchains	In school	Science: Life Processes and Living Things

Mynydd Marian is also ideal for longer term studies allowing the children to get to know their local countryside well, monitoring the seasonal changes and developing a basic understanding of the local ecology. These repeated visits could be used as the basis of **John Muir Awards**, a national environmental award scheme that encourages the discovery and conservation of wild places in a spirit of fun, adventure and exploration. The introductory award involving a minimum of 15 hours over 4 months would be ideal for primary school children.

For more information contact:
 The John Muir Award
 41 Commercial Street
 Leith
 Edinburgh EH6 6JD
 tel/fax: 0845 4582910
 e-mail: info@johnmuiraward.org
[www. johnmuiraward.org](http://www.johnmuiraward.org)
 web: www.johnmuiraward.org

Welsh contact:
 Hugo Iffla 0845 4569398



Teachers' Notes: Uses of Mynydd Marian

Telegraph Station

This was built in 1841 by the Trustees of Liverpool Docks to send messages and reports of ships from Holyhead to Liverpool. At this time Liverpool was a major port, exporting and importing goods across the world, particularly to the United States of America. It was useful for the port at Liverpool to know what boats would be arriving and with what cargo.

These messages were sent by semaphore, a method of signalling that was devised over 200 years ago. The type of semaphore used at Mynydd Marian developed over the years, starting with large wooden poles with arms, these became more and more complex and were later superseded by lights. Semaphore was later replaced by the electric telegraph system. There were 12 stations in the chain from Holyhead to Liverpool: Holyhead Mountain, Cefn Du, Mynydd Elian, Ynys Seiriol, (Puffin Island), Great Orme, Llysfaen, Point of Ayr, Hilbre Island, Bidston Bill and Duncan's Warehouse in Chapel Street, Liverpool. There were two intermediate stations, Carreglwyd, near Llanfaethlu in Anglesey, and the Foryd in Rhyl. Weather conditions determined which stations were used each time. The record for sending a message from Liverpool to Holyhead and receiving a reply in Liverpool was 53 seconds!!

Liverpool Maritime Museum has displays about semaphore and the "Coast" TV series compared using semaphore to pass a message from Holyhead to Liverpool with a mobile phone. The semaphore proved more effective as there was limited mobile phone reception along part of the route!

Today, the word semaphore usually refers to the flag system of semaphore. This system was never used at Mynydd Marian but is an excellent way for children to learn about semaphore. Semaphore flags are usually square, red and yellow, divided diagonally with the red portion in the upper part (red and yellow was usually used when signalling between two ships at sea and blue and white used when signalling between ships and land or on land). The flags are held, arms extended, in various positions representing each of the letters of the alphabet (see table). Semaphore flags were approximately 30cm x 30cm (12in x 12in).

Questions:

Can the children see the plaque on Telegraph House commemorating its former use?

Can they see the adjoining stations in the chain? The Great Orme, Rhyl and Point of Ayr Lighthouse are visible on a clear day. *(You could combine this with a field sketching activity)*

Why do they think it stopped being used?

How do they think ports get information about shipping nowadays?

How did semaphore work?

(Make a set of flags and try getting the children to send simple messages)



Semaphore Code

Ready or End of Word

A B C D E F G

H I J K L M N

O P Q R S T

U V W X Y Z Direction sign



Quarrying

Mynydd Marian was once edged by numerous small limestone quarries, many of which were still in use up until the late 19th century. The stone was quarried by hand on a small scale and used for building stone and for lime production. Crushed limestone was either burned locally in limekilns to produce lime for agriculture or taken by horse and cart to the sea where it was loaded onto sailing barges for sale in Widnes and Runcorn for use in the chemical industry. Initially the barges were just run aground for loading but later, as the larger quarries were opened and mechanisation increased output, stone jetties were built and the two larger scale quarries developed. The small quarries have long since closed but Raynes Quarry nearer the coast is still working. For more information about the working quarry, or to arrange a site visit, please contact the manager at Raynes Quarry on 01492 517378.

Grazing

Farming was the other major land use until recent years. Historically any field capable of growing crops was ploughed but, because the soils of Mynydd Marian are so thin, they were grazed instead by sheep, geese and possibly cattle. This lack of cultivation and fertilisation partly explains why the site is so flower-rich today.

Reservoirs

Until 1921 water was collected from wells or natural springs. A concrete underground storage reservoir of 132,000 gallons capacity was built at the top of Mynydd Marian in 1921 (with railings round it now). Pipes were laid from it to a series of taps along the road and locals came to collect it in buckets! A second reservoir, fenced off beside Telegraph House, was built later and both are still in use for water storage.

Leisure

Nowadays the major use of Mynydd Marian is for pleasure. Many local people regularly walk their dogs here, the cliffs are used by rock-climbers and others visit to look at the flora and fauna. Conwy Countryside Service carries out regular conservation work, such as cutting back scrub, to enhance the ecological value of the site.



single limekiln



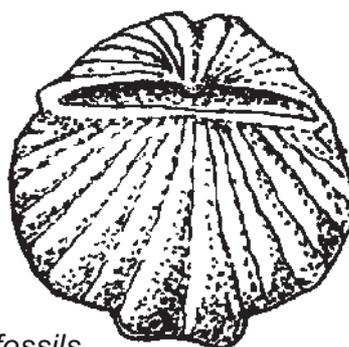
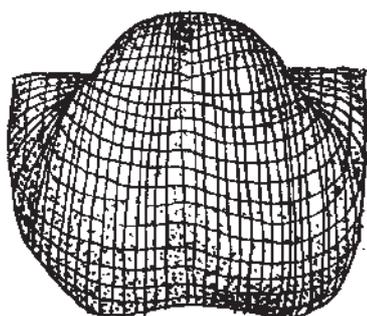
Teachers' Notes: Fossil Hunting!

The limestone at Mynydd Marian was formed about 300 million years ago when this part of Wales was covered by a warm sea full of marine invertebrates. The shells of the dead invertebrates gradually built up on the sea bed and, over millions of years, other layers of sediment formed above them, gradually compressing them to form limestone. The fossilised remains of some of these creatures can be seen in the exposed limestone.

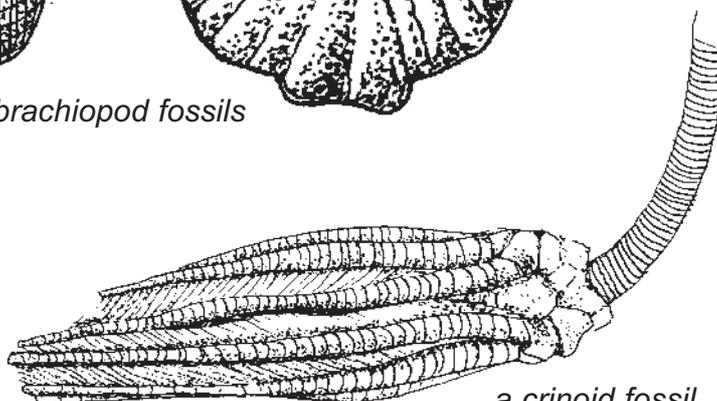
The stone walls and large boulders are the best places to look as they are safe to explore and the fossils are relatively easy to find (there are some excellent specimens near the end of the stone wall closest to the information panel and on the boulders below Telegraph House). Once the children know what to look for, they will soon find plenty more on some of the rock faces and amongst piles of broken rock. N.B. take care when searching amongst loose rock as there may be broken glass and litter.

Segments of crinoids are commonly found, either a single segment like a small button, or two or three segments together, forming a row of cylindrical discs (like part of a tube of polo mints). Crinoids were simple ancestors of sea-urchins and starfish. They had long stems that attached the creature to rock or driftwood and long feeding arms.

Pieces of brachiopod fossils are also commonly found, looking a bit like cockle shells. They were soft-bodied creatures enclosed within two hard shells, superficially like clams, but not related.



brachiopod fossils



a crinoid fossil



Teachers' Notes: Butterflies

The scrub and limestone grassland of Mynydd Marian provides an ideal habitat for many butterflies. 18 species were recorded in 2005. The site provides both food plants for the caterpillars and plentiful nectar sources for the adults. The different species tend to be seen where their preferred food plant grows eg common blue is found on the close cropped grass and rocky slopes where birds foot trefoil grows, whereas ringlet is more likely to be seen around the bramble scrub. Garden butterflies are also seen near Telegraph House where patches of garden flowers have naturalised.

The patterning and colour of a butterfly's wing can differ considerably between the topside and underside. There are also differences between males and females and, with species such as the common blue, colour may vary significantly between individuals!

Some butterflies rest with their wings open, others have them fully or partly closed. It sometimes depends on the weather as they are cold-blooded creatures and need the sun's warmth to raise their body temperatures high enough for flying. Where sunlight is weak, species such as the common blue, may bask with their wings open to absorb the maximum amount of heat, but in sunny weather may rest with wings folded.

Children often confuse butterflies with moths. Butterflies fly in the daytime whereas most moths are night-flying. However, there are a few day-flying moths and one, the black and red-spotted burnet moth, is common here and is included on the identification sheet. The easiest way to tell moths and butterflies apart is by their antennae. Butterflies have long, slender antennae with a swollen or clubbed end, whereas moth antennae vary from single strands to feathered. Unfortunately the day-flying burnet and cinnabar moths have curved club-shaped antennae, similar to the butterflies, but their distinctive red and black colouring makes them easily distinguishable!

Choosing the time for a butterfly walk

Butterflies only fly in warm, dry, still weather so don't expect to see butterflies when it's windy! Warm, cloudy weather is good as the butterflies will be flying more slowly. In hot sunshine they fly faster and are harder to identify!

Different species emerge at different times of year so you may not have all five of the common Mynydd Marian species flying at the same time (see table showing approximate flying times). The common blue and small heath are often flying in May but Mid-June to July are better times for a butterfly walk as meadow brown, ringlet and gatekeeper may also be flying.

Approximate flight period of butterflies in North Wales

	April	May	June	July	August	September	October
Small heath		—————	—————	—————	—————	—————	
Common blue		-----	-----	-----	-----	-----	
Meadow brown			-----	-----	-----	-----	
Gatekeeper				—————	—————	—————	
Ringlet			—————	—————	—————		

————— main flight period

----- sometimes seen



Butterfly survey

Annual records are kept of the butterfly population of Mynydd Marian. Of the 18 species five are relatively common, each making up 9% or more of the sampled butterflies on a recent survey. Instead of just doing a butterfly walk why not get the children to record the common species they see? Use the simple key and ID sheets prior to your visit to familiarise your pupils with the common species and then get the children to record what they see on their walk (you could cut out and laminate the butterflies to use with the key). Pupils are also likely to see other species in smaller numbers and these are also included on the identification sheets. Please send your results to Conwy Countryside Service (contact details at the end of the pack).

Common Butterflies at Mynydd Marian

Statistics from a recent butterfly survey (Could be used to make a pie or bar chart.)

Small heath	47%
Gatekeeper	9%
Meadow brown	11%
Common blue	9%
Ringlet	9%
Others	15%

Small heath

The most common butterfly is easily identified as it is the only small, light-brown butterfly.

Wingspan: 34-38mm

Flying time: June/ July and second brood August/ Sept

Caterpillar food plants: fine leaved grasses

Behaviour: It spends long periods at rest, perched in bare spots leaning towards the sun. It always settles with wings closed so hindwings are seen. Flight is quite rapid, weaving and bobbing just above the grassheads.

Meadow brown

This is a large, dusky-brown butterfly with orange patches.

Wingspan: 50-55mm

Flying time: late June, July, August

Caterpillar food plants: coarse and medium-leaved grasses

Behaviour: Flight is weak and fluttering just above grass heads as they move from flower to flower. It is often seen gathering nectar from bramble flowers. It often sits with wings closed, with only lower hindwing visible.

Gatekeeper

This is a medium-sized golden-brown butterfly.

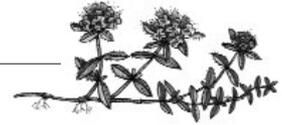
Wingspan: 40-47mm

Flying time: late July – August

Caterpillar food plants: Fine and medium-leaved grasses

Behaviour: Flight is jerky and fairly rapid, rarely settling on the ground or flying over open grassland. It likes yellow flowers, but also blackberry.





Ringlet

This medium–large butterfly has distinctive dark velvety-brown upperwings. The wings are usually closed when settled showing conspicuous eyes with white centres.

Wingspan: 48-52mm

Flying time: July to early August

Caterpillar food plants: grasses

Behaviour: Usually seen in shady places. Flight is weak and fluttering, hovering above grass heads. It is often seen feeding on brambles with meadow browns. One of the few butterflies that will fly when overcast and even in light showers.

Common blue

This small butterfly has considerable differences between male and females. The males are easy to recognise, with bright blue upperwings but the females are more difficult to identify. They have orange rings and dark spots along the outer wing edge but the main colour can vary from purple-blue to dark brown with a blue tinge near the body! Both sexes have beige-brown patterned underwings.

Wingspan: 35mm

Flying time: late May/ June and often a second brood in August

Caterpillar food plant: bird's foot trefoil

Behaviour: Flits just above the ground. They bask in weak sunlight with their wings open but may have closed wings in stronger sun. Often seen on the rocky southern slopes.

The rare **silver studded blue** is also found here and flies in July and early August. It is smaller, with a 29-31mm wingspan, and is seen on the rockier areas.

Six-spot burnet moth

This very distinctive black moth with red spots is common here in the summer. The papery cocoons of their pupae are also frequently seen high up on grass stems.

Wingspan: 32mm

Caterpillar food plant: grasses

Behaviour: It is active in the daytime, unlike most moths, but its flight is sluggish and slower than most of the butterflies, although it flaps its wings rapidly. When resting on a grass stalk, the wings are folded along the body. Another red and black day flying moth, **the cinnabar moth** is also seen here.

Other butterflies

Painted lady

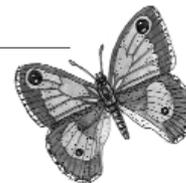
This is a large pale butterfly, varying from pale salmon-pink to dull orange.

Wingspan: 64-70mm

Flying time: mid April – early October

Caterpillar food plants: thistles, occasionally nettles or mallow.

Behaviour: They settle with wings wide open and have a powerful gliding flight. They are often seen in gardens.



Red admiral

This large vividly marked black and red butterfly is very distinctive.

Wingspan: 67-72mm

Flying time: mid March -October

Caterpillar food plants: nettles

Behaviour: They are powerful fliers and bask in the sun with its wings wide open. They are often seen in gardens.

Large white and small white

These familiar white butterflies are some of the most common British butterflies. The large white has distinctive black wing tips whereas the others have smaller grey tips.

Wingspan: 63-70mm for large white and 48mm for small white

Flying time: April - September

Caterpillar food plant: brassicas (cabbages) and wild crucifers (mustard-like plants)

Behaviour: Large numbers are often seen around vegetable plots but individuals are also seen on uncultivated ground.

Small tortoiseshell

The wings of this orange and black medium-sized butterfly have a distinctive dark border with blue crescents.

Wingspan: 50-56mm

Flying time: The adults hibernate here and may be seen during mild weather in early spring and late autumn as well as the summer months.

Caterpillar food plant: nettles

Behaviour: They bask with wings wide open and are often seen in gardens.

Speckled wood

The clear pattern of creamy-yellow markings on the chocolate brown wings of this butterfly make it easy to identify (the ringlet is darker with fewer markings).

Wingspan: 47-50mm

Flying time: April - September

Caterpillar food plant: grasses

Behaviour: They are found in shady places in scrub or woodland, often feeding on bramble blossom.

Orange tip

The male has distinctive orange wing tips.

Wingspan: 45-50mm

Flying time: mid April to early July

Caterpillar food plant: crucifer family, particularly lady's smock and garlic mustard

Behaviour: They are quite mobile and the males are seen flitting slowly between white objects looking for females.





Teachers' Notes: Flowers

During late spring and summer, the grassland of Mynydd Marian is a mass of colour from the wealth of wildflowers that thrive on the thin limestone soils. Flowering times vary, but June and July are good months to visit as a wide variety will be in flower.

The short, rabbit-cropped turf on and around the hill top is a good place to look for flowers. Wild thyme, bird's foot trefoil, rockrose, and mouse ear hawkweed are common along with swathes of orchids - early purple orchids in late spring and common spotted orchids in early summer. On the rockier areas, different species that can survive the drier conditions, such as tiny stonecrops (like rockery plants) and the prickly carline thistle can also be found.

Different species grow in the richer soils and longer grass lower down the hill on the northern side and dense patches of gorse and bramble are also present.

N.B. Please do not allow children to pick or trample any of the flowers.

Common and distinctive species (see ID sheet)

N.B. over 100 species have been recorded at Mynydd Marian and it is unrealistic to do a comprehensive identification sheet. These notes and the accompanying sheet aim to help identify some of the most common and distinctive species.

Carline thistle

Habitat: rocky areas and short grass

Flowers from July to September but dead flower heads from the previous season can usually be seen at all times of the year.

It has prickly stems and a thistle-like flower - there can be two or three flowers on one plant but often only one (plants tend to be smaller on the dry rocky areas).

Wild thyme

Habitat: rocky areas and closely cropped grass

Flowers from June – September

This aromatic, low growing herb has clumps of tiny mauve flowers. Its smell and flavour is less strong than its domestic relative.

Salad burnet

Habitat: medium to longer grass

Flowers from May - September

This herb has an unusual flower head like a simple green pom-pom, sometimes with red dangling stamens, with distinctive leaves, made up of pairs of jagged-edged leaflets. Its young leaves are edible and can be used in salads.



Common rockrose

Habitat: short grass

Flowers from June – September

This creeping evergreen has pointed, thin, oval leaves and yellow flowers with five heartshaped petals (the flower is superficially similar to buttercup, which is also found on the site, but the petals are not as glossy and leaves are completely different).

(The nationally rare **hoary rockrose** is also present, but the children are unlikely to distinguish them as they are very similar!)

Bird's foot trefoil

Habitat: short to medium grass

Flowers from June - September

This sprawling, fairly low growing plant has clusters of distinctive bright yellow flowers and its leaves are made up of five oval leaflets.

Common spotted orchid

Habitat: short to medium grass

Flowers from June - early August

This pretty orchid has tall pink single-stemmed flowers, made up of lots of individual florets. The rosette of leaves at the base of the stalk are often spotted.

There are often large numbers of flower spikes in one area. The height of the spike varies considerably and the colour can vary from pale pink to deeper pink.

Early purple orchid

Habitat: short to medium grass

Flowers from April - June

This pretty orchid has tall purple single-stemmed flowers, made up of lots of individual florets. The rosette of leaves at the base of the stalk are often spotted.

There are often large numbers of flower spikes in one area.

Mouse-ear hawkweed

Habitat: short to medium grass

Flowers from June – August

This fairly small plant has a yellow dandelion-like flower (dandelions will inevitably also be present on the site but not on the short turf on the higher parts of the site).

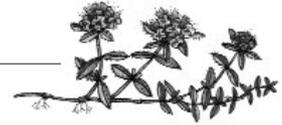
The flower stalk and small oval leaves are covered with soft white hairs and the underside of the leaves are white-felted with these soft hairs (like a mouse's ear – hence its name!)

Common knapweed

Habitat: in longer grass

Flowers from June - September

This medium to tall plant has purple thistle-like flowers that are very attractive to butterflies. The stem and leaves are covered in small rough hairs. The lower leaves are jagged and the upper leaves are smooth and pointed.



Teachers' Notes: Who Uses Mynydd Marian?

Objectives: To help pupils consider issues from different viewpoints and understand that people can have conflicting demands on the environment.

Following a visit to Mynydd Marian, the information provided here could be used for a variety of classroom activities to trigger discussion.

Background

Lots of different people use Mynydd Marian:

Dog walkers who come here each day;

Local children playing after school or during the holidays;

School children coming on an educational visit;

Naturalists coming to look at the flora and fauna or working to conserve the site;

Rock climbers using the limestone cliffs made by quarrying;

Walkers both locals on a short walk or ramblers crossing Mynydd Marian as part of a longer walk;

Welsh Water visit to maintain the reservoirs;

Telecommunications technicians occasionally visit to maintain the aerial;

Local residents whose houses edge Mynydd Marian.

Different people have different opinions about how Mynydd Marian should be used and sometimes the different uses of the site can be conflicting. It is the job of the Countryside Warden responsible for the site and the Local Nature Reserve Management Advisory Group to resolve these conflicts.

Activity 1

Use the notes given here to trigger a discussion about who uses Mynydd Marian and what they want from the site (see role play scenarios for additional information).

- Divide the class into small groups and get them to brainstorm to produce a list of people who might use Mynydd Marian.
- Make a list of their ideas on whiteboard or blackboard, asking each group to suggest a user in turn.
- Then ask each group to consider which of these users might cause problems to other users. You may wish to write out trigger cards to encourage discussion if needed, for example:

Dog poo Disturbing local residents Dog bites Vehicles on the grassland

Litter Disturbing wildlife Falling rock Garden plants growing on the grassland

- What could be done to overcome these problems? Lead a class discussion or get groups to discuss it first and propose ideas.



Activity 2: Role Play

With an older, able KS2 class, you could develop a role-play, in which small groups of children take on the roles of different users of the site, based around the main issue of the re-introduction of grazing. Simple briefing cards are included for each role.

Running the session

This will depend greatly on the age, ability and size of your class. You may wish to run it as a formal meeting where each group presents its case to the Management Advisory Group (take the role of chairman of the Advisory Group yourself so that you can sum up and question each group to draw out all the points). Giving out simple props to identify each group will add to the enjoyment of the activity, for example binoculars or a wildflower book for the naturalists, a soft toy dog for the dog walker, a length of rope for the climbers etc.

Divide the class into groups of 4-5 and give each group a role card. Introduce the scenario to the whole class and explain that each group is being given a character and that they must try to imagine how that character is thinking. Stress that the characters can use the meeting to air other grievances about the management of Mynydd Marian, in addition to commenting about the grazing (for example moaning about other users!) Give each group large sheets of paper to jot down the key points their group want to make.

Allow them 15 minutes to discuss the issues and plan what their group is going to say. Get each group to nominate one or two members to act as spokespeople. Then ask each group in turn to present its viewpoint, starting with the Countryside Warden and write up the key findings on a flip chart or whiteboard.

At the end of the presentations ask the children to leave their roles behind and listen to your summary of the main points that have been made. Then ask the class to vote on whether they think grazing should be re-introduced or not.





The Need for Grazing

Mynydd Marian is designated as a Site of Special Scientific Interest in recognition of its limestone grassland communities and the wildlife they support, including nationally rare plants and butterflies. Most of these species flourish where the grass is close-cropped. For many years the site was grazed by livestock, including the Village Green area that was grazed by geese! More recently Pen y Bryn Field was grazed and some parts of the site were grazed by ponies in 1987. Nowadays it is only the numerous rabbits that keep the grass cropped. Rabbit grazing alone is insufficient to prevent the growth of gorse, cotoneaster (a garden escapee), bramble and other woody scrub. If left alone they will gradually spread across the site, reducing the area of short grass where most of the wildflowers thrive. Currently the site warden organises regular cutting of some areas of gorse and scrub and the removal of cotoneaster, using both contractors and volunteers but this is costly and time-consuming. The re-introduction of grazing in some form, either low level grazing throughout the year or more intense seasonal grazing once the flowers have set seed, could be a better long-term solution for the management of the site.

However re-introducing grazing would also bring problems. Fencing would be required to enclose the stock and this could reduce the open feel of the site if not done sensitively. The grazing must be carefully controlled as overgrazing can result in trampling of the plants and may not allow the seeds to set. Dog walkers would have to keep their dogs on leads to reduce the problems of dog-worrying. This could be extremely unpopular as currently the dogs are free to roam.

Setting the Scene

Local residents and other users of Mynydd Marian are invited to an open meeting at Llysfaen Village Hall to give their opinions to the Mynydd Marian Advisory Group on the plans to re-introduce sheep to graze Mynydd Marian (you may also want to use the meeting to express your concerns about other issues on the site).

Local parents

Your children love to play on Mynydd Marian on summer evenings and during the holidays but you worry about them going up there alone. You worry about the numerous dogs that are usually running round off their leads as they could bite or frighten your children and there's always lots of dog mess (dog poo can contain parasites that can permanently damage human eyesight). You think the steep cliff faces and rocky areas are dangerous. Introducing sheep could be good as the area will have to be fenced and dogs will have to be better controlled.

Dog walker

You only live 5 minutes walk away in Llysfaen and have been walking here every day with your dogs for 20 years and you don't see why you should have to change your habits. You think your dog is well-trained and won't worry sheep so you don't see why you should have to keep it on a lead. Your dog only poos in the long grass so you don't see why you should clear it up as it is natural and will break down in time. You are also worried that fences could restrict your access onto the site and you think it will spoil the open feel of the site.



Countryside Warden

Your task is to explain why it is desirable to have grazing on Mynydd Marian. Lots of flowers thrive on Mynydd Marian, including some very rare ones. The flowers attract many insects, especially butterflies. The flowers grow best in the shorter grass and cannot grow under gorse or bramble. Cutting the gorse is expensive and takes a lot of time. Introducing sheep to graze the scrub would be a far better long-term solution. Fencing will be needed for the sheep but it must not spoil the open feel of the site so will have to be carefully positioned, ideally around the lower boundary. Providing for public enjoyment is an important part of the site management, so you must balance the need for conserving the wildlife with encouraging public use.

Local walker

You've lived here for over 30 years and love walking on Mynydd Marian, especially in the summer when lots of the flowers are in bloom and the butterflies and grasshoppers are active. You've noticed that there is far more gorse and scrub nowadays and you think there are fewer birds and flowers than when you were a child. You're very pleased that Conwy Countryside Service are trying to conserve the wildlife and may be prepared to help them. You like seeing sheep in the countryside but you're worried about the site being fenced as you've got arthritis and can't climb stiles and the open feel of the site is very important to you. You don't like all the dog mess on Mynydd Marian nowadays.

Local Farmer

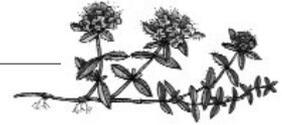
You are interested in having some fresh grazing for your sheep in the autumn and winter to give your own fields a rest. However, you are worried that out of control dogs will worry the sheep, especially when they are pregnant and during lambing. Walkers or local children may leave gates open so the sheep wander onto the roads. The cliff edge may have to be fenced to stop the sheep falling over and you worry that climbers may damage the new fences along the cliff-top. Checking on the sheep may be a problem as you don't live beside Mynydd Marian.

Rock climbers

You drive to Mynydd Marian whenever you've got time to climb on the cliffs at Castle Quarry. You're not too concerned about the grazing (apart from the risk of sheep falling down the cliffs) as long as your access to the cliffs for climbing continues to be unrestricted. The positioning of fences and stiles may be important to you to ensure that you can easily walk back down to your car after a climb.

Welsh Water Officer

You drive up in your Landrover to check the reservoirs every month or when there is a particular problem. Having to open gates will slow you down and you are worried that the lambs may be able to get through your fences onto the reservoirs.



Teachers' Notes: Foodchains

Background notes: Ecosystems

Glossary of terms:

Habitat – the home for a living thing that provides everything it needs.

Community – the collection of plants and animals that share a habitat.

Ecosystem - all the plants and animals living in one community and the interrelationships between them and their environment.

Within each ecosystem there are PRODUCERS, green plants, who make their own energy by photosynthesis; CONSUMERS, animals, who get their energy by eating other plants or animals and DECOMPOSERS such as fungi and bacteria who get their energy by breaking down dead and decaying plants and animals.

Simple feeding relationships within an ecosystem are called FOOD CHAINS. They usually start with a green plant, the 'producer' of energy.

for example: oak leaf ----> caterpillar ----> blue tit ----> sparrowhawk

Energy is lost at each level in the chain as each organism respire to release the energy it needs to live, so only the portion that is stored in plant or animal tissue can be passed onto the next level. A blue tit needs to eat many caterpillars to get the energy it requires to survive. Hence the organisms at the beginning of a food chain are usually very numerous while the animals at the end of the chain are often fewer in number. Food chains are an oversimplified way of showing the energy flow through an ecosystem as, in reality, sparrowhawks may eat many other kinds of food as well as blue tits. This more complex pattern of feeding relationships is known as a food web.

What's on the Menu Today?

This sheet explains the main terms associated with food chains and give examples from each habitat. It should be done before 'Mynydd Marian Food Chains' as it gives the food preferences of many of the illustrated species. Stress the use of arrows to show the direction of energy flow through the food chain.

Mynydd Marian Food Chains

This classroom activity gets children to cut and paste pictures of the animals and plants to make simple food chains. Photocopy extra sheets in case a pupil wants to use the same creature twice (you'll need lots of extra suns for the beginning of each chain or ask the children to draw them). Build up the first food chain with the whole class and then encourage them to make others (some may find this hard so have some examples ready to prompt them).

More able or older pupils could use the pictures to build up a more complex food web or they could be asked to find other animals in the same habitat to make new chains or add to their chains. Younger or less able children could be given a shortened information sheet with fewer pictures or you could use the pictures to make some chains with gaps in them for the children to fill in.

Equipment: Scissors, glue, paper, photocopied sheets (and spares)

Mynydd Marian Butterflies

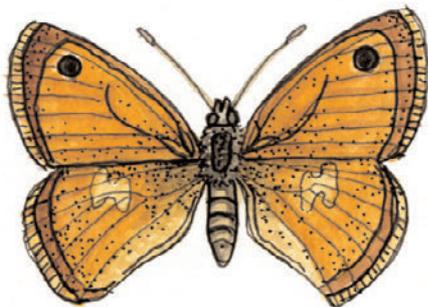
Six-spot burnet moth



32mm



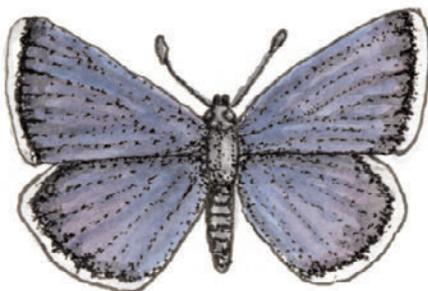
Small heath



34mm



Common blue

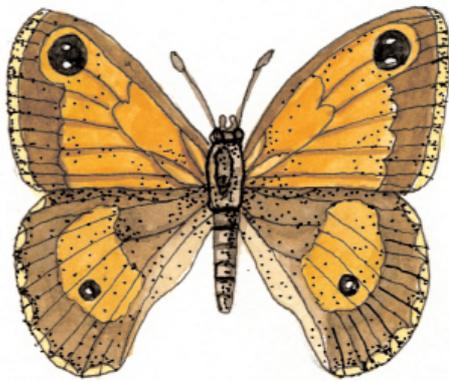


35mm



Mynydd Marian Butterflies

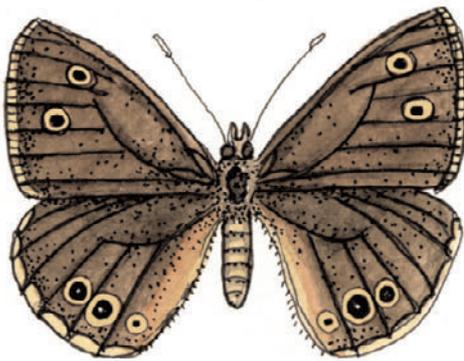
Gatekeeper



40-47mm



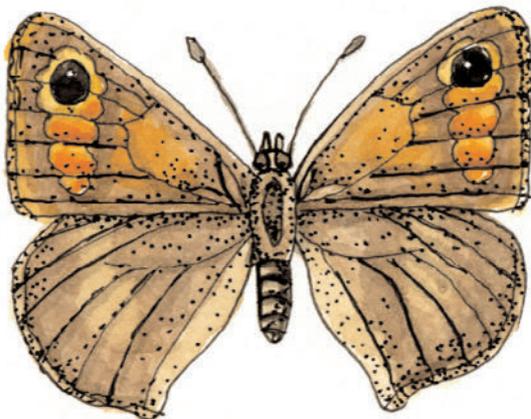
Ringlet



48mm



Meadow brown

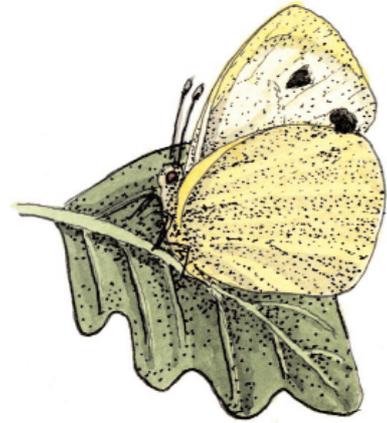
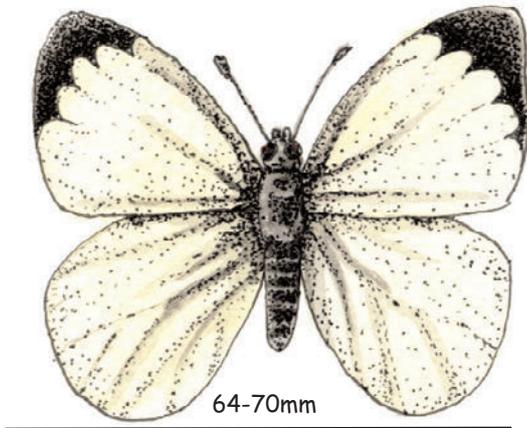


50-55mm

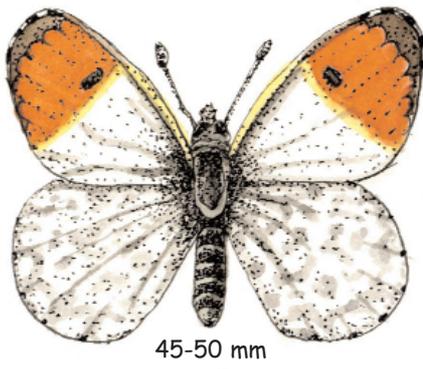


Mynydd Marian Butterflies

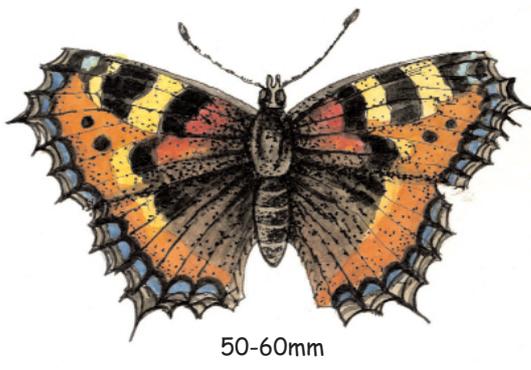
Large white



Orange tip



Small tortoiseshell



Mynydd Marian Butterflies

Painted lady



64-70mm



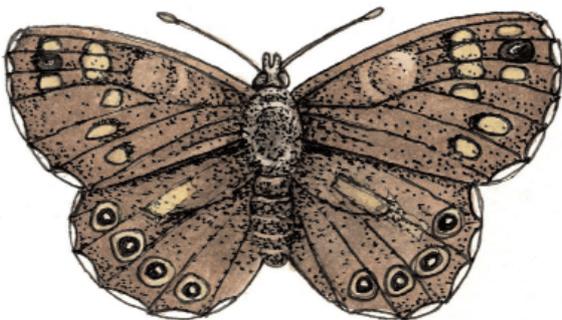
Red admiral



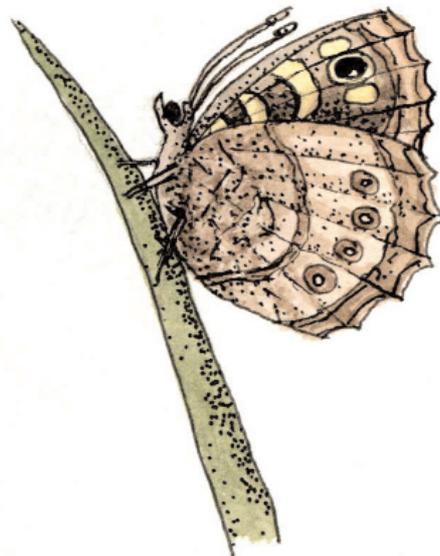
67-72mm



Speckled wood



47-50mm



Mynydd Marian Butterfly Key



1. Is it black with bright red spots? Yes: It's a Six-spot Burnet Moth
No: Go to 2

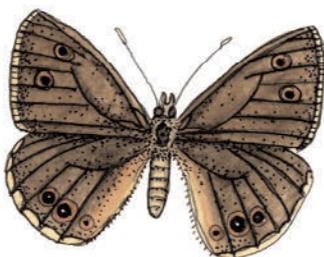
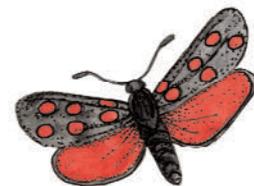
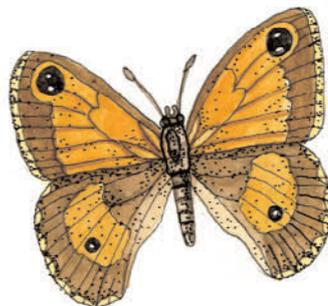
2. Is it small and blue? Yes : It's a Common Blue
No: Go to 3

3. Is it small and orange-brown? Yes: It's a Small Heath
No: Got to 4

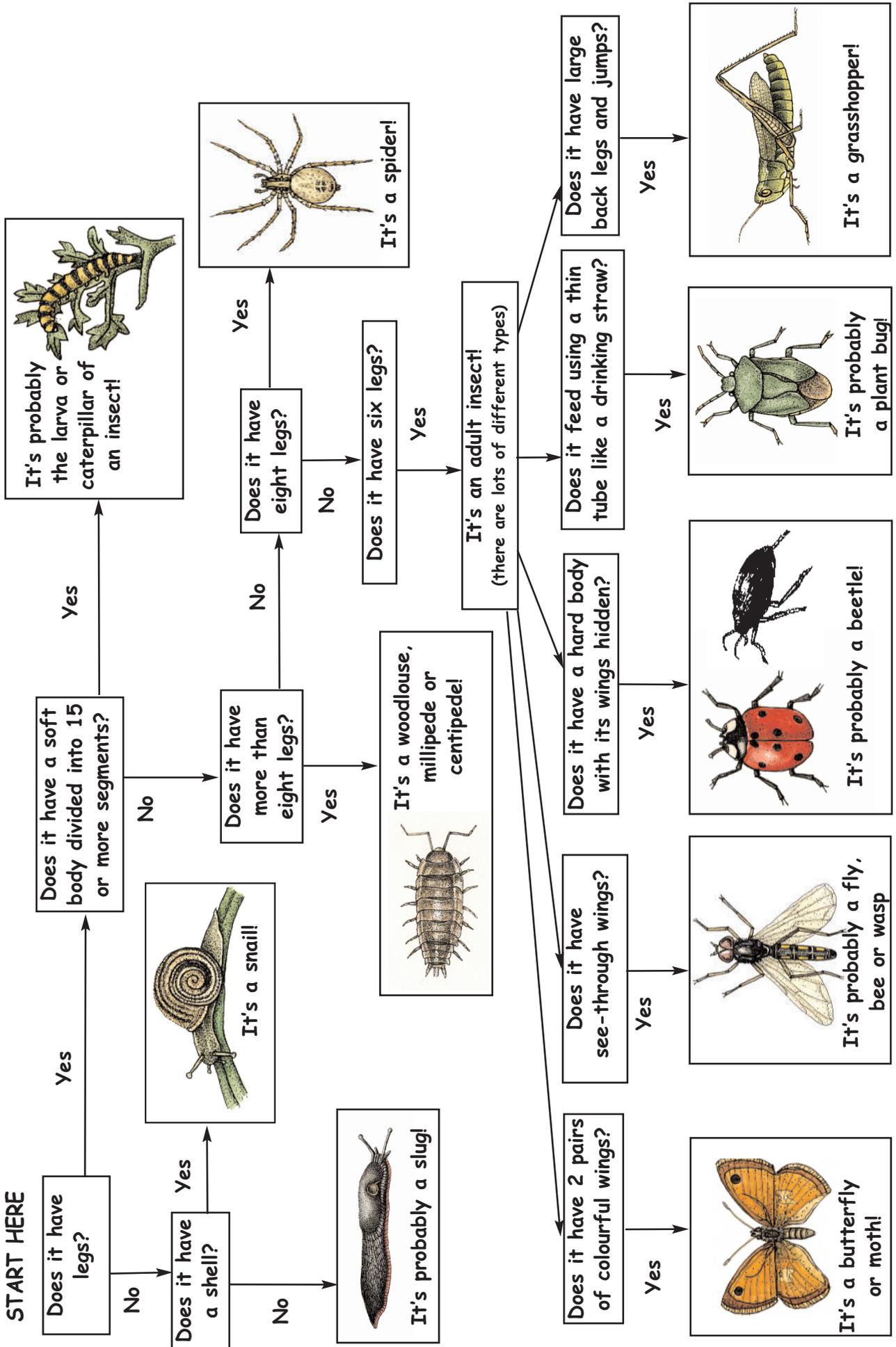
4. Is it mainly orange with a black spot? Yes: It's a Gatekeeper
No: Go to 5

5. Is it dark brown with some small pale dots at the wing edges? Yes: It's a Ringlet
No: Go to 6

6. Is it large and dull brown with orange patches? Yes: It's a Meadow Brown
No: It's one of the less common butterflies

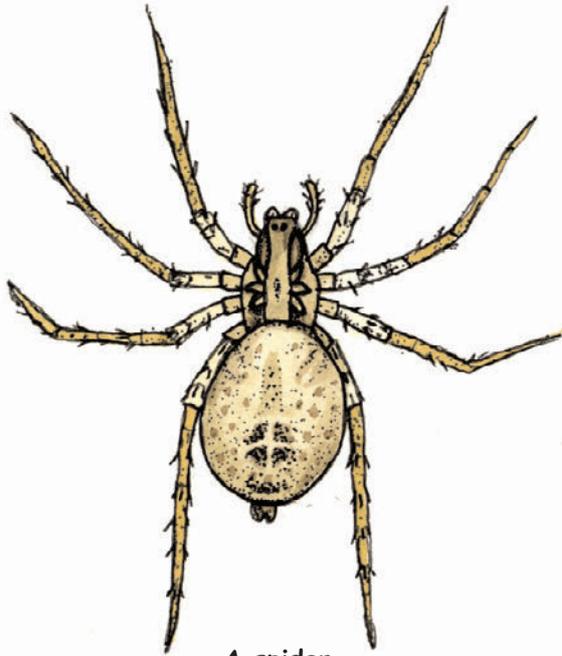


What's your grassland minibeast?



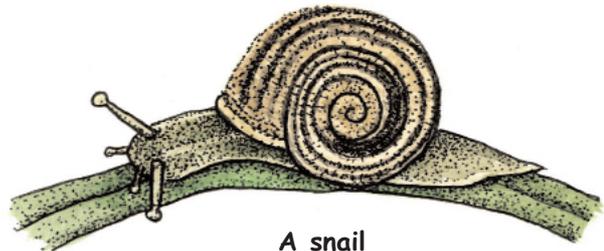
Mynydd Marian Common Minibeasts

These pictures are not to scale. You may find bigger or smaller creatures at Mynydd Marian.



A spider

There are many different types.
This one is a buzzing spider.



A snail

There are many different types.
This one is a banded snail.

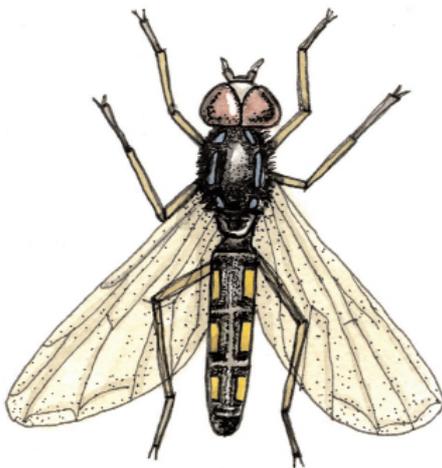


A caterpillar

There are many different types. This
one is a cinnabar moth caterpillar.

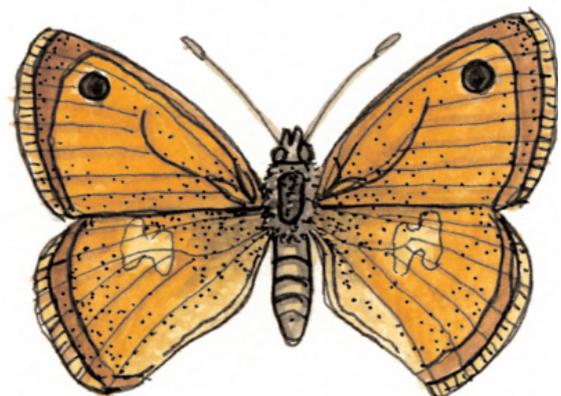


Black slug



A fly

There are many different types.
This one is a hover fly.



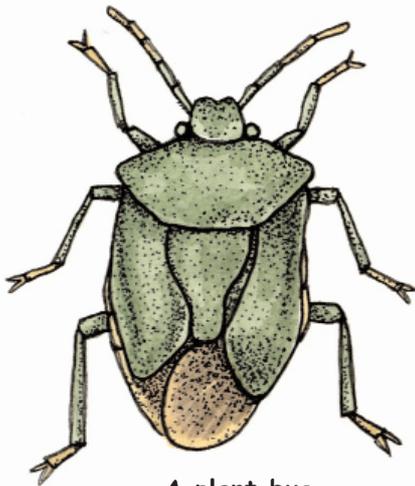
A butterfly

There are many different types. This one
is a small heath.

Mynydd Marian Common Minibeasts

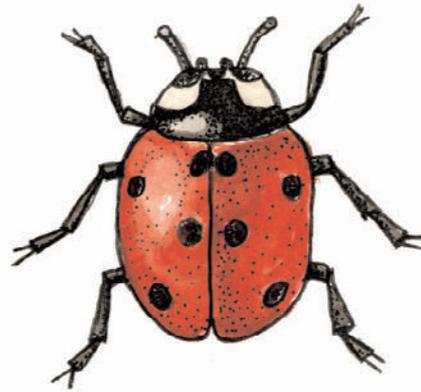


A meadow grasshopper



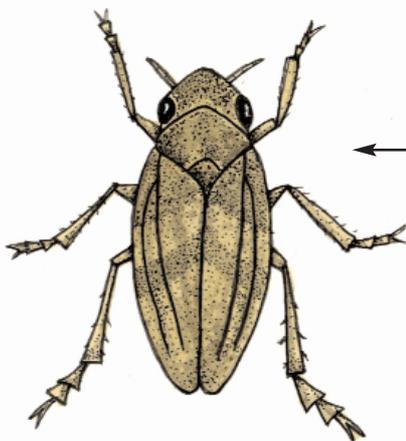
A plant bug

There are many different types.
This one is a green shield bug.



A beetle

There are many different types.
This one is a ladybird.



A froghopper
(another bug)



Cuckoo spit
(contains young froghoppers)



Mynydd Marian Minibeast Survey



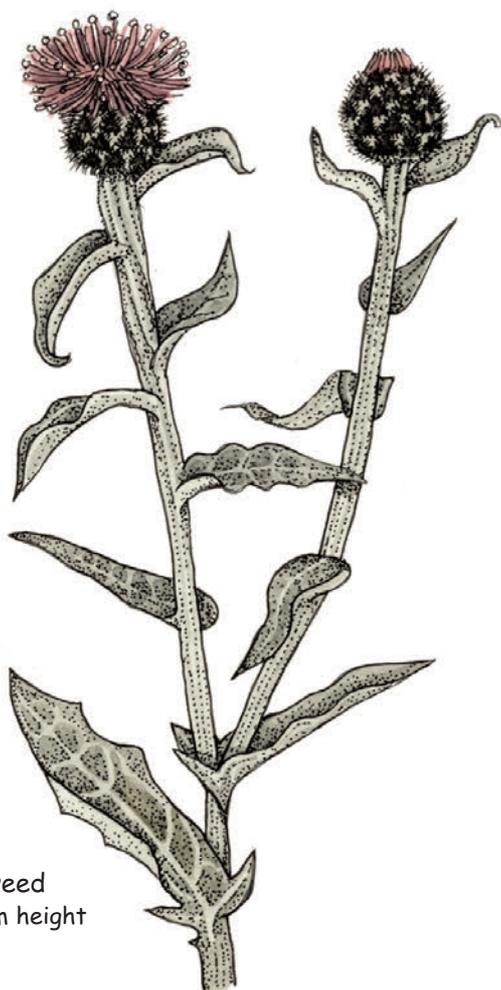
date:

weather:

Name of minibeast	numbers seen
butterfly or moth	
grasshopper	
froghopper or cuckoo spit	
ladybird or other beetle	
bee, wasp or hover fly	
spider	
slug	
snail	
plant bug	
caterpillar	
woodlouse	
Other	



Common Flowers at Mynydd Marian



Knapweed
up to 50cm height



Early purple orchid
up to 50cm height



Carline thistle
up to 20cm height



Common rockrose
up to 25cm height

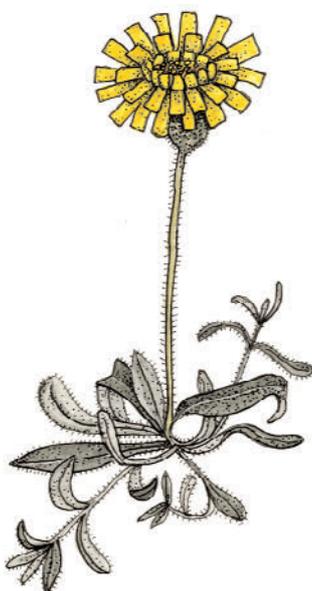
Common Flowers at Mynydd Marian



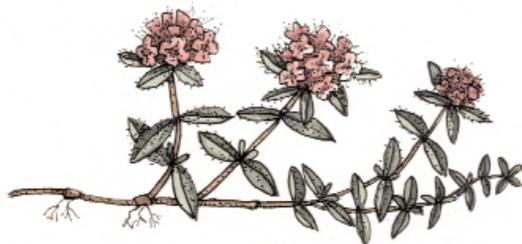
Common spotted orchid
up to 50cm height



Bird's-foot-trefoil
up to 35cm height but usually lower growing



Mouse-ear hawkweed
up to 25cm height

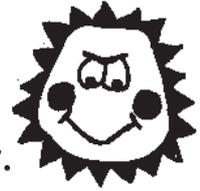


Wild thyme
up to 5cm height



Salad burnet
up to 30cm height

WHAT'S ON THE MENU TODAY?

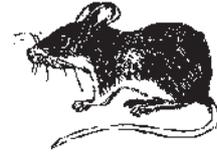


GREEN PLANTS are **PRODUCERS** who make their own food using the sun's energy.

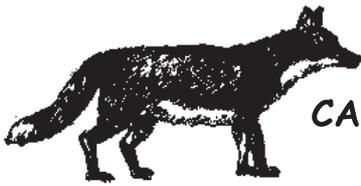
ANIMALS are **CONSUMERS** who get their energy by eating plants or other animals.

There are 3 groups of Consumers:

HERBIVORES *who eat plants*



CARNIVORES *who eat other animals*



OMNIVORES *who eat both plants and other animals*

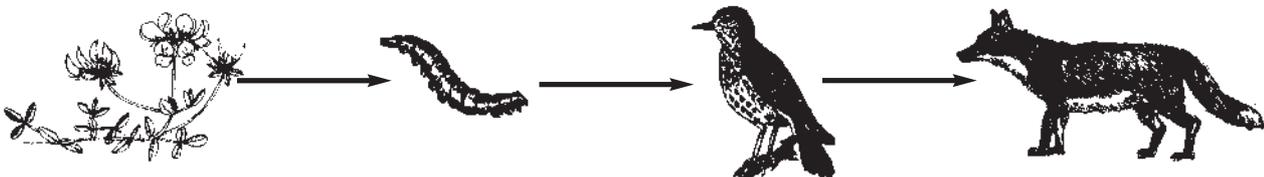


*Here are the preferred foods of some of the local animals.
Are they carnivores, herbivores or omnivores?*

fox	mice, voles, shrews, rabbits, birds, insects
buzzard	birds, rabbits, mice, voles, shrews
rabbit	grasses and other plants
mouse	nuts, seeds and berries
kestrel	mice, voles, shrews, small birds, beetles, worms, lizards
badger	worms, frogs, mice, fruits, caterpillars, beetles
plant bug	juices from plant stems
slug	leaves and fruits
ground beetle	worms, slugs and insects
thrush	snails, slugs, insects and berries
common lizard	spiders and insects
common blue butterfly	
adult	nectar from flowers
caterpillar	bird's foot trefoil leaves

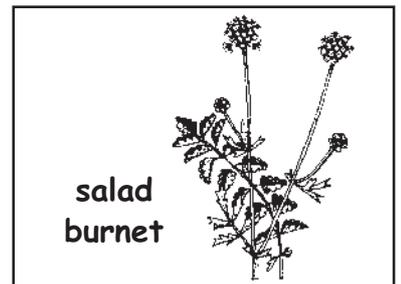
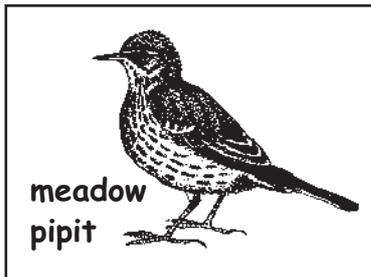
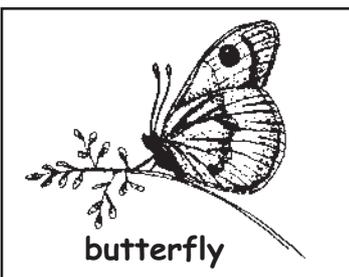
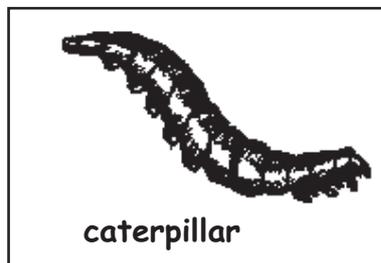
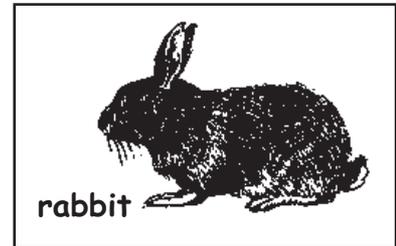
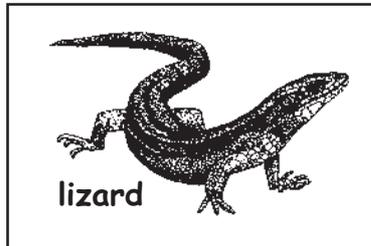
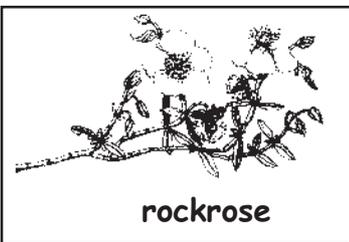
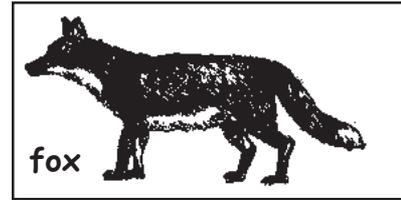
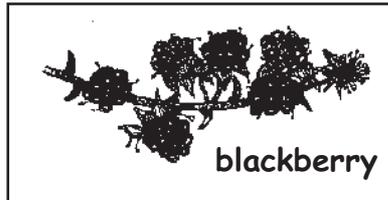
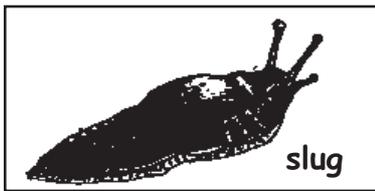
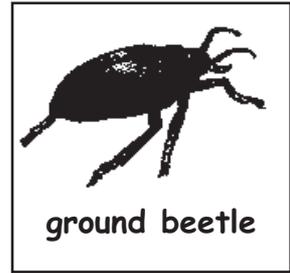
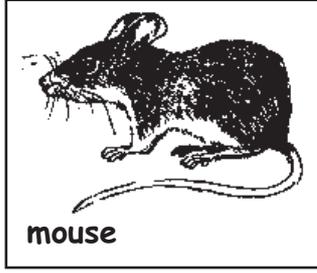
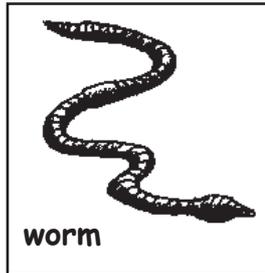
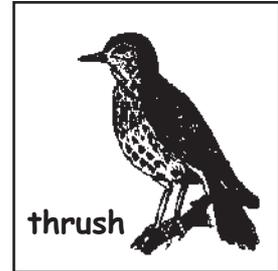
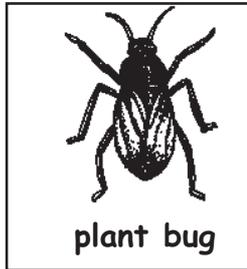
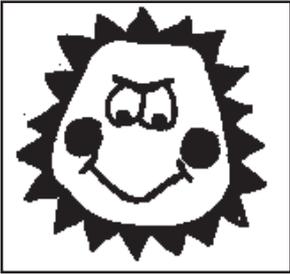
*The feeding relationship between plants and animals in the same habitat is called a **FOOD CHAIN**.*

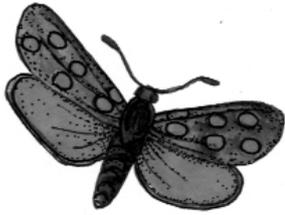
trefoil is eaten by a **caterpillar** which is eaten by a **thrush** which is eaten by a **fox** (the arrows show the direction of energy flow)



Mynydd Marian Food Chains

Cut out the plants and animals from the sheet and see how many food chains you can make. Use arrows to link the chains to show the direction of energy flow.





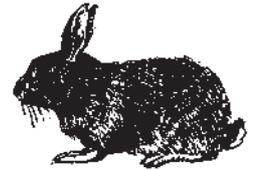
Mynydd Marian Quiz



1. What was Telegraph House used for?.....
2. What year was it built? (Clue: look for the plaque on the wall).....
3. Look for fossils in the limestone boulders or the stone wall and draw some below.

4. What is stored in the underground reservoirs on top of the hill?

5. What animals are eating the grass and how do you know this?



.....

6. What do you like best about Mynydd Marian?.....

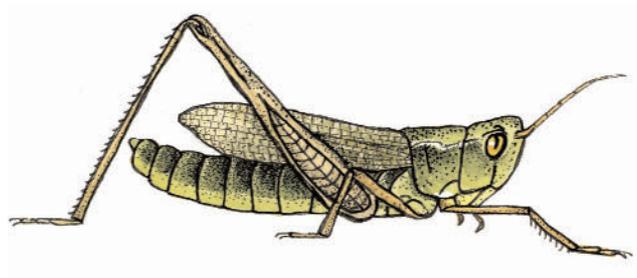
7. What do you like least about Mynydd Marian?.....

8. What can you do to look after Mynydd Marian? (Clue: look at the panel)

.....

Draw some of the flowers and insects you have seen today.

For further information about Mynydd Marian Local Nature Reserve or for help and advice on using this pack please contact the Countryside Warden on 01492 575200 or e-mail cg.cs@conwy.gov.uk



Written by Lorna Jenner, designed by William Smuts, illustrated by Wendi Williams-Shiel
With thanks to: Gill Taylor-Williams and local teachers who advised on the pack contents.