Churchtown Farm Community Nature Reserve Education Pack

Cornwall

Introduction...

Welcome to the Churchtown Farm Community Nature Reserve education pack! This pack has been compiled to act as a resource for teachers and group leaders to facilitate the use of this fantastic nature reserve for educational purposes. We hope that by using this pack the full potential of the nature reserve as an outdoor classroom, and a place to enjoy nature, can be realised!

Churchtown Farm Community Nature Reserve...

The Cornwall Wildlife Trust's Churchtown Farm Community Nature Reserve is an important place both for people and wildlife. The Reserve has a wide variety of different wildlife habitats, mostly hay meadows with arable fields, woodland, wetland, scrub, rocky shoreline, mudflats and an extensive network of hedgerows. There is a rich history of quarrying, farming and nautical activities and the site's two quarries and the headland running around the west and south shores of the reserve are County Geological Sites. From the reserve there are extensive views over the River Lynher, the River Tamar and beyond to Devonport and Plymouth. Its location on the edge of Saltash makes it an ideal place for people to escape for a bit of peace and quiet.

The 60 hectare (150 acre) site falls within the Tamar Valley Area of Outstanding Natural Beauty, and the estuary foreshore lies alongside the Tamar Estuary candidate Special Area of Conservation (cSAC), a designation of international significance. As a nature reserve with this kind of protection, this site will be safeguarded for its resident wildlife and its visiting public!

Putting the *Community* in Nature Reserve...

One of the most important things about this site is that local people are involved in deciding what happens here, and in getting things done. Through the Friends of Churchtown Farm Community Nature Reserve, local people are guiding the development of the site and contributing to practical tasks, guided walks, wildlife monitoring, wardening and all manner of other areas of the Reserve's life. In January 2003 a Community Facilitator was employed to ensure the full potential of the Community Nature Reserve Project is realised. This two - year project has been funded by The Countryside Agency through the Aggregates Levy Sustainability Fund and The Heritage Lottery through a Heritage grant.

Dormouse
Muscardinus avellanarius

Cornwall Wildlife Trust - an introduction...

The Cornwall Wildlife Trust, founded in 1962, is a registered charity and part of a national network of 47 other Wildlife Trusts. Our aim is to protect Cornwall's countryside and wildlife for the benefit of existing and future generations. The Trust has 10,000 members and plays a vital role in advising the general public, landowners and other conservation organisations on all aspects of nature conservation.

Nature Reserves...

One of the key ways in which Cornwall Wildlife Trust goes about its work of protecting the countryside and wildlife is by managing nature reserves which we either own or lease. Currently the Reserves Section of the Trust manages 52 nature reserves across the county, totalling some 1,789 hectares (4,422 acres), 0.5% of the total area of Cornwall. Hundreds of species of flora and fauna and many different habitats including woodlands, wetlands, marshes, moorland, heathland, grasslands, estuarine mudflats and agricultural land are protected within the nature reserves.

Work on the reserves is carried out by a small team of staff, with the support of hundreds of volunteers! Voluntary wardens patrol the reserves reporting any damage, monitoring species numbers and changes, carrying out practical tasks and leading guided walks. These volunteers are an invaluable part of our team and we could not function without them.

For more information...
For more information on Cornwall Wildlife Trust, or information on becoming a volunteer contact us on 01872 273939.

Practicalities...

Visiting nature reserves- General guidelines...
Whenever you visit a nature reserve there are a few key things to remember:

- Do not disturb wild animals, birds or flowers or take anything away (although blackberries are acceptable!),
- Take your litter home and do not leave anything on the reserve,
- Keep to the paths, tracks and waymarked trails,
- Leave all gates as you find them,
- Keep dogs under strict control and clean up after them at all times.

Cornwall Wildlife Trust can not accept any responsibility for any loss, injury, damage, however caused, which may be sustained while visiting any of its nature reserves.

Restrictions...
Most of the reserve is open for quiet recreation and enjoyment of nature. Horses, bicycles, motor vehicles and camping are not permitted on the reserve. It is particularly popular with dog walkers and to balance the need for space to exercise dogs with the need to improve habitats for wildlife some areas of the Reserve have restrictions, some permanent and some seasonal.

Permanent restrictions:
Areas with permanent restrictions are those with a high conservation value, where it is desirable to minimise disturbance to wildlife. The areas marked PR on the map are places where dogs must be kept on a lead at all times.

Seasonal restrictions:
Areas with seasonal restrictions are places that may attract ground-nesting birds such as skylarks, which would be disturbed by wandering people and dogs. Restrictions in these areas will apply during bird nesting season. The areas marked SR on the map are areas where dogs must be kept on a lead from 1st March until 30th September and visitors are asked to keep to the paths.

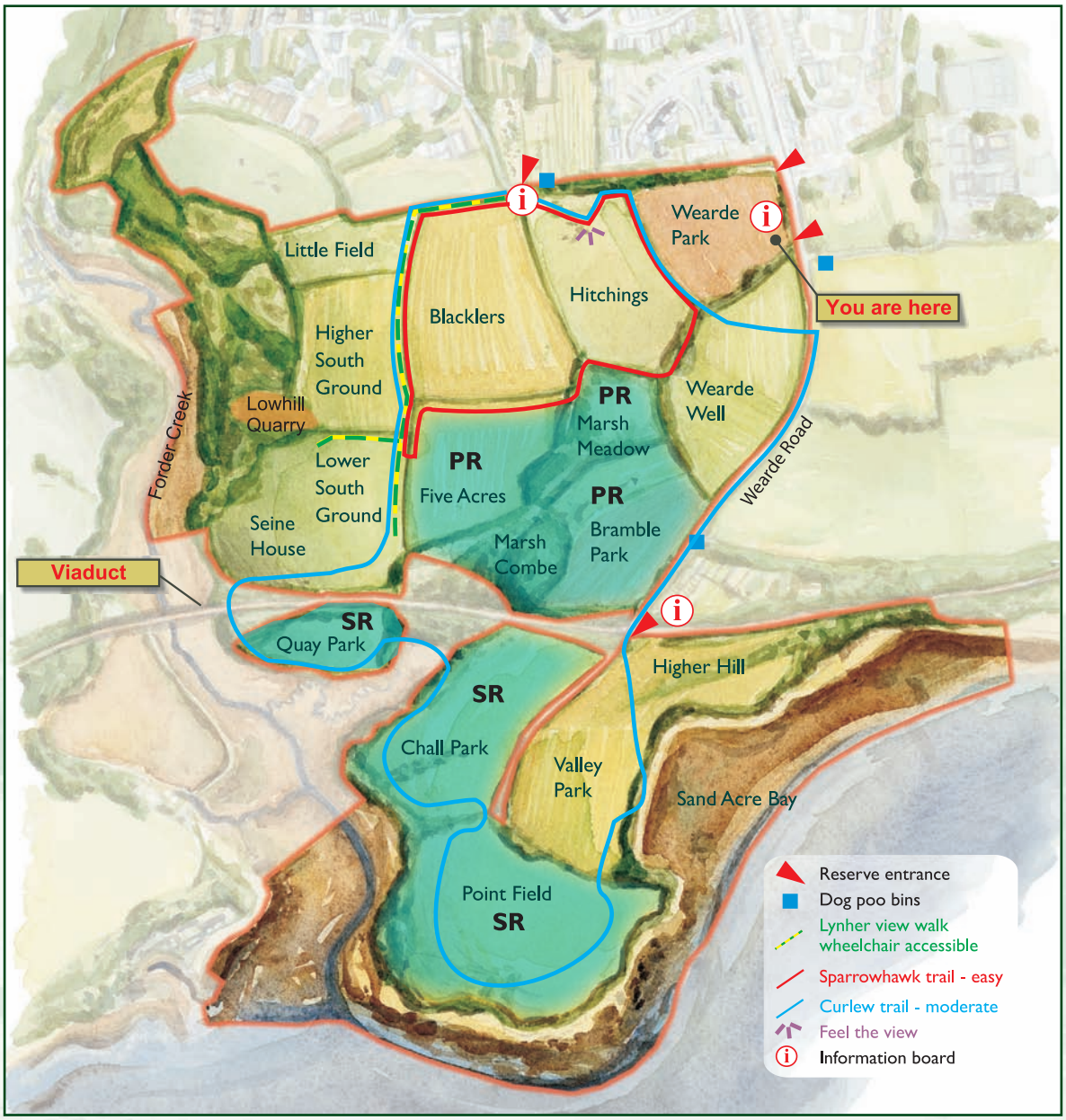
Facilities...
Facilities at Churchtown Farm are limited, there are no shelters, toilets or hand-washing facilities on the reserve. The nearest public toilets are on St Stephens Road, opposite the Church.

There is an East Cornwall Reserves Manager, covering Churchtown Farm based in the area who can provide advice, information and education support if required.

Access around the site is by a network of informal footpaths and there are two waymarked circular trails (see map). The terrain is sometimes steep, and the paths can be slippery and uneven. For more information see the website www.cornwallwildlifetrust.org.uk/involved/churchtown.htm or the Access leaflet, available by contacting Cornwall Wildlife Trust on 01872 273939.

Equipment and Clothing...
Uneven terrain and bad weather are the most important factors to consider when dressing for a trip to Churchtown Farm Community Nature Reserve (CNR).

- Footwear should be robust with a good grip, as paths are generally grassy and can get slippery when wet,
- Wet weather clothing should be considered,
- A spare layer is recommended as it can take longer than you think to walk back to the road if you're cold!
- A first aid kit should be carried for group visits.



Access...

There is open access across most of the Reserve and special waymarked trails have been created for everyone to enjoy.

The main access point is behind St Stephens Church. However, the circular trails can be joined anywhere along their route. The walks described form a Nature and Heritage trail - around their lengths you will find panels and interactive features with information on the site's wildlife and heritage.

Lynher View Walk - 500m (0.3 miles), approx 25 minutes
This is a wheelchair accessible route in two stages with varying gradients. The path has a hard, even surface. The first stretch descends a moderate gradient. After 200m on the right hand side is a viewing area and seating.

Otter
Lutra lutra

The path leads on to another viewing area further down. Although still wheelchair accessible this section is steeper and the return journey involves a climb back up. There is a rest area and passing place half-way along. To return by wheelchair from the bottom, reverse the route you've just taken.

The Curlew Trail - 3km (1.9 miles), approx 1hr 20 mins, or via the quarry - 3.5km (2.2 miles) approx 1hr 35 mins
This is the longest trail, of moderate difficulty, and takes in a wide variety of terrain including steep inclines, muddy patches and uneven path surfaces finishing with a lengthy climb back to the top.

The Sparrowhawk Trail - 1.3km (0.8 miles), approx 30 mins
This medium length circular walk of little difficulty has moderate gradients with a short climb at the end. The walking surface is mostly smooth, although some parts may be muddy and slippery.

Feel the View…
A tactile panel, with Braille text, describes the wonderful view from this point. It can be accessed directly by walking through the kissing gate behind the Church and heading out into the field at an angle.

Bird Hunt…
Way marker posts around the Reserve can provide a permanent reminder of birds found here. There are eight pictures to rub - take some paper and a crayon and see if you can take rubbings from the full set!

How to get there...

Churchtown Farm CNR is located on the southern border of Saltash in the parish of St Stephens on foot or bicycle.

By Bus...
Bus service 33a from Fore Sreet Saltash stops in St Stephens Road. From here it is a short walk to the Cecil Arms pub and up Farm Lane to the reserve.

By Car/Coach...
From Carkeel roundabout on the A38, follow Callington Road straight over the roundabout and straight on at the traffic lights. Then turn right at the mini roundabout by the fire station into Church Road, following signs to St Stephens. Follow Church Road past Saltash College and straight over the mini-roundabout.

For the entrance to the reserve behind St Stephens Church turn right at the T-junction to St Stephens Road and park in front of Church. Follow the road around to the Cecil Arms Pub and walk left up Farm Lane past the cemetery. The entrance to the reserve is at the end of this lane.
For the Wearde Road entrance, turn left at the T- junction to St Stephens Road. Take the second turning right into Wearde Road. Continue down the hill past the left turn to Saltash Community School. Entrance to reserve is down a small track, on the sharp left hand bend by the allotments.

Parking is limited! Coaches should park on the entrance road to the Community School, off Wearde Road. There is limited car parking at the entrance to the reserve on the corner of Wearde Road.

On Foot...
From Fore Street in the centre of town, walk to the top of high street and turn left into St Stephens Road. Continue along St Stephens Road and turn left into Wearde Road. Continue down Wearde Road and the reserve is opposite Wearde Farm.

Risk Assessment

Health and safety for visitors...
A site register is included in this pack which highlights hazards particular to Churchtown Farm Community Nature Reserve, along with precautions. It also provides additional information which is helpful in planning emergency procedures. We recommend that teachers and leaders carry out a health and safety visit before arriving with a group, to identify any further hazards and consider the needs of their particular group. They should then prepare and implement their own risk assessment.

- The site holds a few small streams and a small area of open water and visitors are advised to wash their hands with soap and water or sterilising wipes after contact with this water due to the slight risk of Weil's disease. Cuts and small abrasions should be covered before contact with any water.

- The rivers Tamar and Lynher and Forder Creek flow past the reserve. They can flow rapidly and have tidal currents. Low tide exposes deep mud, which no one should attempt to cross without first preparing and implementing a suitable risk assessment.

- The site is heavily used by dog walkers and as such care should be taken to reduce the risk of contact with dog mess.

- Paths can become slippery when wet and surfaces are often uneven.

Responsibility lies with the teacher/adult in charge of the group, who must remain with them at all times.

SITE REGISTER...

SITE:	Churchtown Farm Community Nature Reserve
ASSESSMENT DATE	January 2011 ASSESSED BY Peter Kent
EMERGENCY INFORMATION: - use this information when dialling the emergency services.	
If someone is injured, dial 999 and ask for an ambulance IMMEDIATELY.	
The nearest public telephone is:	In Cecil Arms Public House
Mobile phone reception:	Good over most of the site

Tell the emergency services where you are:

You are at - Churchtown Farm which is located off of Wearde Road, opposite the entrance to Saltash Community School.

The Grid Reference of the entrance of the site is: SX417 582; This is reached by following Farm Lane from the Cecil Arms Pub up and around the edge of St Stephens Church to the back of the cemetery. SX419 575; This is reached by continuing 400 yards past the entrance to Saltash Community School down Wearde Road to a sharp left hand corner where there is a small entrance to the reserve.

Tell the emergency services the nature of the accident, how many people involved and return to the scene of the accident to await their arrival.

Location of nearest casualty department (or doctor for remote sites):
Minor Injuries Unit ; St Barnabas Hospital, Higher Port View, Saltash 01752 843101
24 hour Accident and emergency ; Derriford Hospital, Plymouth, Devon 01752 777111

SITE SPECIFIC (including access which maybe across land not owned or leased by CWT) HAZARDS AND PRECAUTIONS:

HAZARD Potential for harm	PRECAUTIONS To remove hazard, reduce risk level
1 Slippery and uneven ground	Care should be taken when working on uneven and sloping terrain. Many of the paths become slippery when wet and some of the paths are rocky and very uneven.
2 Soft Mud	During low tide much intertidal habitat is exposed. Participants should not enter the muddy areas and should keep to the highest watermark when crossing the beaches.
3 Rubbish	Rubbish, including rusty metal objects and glass, will be present on the beaches and in Lowhill Quarry. Extra care should be taken working in these areas.
4 Quarry	There are two quarries on site, Lowhill in particular is very deep and has vertical faces. Both are dangerous and great care should be taken when working close to them. Children should be supervised at all times in this area.
5 Dog Excrement	Participants should where possible avoid working in areas of high dog excrement (i.e. the main footpaths) and ensure that hands are washed immediately after contact, before eating food and at the end of work.
6 Livestock	Participants should ensure that their work does not interfere with livestock.

OTHER INFORMATION: Contact East Cornwall Reserves Manager, Cornwall Wildlife Trust, Five Acres, Allet, Truro TR4 9DJ Tel: 01872 273939 / 07866 430086(mobile).
Reserves Manager, Cornwall Wildlife Trust, Five Acres, Allet, Truro. TR4 9DJ. 01872 273939 / 07970 281879 (mobile).

Site Designations...

The reserve lies in the Tamar Valley Area of Outstanding Natural Beauty. An area of outstanding natural beauty (AONB) is designated for its landscape and scenic beauty. This means that an AONB is not necessarily an area of high nature conservation value, but in practice it often includes many areas that are. AONBs and National Parks are actually of equal importance for landscape and scenic beauty; the difference is that National Park Authorities exist and have special powers to conserve and enhance National Parks. With a few exceptions, no such authorities or powers exist for AONBs at the moment. AONBs are designated by the Countryside Agency in England. The designation usually covers a wide area and many types and uses of land.

The mudflats at Churchtown Farm are adjacent to the Plymouth Sound and Estuaries candidate Special Area of Conservation. Special Areas of Conservation (SACs) are designated under the EC Habitats Directive providing protection for certain key species and habitat types. Candidate SACs (cSACs) are afforded the same legal protection as a SAC.

Churchtown Farm has areas that are County Geological Sites. These are sites of at least county importance for geology and/or geomorphology. They are identified by the Cornwall RIGS (Regionally Important Geological/Geomorphological Sites) group and selected using scientific, historical, educational and aesthetic criteria. They are shown on local plans and are given a greater protection with respect to development.

Wildlife and Amenity...

Churchtown Farm CNR is an important amenity for hundreds of local residents. While the other CWT nature reserves are managed primarily for the benefit of wildlife, at Churchtown Farm the management is about achieving a balance between human amenity and habitat conservation. People come to Churchtown Farm for all kinds of reasons: to walk their dogs, to walk themselves, to picnic, to fish, to barbeque, to ride motorbikes, to camp, to admire the view, to drink alcohol, to learn, to have bonfires and to enjoy nature. Clearly not all of these aspects are desirable and some need to be controlled to prevent damage.

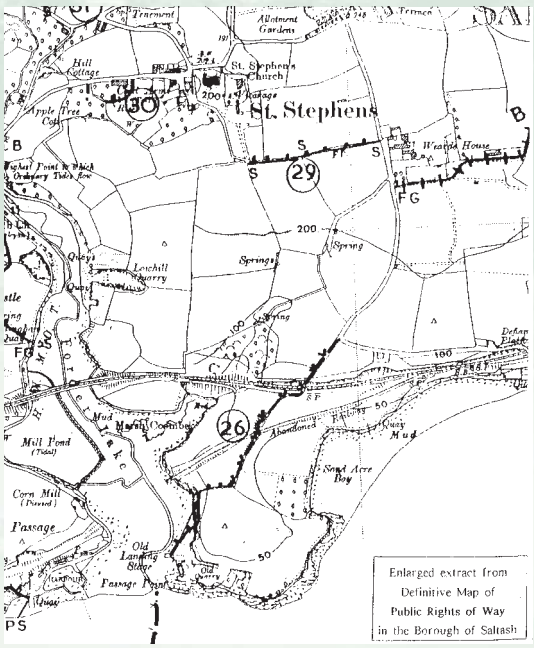
The philosophy at Churchtown Farm CNR is that we want people to come along and enjoy what the site has to offer, without reducing its value for wildlife or for other visitors. In addition to this, we want visitors to learn something about their native wildlife and countryside and leave with a better understanding and sense of value for nature. Part of this process is to educate people about how to enjoy the countryside without damaging it. Most issues which need attention relate back to common sense and the basic rules outlined above and culprits often simply need a bit of basic education to encourage them to change their behaviour.

History of Churchtown Farm...

Prehistoric implements such as flints have been found at Churchtown. They are from the Mesolithic Period (10,000- 4,000 BC) when people were hunter-gatherers, the Neolithic period (4,000- 2,400 BC) that saw the start of agriculture and animal domestication and the Bronze Age (2,400- 600 BC). It is possible that there was a Bronze Age settlement in the vicinity. The flints in particular are evidence that there was farming in parts of the Nature Reserve in prehistoric times.

The place-name was first documented in 1188, by the Bishop of Exeter who referred to it as Chircheton, in matters relating to the church that owned the land. Every rural parish church had an area of land attached to it, to provide the parson with a livelihood.

The current name 'Churchtown Farm' arose 93 years ago, when two tenements with farmsteads were amalgamated with the site.



The Dock Dung Story:
For 200 years 'Dock Dung' was delivered by sailing barge to quays throughout the Tamar and Lynher estuaries and their branches. It was then carted to farms and market gardens for spreading on the land. At Churchtown there was a quay adjoining Higher Hill field, Wearde Farm and possibly another in the bay at Marsh Coombe.

Dock Dung is actually the sweepings from the streets of Plymouth Dock, renamed Devonport in 1824. Sweepings were rich in organic matter from the horse-drawn carriages. Dock Dung trade died out as motor traffic increased.

Interesting objects lost or discarded in the streets were contained in the dung and consequently were and still are recovered from fields in the Tamar and Lynher valleys.

Land uses at Churchtown:

1. A passenger ferry would dock at Point Field and Passenger Hill in medieval times, going to and coming from Saltash. See old field names map.
2. Quarries have been worked for building and road stone that were then loaded on to sailing barges and larger vessels at the quays.

In the southwest corner of Point Field building stone was quarried from 1868 for public works projects in London. The quarry was abandoned circa 1900.

A road stone quarry was started in Lower Hill circa 1890, and ceased working circa 1915.

3. In 1859 Cornwall Railway opened. The line cut through Higher Hill, Valley Park and Chall Park fields and was carried over the mouth of the Forder Creek on a timber-trestle viaduct. In 1908 the line was converted to double track and realigned between Wearde and a point east of St Germans.

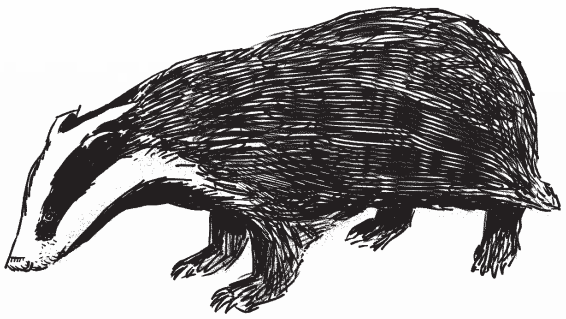
Habitats at Churchtown Farm...

What is a habitat?

A habitat is a home for wildlife, and different wildlife likes different homes. A woodland is a habitat, and so is a grassland, and there are different types of woodland and grassland. Things which make habitats differ from each other include location, climate and geology. For example a wet field in a limestone valley is going to have different plants to a field on a steep granite hill. The rocks affect the soil, the drainage and the wind affects the plant growth and the different plants affect the animals which can live there. Another major factor in creating different habitats is man's influence. The habitats we'll be looking at on Churchtown Farm are easy to tell apart, and they're all affected by management, or man's influence.

Farming for Wildlife…
Churchtown Farm Community Nature Reserve is farmed in a way which reflects old-fashioned Cornish farming methods, benefiting wildlife in many ways. All of the land in Cornwall, in fact very nearly all of the land in Britain, has been affected by man's influence over thousands of years. The countryside we often tend to think of as being natural is actually the product of cutting, grazing, planting and nurturing - usually for agriculture. This has been going on for so long that Britain's wildlife has adapted to it and become associated with the different habitats man has created. Heathland, for example, is the product of grazing and burning - if this stopped, trees would begin to grow and form a woodland.

Woodlands have been managed for many centuries to provide a source of fuel and timber. An ancient woodland would have had its trees selectively harvested, and often its trees would have been continually coppiced - cut back to ground level to encourage vigorous young growth, used for anything from broomsticks to charcoal. What we see now in ancient woodlands is the result of this management. Historically, Churchtown was farmed for dairy and arable production. Until relatively recently, around 50 years ago, farming in this way had been more or less unchanged for centuries. However, over the last 50 years things have moved towards intensification, using modern technology to make the land ever-more productive for commercial farmers. Under intensification most of the fields have been re-seeded with highly productive grass mixtures, maintained by regular applications of chemical fertilisers and heavy grazing. Arable fields have been made far more efficient producers with the application of pesticides and herbicides, killing off anything which may compete with the crop. This intensive management has artificially increased the soil nutrients and encouraged fields with a very limited range of plant species, just neat, uniform grass. In such fields there is very little insect, animal or bird life. The arable fields here had also been left uncultivated for a time, allowing them to become overgrown with scrubby vegetation.



Badger
Meles meles

In an attempt to encourage wildlife back to the farm we will use a number of less intensive management techniques aimed at reducing the soil nutrient levels and increasing the number of plant species - this means more wildlife throughout the food web! Below are summaries of the different habitats found at Churchtown Farm Community Nature Reserve, the management we are carrying out and the wildlife you might expect to find in them. This wildlife might include:

- Flora (flowering plants, ferns, mosses, lichens and trees)
- Fauna: Mammals (hairy skin, have lungs, warm-blooded, feed young on milk)
- Amphibians (moist skin, no scales, cold-blooded, lay eggs in jelly)
- Reptiles (dry, scaly skin, cold-blooded, lay eggs in leathery shells)
- Invertebrates (creepy crawlies!). No backbone, have a protective 'exoskeleton'.
- Birds (skin covered in feathers, warm-blooded, lays eggs with shell)

Arable Fields…

There are three fields on the Reserve which have been sown with arable crops. This has twin benefits for wildlife. Firstly, under intensive management, arable fields would have been repeatedly sprayed with herbicides and pesticides to kill off unwanted competitors to the growing crops. This means that arable weeds, once common within arable fields, have declined dramatically throughout the UK. These plants thrive on the repeated pattern of disturbance, once the fields are ploughed, with the bare soil to grow on. It is because they compete with the crops for light and nutrients that they get controlled. The seeds of these plants can survive in the soil for a long time. Because at Churchtown Farm we are not using any herbicides or pesticides, a number of rare plants have been found on the arable fields, growing back from the seeds of their ancestors.

Secondly, these fields are important for birds. Modern methods of harvesting crops are very efficient, removing almost all of the corn, oats or barley seeds. In the past though, inefficient methods of harvesting would have led to plenty of seeds being spilled - ideal for birds to eat over winter. With the modern methods, the reduction in winter food has been matched by a reduction in once-common farmland birds, which are also left with less insects to feed on because of the pesticide spraying! Our crops at Churchtown Farm will be left for the birds, to keep them fed over the winter months when there's less food around.

Arable management…

Three fields at Churchtown Farm will be managed for arable weeds and birds. Either crops will be sown repeatedly, chosen to provide the maximum food for wildlife, or the ground will just be ploughed up and left for the summer to allow the arable weeds to flourish. A mixture of kale and quinoa has been tried. The kale provides cover for birds, and the quinoa holds thousands of seeds for food. This crop is left in for a full two years.

Peacock
Inachis io

Wildlife to look out for...

Beautiful flocks of goldfinches, with the yellow flashes on their wings and red faces, can be seen feeding on the seed left over winter. Skulking around the margins of the fields you may be lucky enough to see a fox, or look out for their grey furry droppings around the field edges. Some plants which have shown up in the arable fields include the now rare cornflower, the poppy, the pink/purple common ramping fumitory and the green sun spurge. Recently surveyed, one of the arable fields alone contained 63 different species of plants! During summer the fields are buzzing with all kinds of different flying insects, particularly hoverflies. The bare soil present in arable fields provides an ideal basking site for lizards, one of the few reptiles you may find on Churchtown Farm CNR. These cold-blooded animals lie in the sun to gain energy from the sun's warmth.

Hay Meadows...

A meadow is basically a field where the grass is grown to be cut for winter animal feed. There has been a huge decline in hay meadow habitats nationally - over 95% of traditional hay meadows which existed in Britain before the war have been lost mainly due to intensive farming practices - and this is reflected in Cornwall. Many of our native wildflowers thrive in soils with low nutrient levels, and many of our butterflies and other insects thrive by feeding on nectar from these wildflowers. The low nutrient levels often found in traditional hay meadows meant that many British fields would have been the colourful, fascinating places which we now want at Churchtown Farm. There you would find many different plants, all growing, going to seed then being cut and made into hay to feed animals over winter. Many of those seeds are still there in the soil, lying dormant waiting for the right conditions to let them grow. At Churchtown Farm we want our meadows to be wildlife oases, swarming with butterflies and exploding with colourful plants. This is a slow process requiring patience - see if you can notice the change at Churchtown over the coming years….

Meadow Management…
Most of the fields at Churchtown Farm haven't been meadows for some time. They've been pastures, fields used for the grazing of animals. To achieve our vision of wildflower-rich meadows, we are allowing the grass to grow long then in late July cutting it and leaving it to dry. This hay is then turned to encourage the seeds to drop and then it's taken away for animal fodder. This process will gradually deprive the soil of nutrients, allowing the wildflowers to compete with the dominant rye grass, eventually leading to more diversity. After they have been cut, some of these fields will also be grazed with cattle to encourage grasses to grow at different lengths.

Wildlife to look out for...
In summer the meadows are alive with meadow brown butterflies. Some days as you walk through they seem to fly up from everywhere! A plant to look for is the yellow flowered birds-foot trefoil, or bacon and eggs as it is sometimes called. This is a food plant for many invertebrates. As the meadow management becomes effective there will be many more flowers to look for. See if you can spot a lady's smock! High above in summer you will see many swifts zooming around - swifts have the fastest flight in a straight line of any bird in Britain, as their name would suggest. Swallows will be flying around closer to the ground looking for flying insects to eat. Sometimes they fly so low you think they may hit the ground! Scurrying around in the long grass you might see field voles or common shrews, or you may find evidence that they've been there - little bits of grass munched off at an angle, or droppings. There's a rumour that a barn owl has been seen hunting these fields in the dusk.....

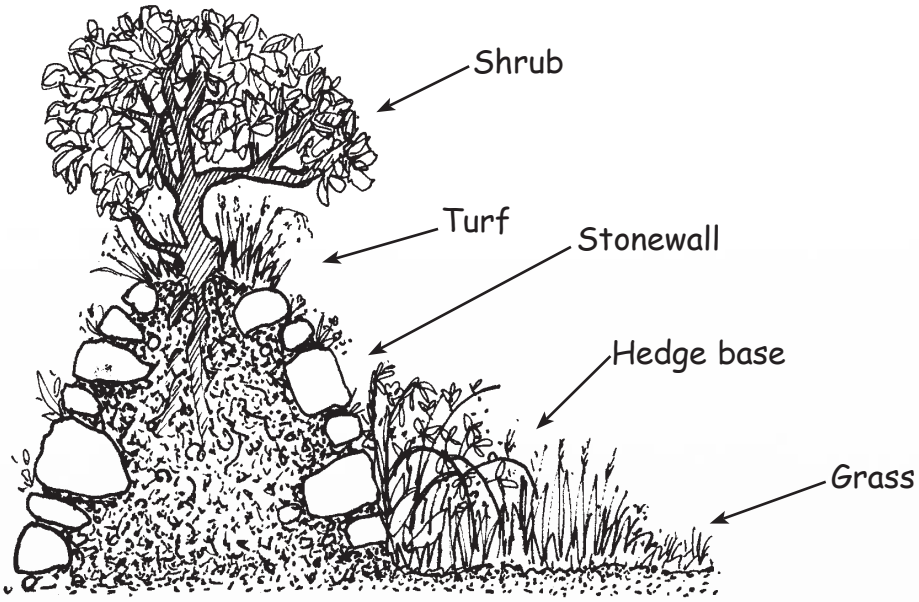
Hedgerows...

Cornish hedges are unique to Cornwall and are a characteristic feature of Churchtown Farm. You only have to cross the Tamar to see that the hedges in Devon and up the rest of the country are different. In Cornwall the term "hedge" usually means a double wall with earth in between and turf and shrubs on top. There are approximately 6 miles of hedgerows in Churchtown Farm alone! These are man-made features, designed to prevent livestock from escaping and to mark the limits between parishes, manors, farms or counties. Those hedges used as field boundaries are usually more recently built as a direct result of the Enclosures Act. The hedgerows at Churchtown Farm have been in place since before 1884 (see historic map) and have changed little since then.

Hedgerows are very important areas for wildlife and are often the richest habitats on modern farms. Bigger machines in farming have led to a desire for bigger fields. As a result of this many miles of hedgerows in Britain have been removed. Thankfully hedges now have legal protection, so the rate of destruction has been slowed.

Hedges act as biological corridors linking one area of the countryside to another, enabling plants, mammals, insects and other wildlife to spread and travel from one site to another - a bit like a wildlife motorway. The structure of a hedgerow plays an important part in attracting and holding wildlife. So hedgerows are homes for wildlife - providing food and shelter for many animals, not just a corridor to other places. Almost every Cornish hedge including those at Churchtown Farm can be divided into five sections: SHRUB LAYER, TURF LAYER, STONE WALL, HEDGEBASE AND GRASSLAYER.

Hedge profile



Shrub Layer is everything growing on top of the Turf Layer. These shrubs and trees provide food, shelter and nesting sites for a variety of birds, mammals and invertebrates.

Below the Shrub Layer, at the top of the stone wall is the Turf Layer where grasses, wild flowers, mosses and lichens find shelter under the shrubs and again provide food, shelter and nesting materials for a wide diversity of wildlife. Below the Turf Layer is the main component of the Cornish Hedge, a thick earth-filled stone wall. These stone walls provide a unique climate and are often covered in mosses, lichens, ferns and small plants. Where stones may have slipped out of the hedge leaving holes, small mammals will move in, often excavating a network of tunnels along the wall.

The lowest level of hedgerows is called the Hedge base and Grass layer. Rabbits and badgers regularly make their homes at the hedge base, burrowing into the wall and excavating an extensive network of tunnels sheltered by the vegetation growing there. Flowers and various grasses often find shelter within the Grass Layer, which if left uncut will be one of the most natural habitats on a farm. At Churchtown Farm a two metre strip around the base of all the hedgerows will be left uncut to allow an undisturbed wildlife refuge.

Hedgerow Management….
Hedgerows that are neglected and left unmanaged will slowly degrade and become of less value for wildlife. Over the years some of the hedgerows at Churchtown Farm have been neglected. The results are hedges with numerous gaps and trees which grow tall, become top heavy and pull the stonework out of place. Our management will enhance their wildlife value by reinstating the stone work. We will also be coppicing and laying, which means cutting the shrubby vegetation back to ground level to encourage vigorous young growth, making thick, bushy, stock-proof boundaries ideal for nesting birds.

Wildlife to look out for...
Flowers in the hedges from spring to autumn will include red campion and herb robert, two colourful pink flowers. Tufted vetch is a summer plant you'll see, with its purple pea-like flowers and small leaves. In autumn the hedges can yield a good crop of blackberries, the fruits of the spiky bramble. The Cornish elm is one of the more common hedgerow trees on the site. Almost all of the mature elms in Britain have been wiped out by Dutch elm disease. The disease results from a fungus which is carried by a beetle. For the beetle to burrow into the bark, the tree has to be of a certain age - usually around 14 years. This is why we have many healthy looking, but young elms around. Other shrubs include blackthorn, dogrose, hawthorn, hazel, ash and sycamore. You may see signs of badgers around the hedges, large holes surrounded by trampled grass and large dark droppings. Examining hazelnut shells could reveal evidence of bank voles, squirrels or even dormice - a nationally rare mouse! We haven't found any signs of these mice, but you never know! The tiny, but noisy wren can be seen nipping in and out of the hedges, and if you're lucky you'll see a sparrowhawk flying at lightning speeds and doing acrobatics along the hedge . These birds of prey hunt along hedges, scaring small birds up into their talons. They will then pluck and eat their catch, or feed to their young.

Mudflats…

The importance of the mudflats is recognised by the candidate Special Area of Conservation designation. Mud flats are caused by an accumulation of silt washed down by rivers over hundreds of years. The ebbing and flowing of the tides cover these areas, and although they appear barren they are full of animals that live buried under the surface. Estuarine mudflats like this are highly productive ecosystems providing a great deal of food for resident and migratory birds, as well as for fish and crustaceans that forage for food with the flooding tide.

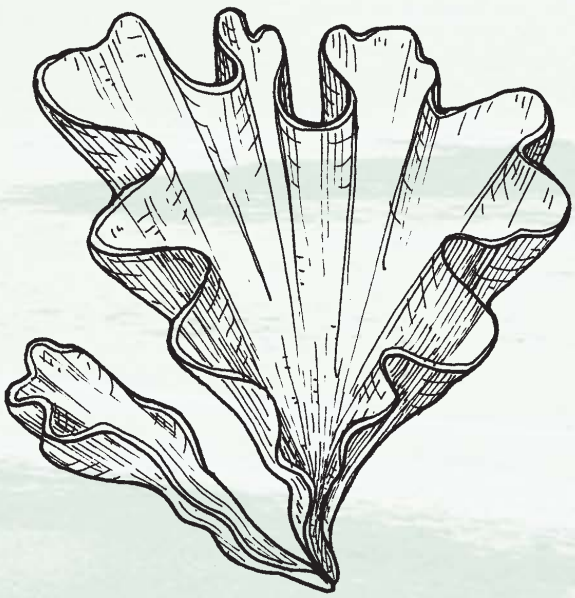
Mud Flat Management…

The plants and animals of mud flats can be badly affected by marine pollution. Preventing marine pollution is a complicated issue, involving many different people over a large area. The Cornwall Wildlife Trust is involved in different projects working with different partners to reduce pollution. Industry and agriculture around the estuary have to make sure they minimize the amount of pollutants they release, but individuals have to take responsibility too. You can do your bit to reduce the amount of pollutants that get into the streams and rivers around the estuary by using fewer chemicals in your garden and taking care to dispose of engine oil and other chemicals at a recognized site. This way we can all make a difference. Regular recording of the types and numbers of species found in the mud can provide a good indication of environmental quality. Also, over a long period of time, the prolonged accumulation of silt can actually rise above all but the highest tides. The result will be a salt marsh habitat - an area of specialised salt tolerant plants, usually above water but occasionally flooded on high tides. Monitoring indicator plants will give us an idea of areas where this is likely to happen.

Oystercatcher
Haematopus ostralegus

Wildlife to look out for...

A winter visit to the mudflats will regularly reward you with views of wildfowl and waders such as little egrets, greenshank, redshank, oystercatchers and curlew, to mention just a few. The areas of mudflat in this part of the estuary are colonised by worms such as ragworms, and bivalve molluscs, for example peppery furrow shells which make a star-shaped marking on the surface of the mud when they are buried. At times on the flooding tide the estuary is gurgling to the gloopy sounds of grey mullet, thousands of them following the water for a fresh feed on the submerged mud. One plant indicator of developing salt marsh is sea purslane. There is a very small area of this under the viaduct.



Sea lettuce
Ulva lactuca

Tides...

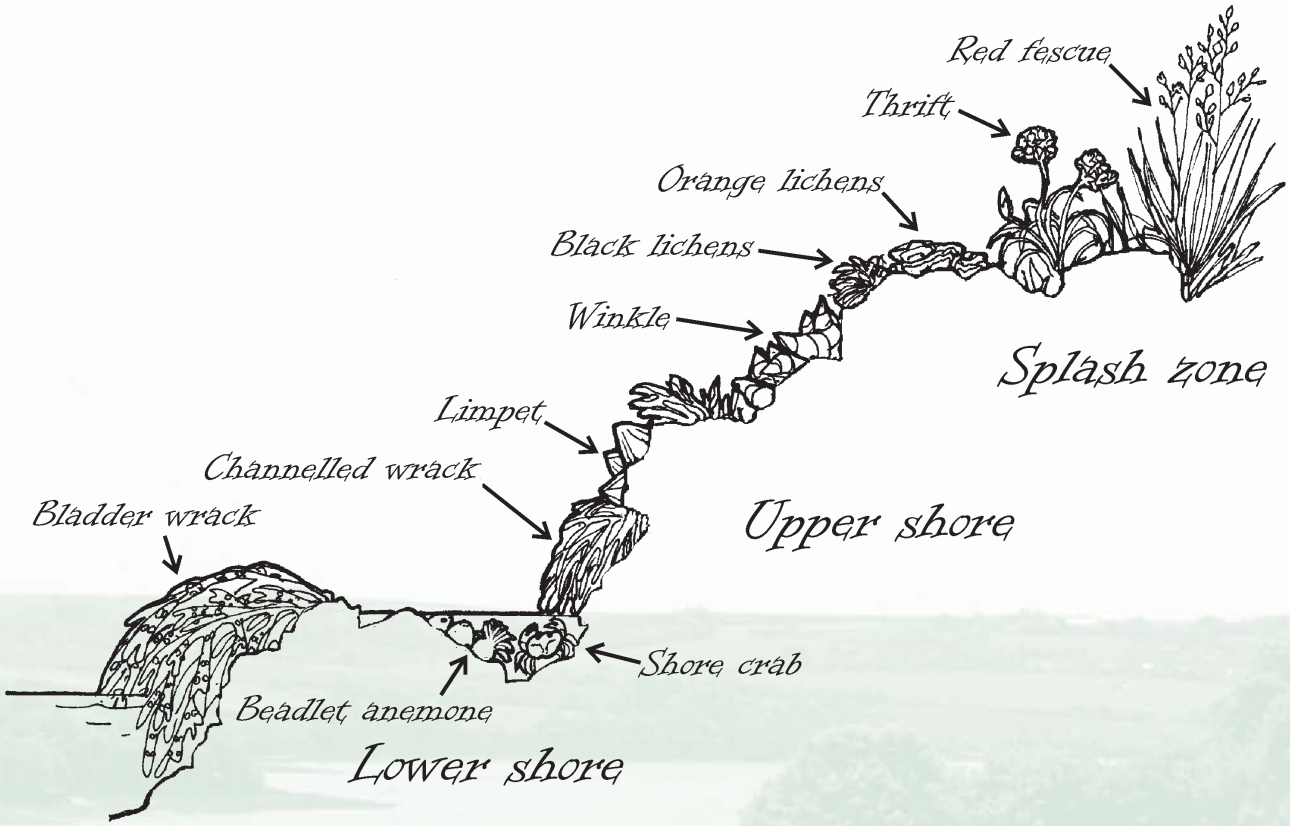
The ebb and flow of the tides is a constant, unceasing backdrop to Churchtown Farm CNR. No sooner have the waters completed the laborious plod to high tide than they begin to go back out again! Tides are caused by the gravitational pull of the moon and the sun. When the tide goes out, where does it go? Well, believe it or not, the moon's pull actually makes the sea bulge, so instead of following the curve of the earth, when the tide is out, the sea is pulled into a dome shape. It takes approximately 6 hours for the tide to go out, and approximately 6 hours for it to come back in. That means that in one full day we almost have 2 high tides and 2 low tides. Not quite though, because for every 12 hour cycle we need to add about 25 minutes to the time it takes, meaning that high and low tide times change every day. At high tide, look up the Lynher and think how much water is there. Then look at the narrow gap between Jupiter Point on the far bank and Passage Point at the end of point fields. From high to low tide, most of the water in the Lynher will be pulled out between this gap - think how strong the current must be!

Rocky Shoreline…

The sheltered headland running around the southern boundary of the reserve shows vegetation typical of that affected by the tides and salty environment. Colourful plants typical of the plants on shorelines all over Cornwall can be found scattered above the high tide mark on the low rocky cliffs. Water in this part of the estuary can be nearly as salty as the open sea, or completely fresh, depending on the state of the tide and the flow of the river. It is often a mixture of seawater and freshwater (called 'brackish' water). As you travel up the estuary you reach the limits of different species' ability to tolerate fresh water. Where different species stop occurring is called a 'Drop Out'.

Shoreline Management…

Management of the shoreline will involve regular litter picks and monitoring of the vegetation.



Wildlife to look out for...

Fresh water makes life difficult for the great majority of marine species, but the same common shore crab that lives on the open coast can be found under stones. At low tide on the southern shore of the headland, you can see 'zonation'. You can clearly see bands of species tolerant to different levels of submergence. Down low, an area of slippery bladder wrack seaweed can be found covering the rocks - this can withstand being submerged in salt water, and being exposed to air. Higher up, a band of lichens can withstand being submerged occasionally, and colourful plants above the high water mark such as red fescue and thrift with its light purple flowers can withstand the salt spray, but not submergence.

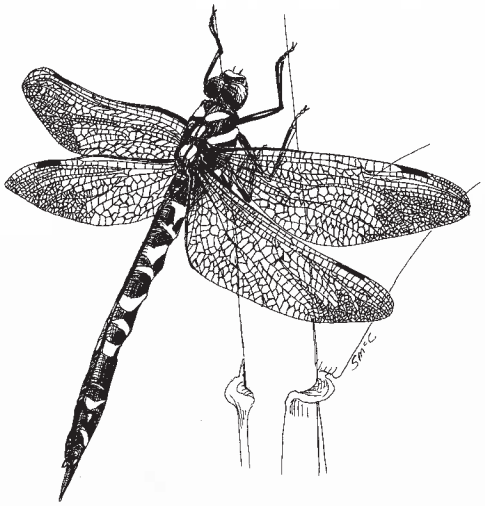
The number of open coast species increases as we progress seawards along the estuary. Seawards of the entrance to the River Lynher, red seaweeds appear for the first time and the common limpet begins to occur. Many species are typical of estuaries including the small branching seamat. There is evidence that one of our favourite mammals is a regular visitor to Churchtown Farm CNR - otter spraint has been found in a number of places on the shoreline. Spraint is a small scented dropping which an otter leaves to mark its territory. Finding spraint is a sure sign that an otter has visited within the last month!

Wetland and Pasture…

A couple of springs on the site have created a wetland habitat in the valley bottom. You can clearly see the different plants growing in the wet areas, and in summer you can see the swallows feasting on the insects that thrive there. Around the wetlands are more areas of grassland. These are some of the more interesting grassland habitats on the site. Because they are steep, they haven't been improved like many of the other fields, so there is a greater range of plants here, and in the summer months, lots of butterflies.

Wetland and Pasture Management….

To keep these areas healthy we are grazing them with cattle owned by a local farmer, a grazier, who is responsible for looking after them. This controls the plant growth, stopping scrubby vegetation like brambles taking over and improves the structure of the grasses, making a range of short grass and tussocks, good habitat for mammals! The cattle's hooves will disturb seeds hidden in the ground and provide areas of bare soil for seeds to settle - you never know what may turn up… We're also creating more wetland habitat by making scrapes. Scrapes are shallow pools, designed to be flooded most of the year, and for the water levels to go up and down. The mud that will be left by the retreating water is good for wildlife. The pools of water will provide homes for dragonfly larvae, frogs, toads and all kinds of invertebrates.



Golden ringed dragonfly
Cordulegaster boltonii

Wildlife to look out for...

The wetland is characterised by the presence of tussock sedges, soft rush and other wetland plant species such as hemp agrimony, marsh thistle and silverweed. Invertebrates which need wetlands to thrive include damselflies, dragonflies - you may see the huge golden ringed dragonfly. Once the scrapes are established we may get more frogs and common toads around. A common plant in the pasture is black knapweed, with its purple, thistly-looking flowers. This area is very good for butterflies which feed on the knapweed and other plants. Species seen here include the peacock, red admiral, painted lady, marbled white, small copper and clouded yellow. The black and red six-spot burnet moth can often be seen on summer days.

Woodland…

Churchtown Farm does not have much in the way of woodland, but what is does have adds diversity to the site - the largest patch is situated around the quarry. On entering the woodland area you instantly notice the difference in the cool, shady interior and the different types of plants growing here. Trees not only provide nesting sites for birds and food for birds and mammals but they also attract many other associated species. The oak tree for example can support over 450 species of insect.

Woodland management…

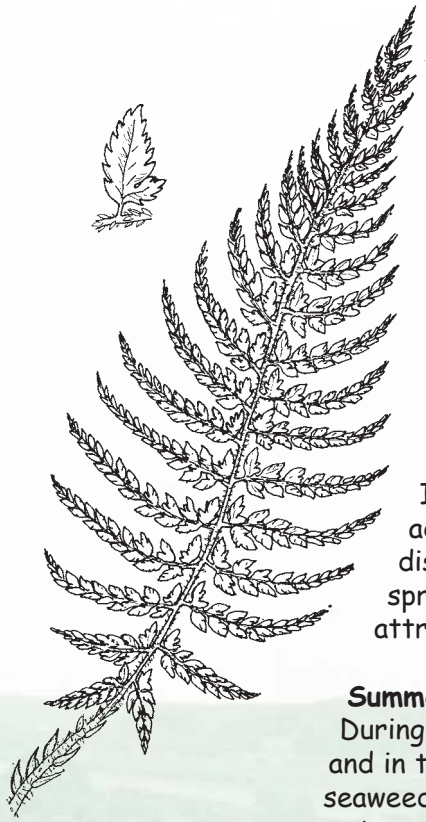
Management of the woodland will consist of putting up bird boxes and some thinning to allow the growth of a wider range of trees. There is also a small area of coppiced hazel in the wood. In the future, this may be coppiced again. This will involve cutting the hazel back to near ground-level and allowing it to grow back into bushy new shoots. This will benefit wildlife by allowing more light in, enabling more plants to grow.

Wildlife to look out for...

Trees in the woodland include oak, ash, wild cherry and sycamore. In the dark, cool atmosphere beneath the trees you'll find typical woodland plants such as bluebells, in spring, and wood anemone. Also look out for the stinking iris. Break off a small part of its leaf, crush it between your fingers and have a sniff. Remind you of roast beef? This environment is also good for all kinds of mosses and, in autumn, fungi. Can you see lots of lichen on the trees? An abundance of lichen is often an indicator of clean air! Bats will find their roosts in nearby buildings and trees- on a summer's evening the small bats zooming around feeding on insects are likely to be the tiny pipistrelle - about the size of the top part of an adults thumb. Perching in the tree tops you may see a buzzard. These large birds of prey can be seen wheeling high up all over the site, with their high-pitched piercing call. They're looking out for unsuspecting or sick rabbits.

Geology...

There are two County Geological Sites within the boundary of the reserve. Lowhill Quarry located on the western side of the reserve was worked up until 1915 for dolerite (greenstone), used in road building. Now the quarry has an important educational value, clearly showing where two types of rock meet: the dolerite, a volcanic rock which would once have been lava, has made an intrusion into the Wearde Sandstone. The narrow entrance to the quarry shows the exposure of the sandstone. The slates along the foreshore from the point fields are also designated because they contain fossils called ostracods, this rare presence of fossils allowing accurate dating of the rock.



Soft shield fern
Polystichum setiferum

Management...

Lowhill Quarry was used for many years as a dumping ground for all kinds of agricultural rubbish. This presented a danger to anybody entering the quarry, as well as being unsightly. The rubbish has now been removed and the area made safe.

Wildlife to look out for...

The quarry has a unique ambience being cool, dark, damp and sheltered, factors which allow the development of an impressive collection of ferns including hart's tongue, soft shield fern and common male fern.

Seasonal changes

Spring

In spring coastal plants such as sea thrift and sea campion burst into flower adorning the shoreline with colour! In the woodland there are magnificent displays of colour by the bluebells and primroses. Birds are most vocal in springtime too, with dawn choruses. The breeding season begins and birds sing to attract mates and mark out their territory.

Summer

During the summer months grasslands flower, providing abundant foraging for insects and in turn for bats that feed at dawn and dusk on the insects. There is an increase in seaweed and tree growth in the summer with the longer hours of sunshine. Tadpoles metamorphose to frogs and many mammals breed and bring up young during this season of abundant resources.

Autumn

The leaves on the trees change colour in autumn and fall, with the retreat of sap. The hedgerows are at their most productive, ripe with blackberries, sloe berries and rosehips.

Winter

Sea birds and waders can been seen in great flocks on the mudflats in winter. Otherwise it is a time of storing up energy; badgers sleep longer and dormice hibernate till the following spring.

Food chains

The fuel for all food chains comes from the sun. It is sunlight energy that allows plants to produce sugars by the process called photosynthesis. This energy is passed on to the herbivore when it eats the plant, and then on to the carnivore when it eats the herbivore. At each transfer a certain amount is lost through incomplete digestion, movement and heat loss. As the amount of energy available decreases from one level in the chain to the next, the amount of life that can be supported at each level also decreases. This can be seen by the abundance of plants (called producers) and still numerous, but less herbivores and the top carnivores which are much less numerous:

Grasses (Producer) → Grasshopper (Herbivore) → Robin (1st order carnivore) → Sparrowhawk (2nd order carnivore)

Monitoring and management

How do we know if it's working?

Monitoring and recording of the flora and fauna at Churchtown Farm CNR is an essential way of assessing whether our management is successful. We rely on visitors to report sightings to us, which we then record and keep on a list. This is one way of noting any new arrivals to the site. You can help with this by reporting any unusual sightings to CWT at the number above or to our website!

A botanist visits the site each summer to see which plants are present. Placing cruelty-free traps on the site can monitor the mammal population. These are usually placed in strategic places overnight and then checked in the morning to see what they have caught. The captives are then released back to the wild. A fixed point photography survey records changes in the site, by taking repeated photographs of the same parts of the site over a long period of time.

How can you help?

Everyone can do their little bit for nature conservation, it's as simple as picking up a piece of litter when you visit the reserve or telling someone to clear up their dogs mess. Or:

- You can become a member of the Wildlife Trust's Junior team the Fox Club, the money that you spend on the membership goes towards helping to save wildlife and habitats.

- You may be able to join in with one of the working groups that carry out conservation work on the reserve, it's fun, rewarding and you get to meet new people - contact Cornwall Wildlife Trust for more details!

- Look out for posters around the site advertising events, and you could come along with your parents and brothers or sisters.

- Gathering information and wildlife sightings is an important part of conservation. If you see something interesting you could report it to the Cornwall Wildlife Trust via our website!

- Become a member of the Friends of Churchtown Farm Community Nature Reserve

Activities...

No.	Subject	Key stage	Activity	On site
1	Woodland	2	Measuring the age of a tree	Yes
2	Woodland	2	Measuring the height of a tree	Yes
3	Woodland	1	Hug a tree	Yes
4	Animals and food chains	1, 2	Bat and moth	
5	Animals and food chains	2, 3	Animal consequences	
6	Animals and food chains	1, 2, 3	Web of life game	
7	Animals and food chains	1, 2	Marine food web game	
8	Habitats	2, 3	Compare two habitats: improved versus semi-improved grassland	Yes
9	Pollution	1, 2	Here today - gone tomorrow?	
10	Pollution	2	Wetland loss - water and cleaning surve	
11 11a	Identification	2	Make a key for identifying seaweeds Seaweeds	Yes
12 12a	Identification	2, 3 2, 3, 4	Watching birds and recording them Bird spotter sheet	Yes Yes
13	Identification	1, 2,3	The mammal detective	Yes
14	Creative	1	Ant's world view	Yes
15	Creative	1, 2	Soft shield fern - draw and write a poem	Yes
16	Creative	1, 2, 3	Design a nature reserve	
17	Monitoring	3, 4	Grassland	Yes
18	Monitoring	3, 4	Mudflats	Yes
19	General	2, 3, 4	Wildlife Quiz	Yes
20	General	1, 2	Scavenger hunt	Yes

WOODLAND ACTIVITIES

1

Measuring the age of a tree

Equipment
Measuring tape, paper, pencil

Introduction
Trees are some of the longest living of all plants. Trees help produce the oxygen we breathe. As they grow they become the habitat and source of food for many animals.

The activity
You can estimate the age of a tree by measuring the circumference of its trunk. Most trees in our country add an extra 2.5cm to their circumference every year.

- Measure the circumference of the trunk at 1.5 metres above ground
- Divide the circumference by 2.5 to give the approximate age

Links to the National Curriculum
Key Stage: 2

Science - Life processes and living things 3a, b and 5a

Maths - Number 1e, 4a, b, Space and measures 1a, d, 2a, 4a, c

Time
20 minutes

Ages
7-11

Dormouse
Muscardinus avellanarius

Measuring the height of a tree

Equipment
Measuring tape, paper, pencil, stick, friend

Introduction
Trees are the tallest plants in the world. Size allows them to tower above all other living things and get plenty of light. Available light and water and temperature affect plant growth. Plants need light to provide food for growth, and leaves are an important part of this process.

The activity
To estimate the height of a tree:

- Measure your friend's height and write it down
- Ask him or her to stand at the base of the tree
- With a pencil in one hand, hold out the stick at arm's length in the other hand, lining up the top with your friend's head. With the pencil, make a mark on the stick that lines up with his or her feet.
- Still standing in the same place, move the stick upwards so that the top lines up with the top of the tree.
- Make another mark on the stick, this time in line with the bottom of the tree.
- Can you work out the tree's height?

The two marks on the stick show how much taller the tree is than your friend. Suppose it is 10 times as tall, if your friend is 1.5m, the tree must be 15m tall.

Links to the National Curriculum
Key Stage: 2

Science - Life processes and living things 3a, b and 5a

Maths - Number 1e, 4a, b, Space and measures 1a, d, 2a, 4a, c

Time 20 minutes

Ages 7-11

A hazelnut showing characteristic signs of dormouse gnawing

Hug a tree

Equipment
Blindfolds

Introduction
Get familiar with trees!

The activity
Choose an area with trees, no brambles/holes/deep mud/nettles. Have the children in pairs/threes (or if younger, one adult per pair). One child wears the blindfold, the other(s) lead them by a circuitous route to a tree. The blindfolded child feels, smells, even tastes the tree till they think they really know it and all its shapes and features. They are then led away, their blindfold is removed and they find 'their' tree. Then the next child has a go. Keep going with different trees.

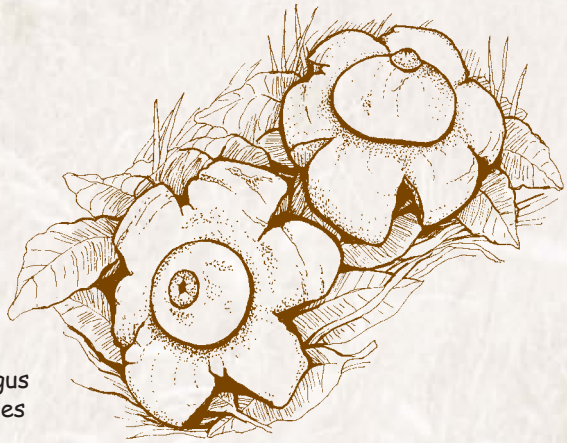
It is possible to talk about the parts of a tree (trunk/leaves/branch/roots), the life cycle and the things trees need to grow.

Links to the National Curriculum
Key Stage: 1

Science - Scientific enquiry 2b, f

Time
20 minutes

Ages
5-7



Earth star fungus
Geastrum species

ANIMALS AND FOOD CHAIN ACTIVITIES 4

Bat and moth

Equipment
At least one blindfold.

Introduction
How do bats locate their food? Echolocation. What do they eat? Often moths.

The activity
Stand the children in a circle. Choose one child to be the bat (the one who knew they use echolocation) and another child to be the moth (choose sensible children!). Blindfold the bat not the moth. The bat goes around saying "bat" and each time the moth must reply "moth". In this way echolocation can be done. The bat must tag the moth to eat it. The children must guide players back to the circle if they hit edges and not let them run out.

To make the game more realistic/harder you can introduce interference by getting the children in the circle to say "rain". You can then talk to the children about how insects find it hard to fly in the rain, and so fewer bats hunt in the rain.

The bat must keep saying "bat" or it becomes blind man's buff. The moth must reply immediately and loudly. If the game drags on and the bat is obviously not going to get the moth everyone should take a step in and decrease the size of the circle.

Links to the National Curriculum
Key Stages: 1 and 2

KS1 Science - Scientific enquiry 2b, e, Life processes and living things 1b, 2e, g, 5a, c

KS2 Science - Scientific enquiry 1a, 2d, Life processes and living things 5a, c

Time
30 minutes or longer

Ages
5-11

Heron
Ardea cinerea

ANIMALS AND FOOD CHAIN ACTIVITIES 5

Animal consequences

Equipment
Paper and pencils

Introduction
Why do some animals have fur and others have feathers? It is possible to understand the appearances of many weird and wonderful animals by considering how they are adapted to their environment.

The activity
Everybody sits in a circle and has a piece of paper and a pencil. Players fold their paper into four, so that the fold runs widthways. On the top panel they draw an animal's head - a bird, a lion, a crocodile etc. Make the two lines of the neck just drawn slightly over the fold over so that the drawing itself cannot be seen, and pass to the person on their left.

Each player then draws the top part of an animal's body, and again passes on the piece of paper. The legs of the body and then the feet are also added in this way. Then the completed animal is passed on to the player on the left.

Players open out the 'mystery animal' and decide where they think it lives (has it got webbed feet? A tail suitable for swinging in trees?) What it eats (has it got a slender beak or a long tongue for drinking nectar? Sharp teeth for meat eating?). What might it get eaten by? Try linking all the imaginary creations in an imaginary food web. Give each animal a suitable name.

Links to the National Curriculum
Key Stages: 2 and 3

KS2 Science - Scientific enquiry 1a, Life processes and living things 1a, c, 5c

KS3 Science - Life processes and living things 5c

Time
30 minutes

Ages
7-14

Golden ringed dragonfly
Cordulegaster boltonii

Web of life game

Equipment
Ball of string

Introduction
See how the natural world is inter-linked. Food chains create the food web.

The activity
All stand in a circle. One person starts with the ball of string - they choose to be an animal or plant (in the wild or on a farm etc) for example a greenfly. Somebody across the circle is asked to think of something that the greenfly is connected to - eats or is eaten by - for example a ladybird. The greenfly keeps hold of the end of the string, and throws the ball across the circle to the ladybird. The ladybird has to find someone else in the circle that can make a connection to them - possibly a blue tit. They keep hold of the string, and throw the ball - so that gradually a 'web' is created linking everybody in the circle. Keep the string taut, people may have to pull back slightly on it.

Then explain that something has happened to affect one of the players in the circle - it may be that somebody has decided to chop down a particular tree, spray the greenfly or take some other 'action'. The player affected is asked to 'die', sitting down or falling and pulling on the string. Ask the players if any of them felt that 'tug' on the string - two other players should have done. See how they will be affected by what has happened - these players 'die', and so more feel the tug.
Continue until all the circle has felt the string 'tug'.

Some living things found on a farm: apple tree, strawberries, bee, clover, cow, farmer, sheep, kale, greenfly, ladybird, wheat, oats. Another way of doing this is to choose species from Churchtown Farm. You can use things such as sunshine, air, soil and water - these will be linked to almost everything else.

Links to the National Curriculum
Key Stages: 1, 2 and 3

KS1 Science - Life processes and living things 1b, c, 2b, f

KS2 Science - Scientific enquiry 1a, Life processes and living things 1c, 5d, e, f

KS3 Science - Life processes and living things 5b, e

Time
30 minutes or longer

Ages
5-14

Curlew
Numenius arquata

ANIMALS AND FOOD CHAIN ACTIVITIES 7

Marine food web game

Equipment
Cards with the picture or name of a marine creature on one side and what it eats or is eaten by on the reverse. These should include plant and animal plankton, seaweed, primary consumers (herbivores) and secondary consumers (carnivores), scavengers and detritivores. One card should have the sun on it.

Introduction
The fuel for all food chains comes from the sun. It is sunlight energy that allows plants to produce sugars by the process called photosynthesis. This energy is passed on to the herbivore when it eats the plant, and then on to the carnivore when it eats the herbivore. At each transfer a certain amount is lost through incomplete digestion, movement and heat loss. As the amount of energy available decreases from one level in the chain to the next, the amount of life that can be supported at each level also decreases. In situations where all organisms are roughly the same size this can be seen as a decreasing number of animals at each level along the food chain. This can be shown as a pyramid of numbers.

The activity
Using the food web diagram (Pawprint no.54) to introduce the concept of food webs, give each child a card and encourage him/her to find other cardholders to link with by checking out who consumes what. The children should join hands or put their hand on the shoulder of another child to represent the links between the species and, when a number of small linked chains have formed, ensure that the plants in each chain are linked to the sun. Encourage the chains to cross-link to others nearby, forming a web. Introduce a problem that results in the extinction of one or more species from the food web (eg an oil spill) and ask/direct anyone affected by the problem to sit down (ie die). Anyone who used to eat the extinct species now has to look around for something else to eat, but no more than three animals can rely on any one food source (person). Any species that are unable to find enough food die out (sit down) too, and eventually the elimination process demonstrates the devastating knock-on effects of removing individual elements of the food web.

Links to the National Curriculum
Key Stages: 1 and 2

KS1 Science - scientific enquiry 2a, e, h, Life processes and living things 1b, 2b, e, 3a, 5a, c

KS2 Science - scientific enquiry 1a, Life processes and living things 1a, c, 2b, 5a, b, c, d, e, f

Time
30 minutes

Ages
5-11

Magpie
Pica pica

HABITATS

8

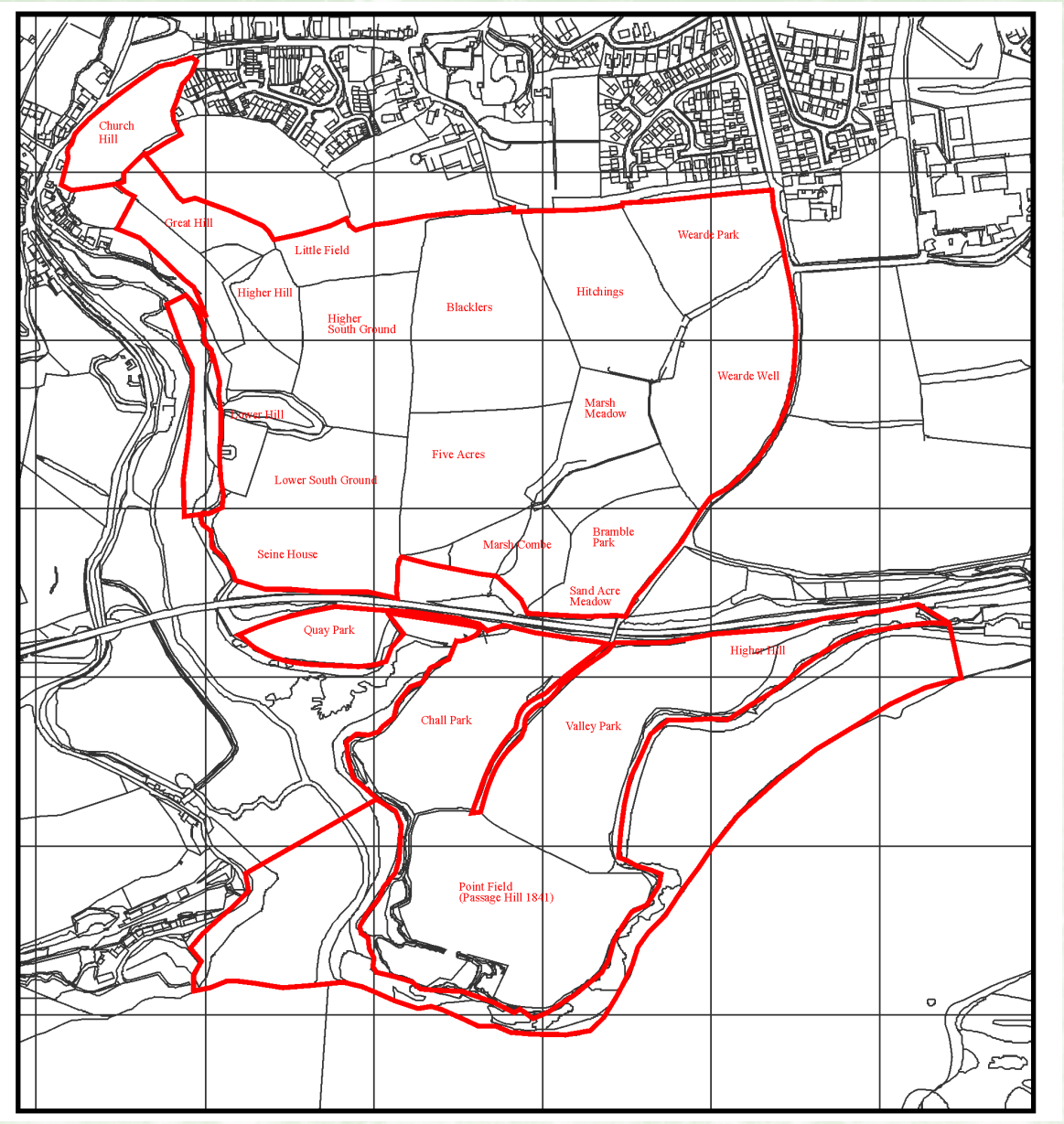
Comparing two habitats: improved grassland versus semi-improved grassland

Equipment
Pencil, paper, metre rules

Introduction
Man has a huge impact on the environment. It is possible to measure the effect man has on a field by comparing a field that has been 'improved' by reseeding, ploughing, draining and adding fertiliser, to one that is semi-natural. The field with less recent interference by man tends to have more species present, in greater numbers.

The activity
Two fields can be compared such as improved grassland (Hitchings or Wearde Well) versus semi-improved grassland (Marsh Meadow).

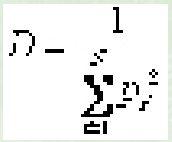
Historic field names



The students can be divided into groups of four or five. Each group should have four metre rules, which can be laid out on a randomly chosen spot in a square. This will form the 'quadrat' in which to sample the plant species. Once each group has set up their square, they can count the number of different types of plants they can see. This should be written down. If the warden is available for the school visit then they can assist with the identification of the plants. For each plant type recognised an estimate of the number of times it occurs in the quadrat should be made.

This procedure should be repeated for each of the fields (improved and semi-improved). For a more quantitative study the students can record five quadrats within each field; alternatively the class results can be pooled for subsequent individual analysis.

The results can be written up in the scientific report format, with introduction, method, results, discussion, limitations and conclusion. Tables, graphs and ICT can be used. Diversity index calculations can be carried out, using the Simpson measure of diversity of a habitat:



Where 'Pi' is the proportion of 'S' made up of the 'I'th species. 'S' is the total number of species in the community (richness). And 'D' is Simpson's diversity index.

The summer is the best time to carry out this activity.

Links to the National Curriculum
Key Stages: 2 and 3

KS2 Science - Scientific enquiry 1a, b, 2a, d, f,g, h, i, j, k, l, m, Life processes and living things 1c, 4b, c, 5a, c, Breadth of study 1d

KS3 Science - Scientific enquiry 2d, e, g, h, i, j, k, l, m, o, p, Life processes and living things 4b, 5a, Breadth of study 1a, c, e, f

Time
30 minutes

Ages
10-14

POLLUTION

9

Here today - gone tomorrow?

Equipment
Latex balloons, orange peel or banana skin, cigarette filters, woollen socks, plastic-coated paper, plastic bags, plastic film containers, nylon fabric, leather, tin cans, aluminium cans, glass bottles and plastic bottles.

Introduction
This activity highlights the non-biodegradability of most rubbish and gets the children thinking about how they can reduce the amount we produce.

The activity
Divide the children into teams of 3 or 4. Spread out all the objects and get the teams to decide which objects would break down the quickest in the sea, making a list in order of degradability. Go through the answers with them, discussing their ideas.

Aluminium can	One million years
Banana skin	1 to 2 years
Cigarette filter	1 to 5 years
Latex balloon	Up to six months
Leather	Up to 50 years
Nylon fabric	30 to 40 years
Orange peel	1 to 2 years
Plastic bag	10 to 20 years
Plastic bottle	More than one million years
Plastic film container	20 to 30 years
Plastic-coated paper	5 years
Tin can	50 years
Woollen sock	1 to 5 years

Discuss which items are most likely to harm wildlife:

- Plastic and nylon debris can entangle wildlife or be mistaken for food. It is estimated that plastic kills one million seabirds and 100,000 whales, dolphins, seals and turtles each year.
- Turtles mistake plastic bags and balloons for their jellyfish prey and end up dying slowly and painfully through gut blockage. Balloons have also been found in the stomachs of dolphins and sharks.
- Cigarette filters resemble floating prey items and can fill the stomach of sea creatures without providing any nourishment, causing them to starve to death.
- In 1997, a dead fin whale that washed ashore in Spain was found to have its stomach and guts full of 20kg of plastic bags and yoghurt pots.

Discuss what can be done to reduce the amount of rubbish we produce (reduce packaging, recycle, reuse), and how we can dispose of it responsibly.

Links to the National Curriculum
Key Stages: 1 and 2
KS1 Science - Scientific enquiry 2h, Life processes and living things 5c
KS2 Science - Scientific enquiry 1a, 2l, Life processes and living things 5a

Time
One hour

Ages
6-11

Wetland loss - water and cleaning survey

Equipment
None

Introduction
Wetlands are the fastest disappearing habitat in the world. They are often the most diverse too, supporting a wide variety of plants and animals. Wetlands are often lost for domestic and industrial rubbish disposal. Remember to save water whenever possible. Remember that your household drain is a direct link to a wetland so think about what you tip down it - use environmentally friendly household products for your washing-up liquid or toilet cleaner.

The activity
Carry out a survey of how much water is used in the home or at school in a day. Estimate first and then use the guidelines below to work out how much is really used in a typical day. The results could be shown in charts and tables. Discuss how water usage in the home can be reduced.

	(Litres)		
Bath	80	Cleaning teeth	2
Dishwasher	55	Cup of tea/coffee	0.25
Shower	35	Washing up	6
Washing machine	10	Bucket	8
Toilet flush	9.5	Washing hands	0.6
Bathroom basin	5	Sprinkler	10/minute

Carry out a household survey of cleaning products to find out which ones claim to be 'environmentally friendly'. Ask children to bring in empty boxes and cleaned out containers. Discuss the claims on the label with the group. Do you believe all of them?

Links to the National Curriculum
Key Stage: 2

KS2 Science - scientific enquiry 1a, b, 2a, f, g, h, i, j, Life processes and living things 5a, Breadth of study 1a, c

Time
30 minutes

Ages
7-11

IDENTIFICATION

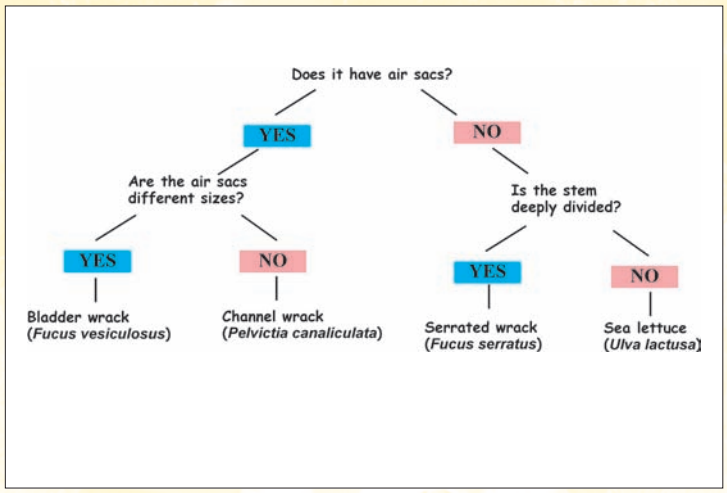
11

Make a key for identifying seaweeds

Equipment
Paper, pencil and copy of diagrams of seaweed

Introduction
Keys will typically be either a diagram or a table. They are simply a tool. You can make a key to describe ANYTHING. They go step by step - each splitting of a branch tells you which things have what characteristics.

The activity
The class can work individually or in pairs to look at the different seaweeds on the shoreline. Ideally each of the species shown in the diagram will be found. The main characteristics can be discussed, getting the children to describe them. These can be used to make a key. See the example key.



In this way we can organise similar plants and animals into groups. The students can use each other's keys to identify the seaweeds on the shore.

Links to the National Curriculum
Key Stage: 2

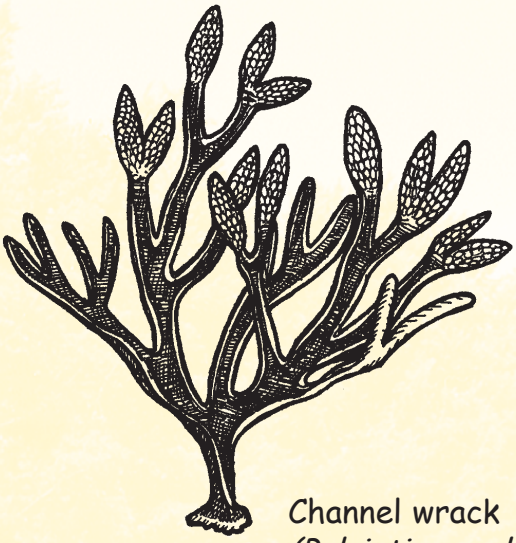
KS2 Science - Scientific enquiry 2a, b, c, h, i Life processes and living things 4a, b, c, 5b

Time
30 minutes

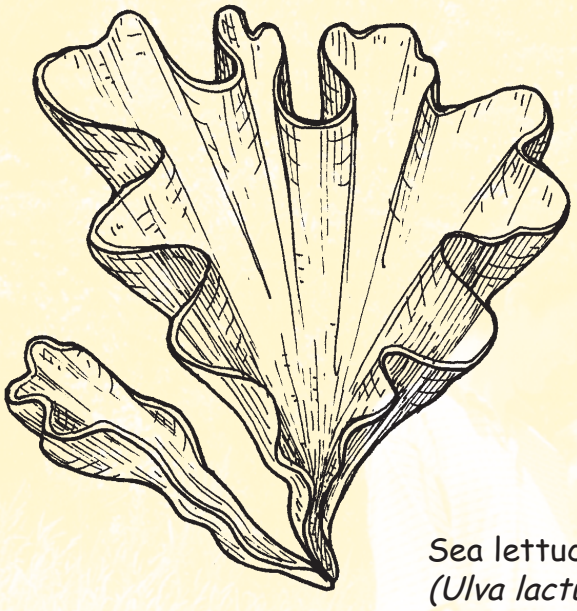
Ages
7-11

Hermit crab
Epagurus bernhardus
Anemone
Actinia equina

SEAWEEDS



Channel wrack
(Pelvictia canaliculata)



Sea lettuce
(Ulva lactusa)

Bladderwrack
(Fucus vesiculosus)

Serrated wrack
(Fucus serratus)

IDENTIFICATION

12

Watching birds and recording them

Equipment
A notebook, coloured pencils and binoculars if possible. Also a good field guide/identification chart.

Introduction
See the illustrated examples of birds that you might see at Churchtown Farm on the spotter sheet (12a) - buzzard, curlew, wren, swallow, magpie, goldfinch, sparrow hawk and chaffinch.

The activity
Keep very quiet when watching the birds. Birds are often quite shy and don't like being disturbed. Do not disturb the birds, especially in spring and summer when they could be nesting.

Write as much as you can about the birds in your notebook and do a drawing if possible with coloured pencils. This will enable you to identify the bird species using a good guide book (Collins Bird Guide, 2000).

Write down:

- What it is - or, if you don't know, describe the bird - size, colours, special features, etc.
- What it was doing
- The date
- The place
- Your name

This is how you make an official biological record that you can send to your local Environmental Records Centre who keep track of all the wildlife within the county.

The students can actually send off the records to Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS): Five Acres, Allet, Truro, Cornwall, TR4 9DJ or www.erccis.co.uk

Links to the National Curriculum
Key Stages: 2 and 3

KS2 Science - scientific enquiry 2h, Life processes and living things 5c

KS3 Science - scientific enquiry 1a, 2l, Life processes and living things 5a

Time
45 minutes or longer

Ages
10-14

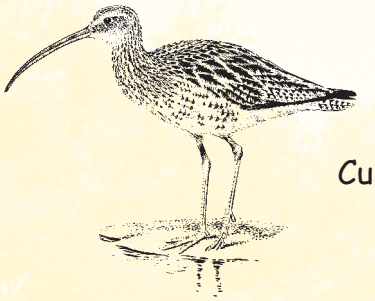
- See also activity 12a - bird spotter sheet

Wren
Troglodytes troglodytes

BIRD SPOTTER SHEET

12a

Buzzard ☐

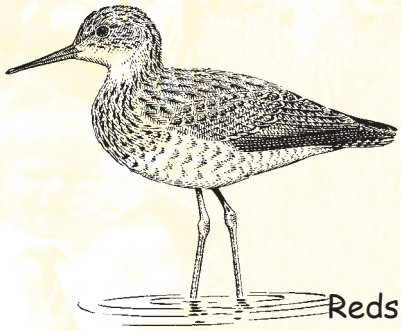


Curlew ☐

Curlew ☐

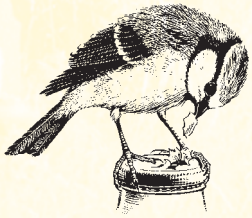
Curlew ☐

Golfinch ☐

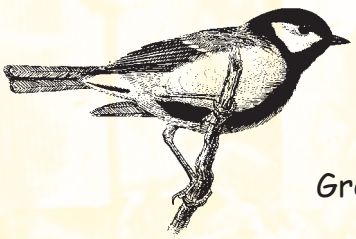


Redshank ☐

Sparrow hawk ☐



Blue tit ☐



Great tit ☐

Wren ☐

Images courtesy of English Nature

The Mammal Detectives

Equipment
Guide to British Mammal Tracks and Signs (see below), paper and pencils, string and tent pegs (optional)

Introduction
Many mammals make their homes in Churchtown Farm Community Nature Reserve. We don't often see them although we know they're there - but how? They leave behind all sorts of clues to their presence. A close examination of these clues can tell us what animals are there and give us all sorts of valuable information on their numbers, habits and activity. With this information we are better prepared to conserve them.

The activity
Choose an area of grassland where there are signs of mammal activity. An area adjacent to a hedge will probably be used by a wider range of mammals. Mark out squares (quadrats) with string and tent pegs approximately 2m square (optional - at KS3 the pupils can decide the methodology). Give each child their own square patch of grass to survey for evidence of mammals. Get them to mark down what they saw and where within their square, and for each bit of evidence what they think made it and what it was doing when it did so. Bring the class together to discuss the results and gather an idea of the activity in the area - what mammals have been there, what they were doing and why. Then look at the wider area around you and think about where they might sleep, what they might eat (carnivore, herbivore or omnivore), whether they come out at night or day, whether they're at risk from any natural predators, whether they have any camouflage and any other factors particular to the animals which may affect their behaviour.

You could also follow any leads you have such as runs, tracks or if you see any holes (burrows or setts) you could examine them. You could also have a general look around for further signs, such as badger latrine areas. You could ask the children to consider what makes the area a good habitat for the different mammals, what might make it a better habitat and what threats it might face from people, dogs, development, agricultural improvement - or anything else.

Types of sign to look out for include: paw prints, runs, digging, hairs or fur, droppings, burrows or setts and nests. Species you are most likely to find evidence of are rabbits (droppings and digging), foxes (dropping often containing fur), badgers (tracks and holes) and field voles (runs and gnawed grass).

All the records you find can be sent into the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) - www.erccis.co.uk . This information will help to conserve these animals in Cornwall!

A description of all the characteristic signs of mammals would be too lengthy to include here. A very useful publication is the Field Studies Council 'A Guide To British Mammal Tracks and Signs' which is a waterproof fold-out fact sheet costing £3.25 (2004). Visit www.field-studies-council.org . The Mammal Society website contains a range of factsheets on British mammals: www.mammal.org.uk

Badger
Meles meles

Links to the National Curriculum
Key stages 1, 2 and 3

KS1 Science - Scientific enquiry 1, 2a,b,f,g,h,j, Life processes and living things 1b,c,2b,e,4b,5a,b,c

KS2 Science - Scientific Enquiry 1a,b,2a,b,c,f,g,j,l,m, Life Processes and Living Things 1c,4a,b,c,5a,b,c,d

KS3 Science - Scientific Enquiry 2e,g,k,m, Life Processes and Living Things 4b,5a,b,d

Time
45 minutes

Ages
5-14

Ant's world view

Equipment
String in 70cm lengths, magnifying glasses or cardboard tubes.

Introduction
Discover the world through the eyes of an ant!

The activity
Lay out a 70cm piece of string and ask the child to imagine he or she is an ant going for a walk along it. The child should move along slowly and describe what an ant would see. To help focus on a very small area at a time, use a magnifying glass or a cardboard tube as the ant's eye.

Links to the National Curriculum
Key Stage: 1

KS1 Science - scientific enquiry 2b, Life processes and living things 1b, 2e, g, 5c

Time
30 minutes

Ages
5-7

Soft shield fern - draw and write a poem

Equipment
Paper, coloured pencils.

Introduction
Ferns have no colourful flowers. They bear spores on the underside of their leaves, which they release to the wind.

The soft shield fern *(Polystichum setiferum)* shows great variation in its appearance in different habitats. It grows in shady hedgerows, woodlands, on rocks and wetter places.

The activity
Get the children to draw the fern. Find descriptive words for the things they notice while drawing the plant. The children can then write a poem about the fern.

Links to the National Curriculum
Key Stages: 1 and 2

KS1 Science - Life processes and living things 3b, c, 5a, b, c

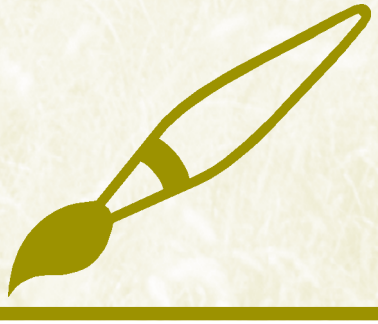
KS1 English - En3 1a, c, 2a, 5a, b, c, d, e, f, g, h, 7a, 9a, b, c, d

KS2 Science - Life processes and living things 3a, b, c, 5b, c,

KS2 English - En3 1a, b, c, e, 5a, b, 6a, 9a, b, 10

Time
30 minutes

Ages
5-11



Design a nature reserve

Equipment
Paper, coloured pencils.

Introduction
Understand the features required for a successful nature reserve. Ponds for amphibians, log piles for hibernating reptiles and even dormice, grassland for insects and birds of prey, woodlands connected via hedgerows, etc.

The activity
Get the students to draw an area with features they could include in a nature reserve, after talking about the possibilities. Annotations of the feature of interest can be made, using their own symbols for trees, shrubs, hedgerows, fences, water, etc. A written nature trail guide corresponding to numbered posts can also be produced.

Links to the National Curriculum
Key Stages: 1, 2 and 3

KS1 Science - Scientific enquiry 2a, c life processes and living things 1b, c, 2b, 5a, b, c

KS2 Science - Life processes and living things 1a, b, c, 5a, b, c

KS3 Science - Life processes and living things 5a, b, d

Time
30 minutes

Ages
5-14

IDENTIFICATION

Grassland

Equipment
Quadrat 50cm by 50cm made of wood, thick wire or card; 100 metre ball of string for the transect; pen and paper; help with botanical identification, eg from the warden, good field guides/identification books.

Introduction
Churchtown Farm has a variety of habitats present, from arable fields to soft muddy sediments in its sheltered creeks. Different species are found in each habitat and are adapted to living there. Monitoring the changes in species in space and time can reveal patterns that help us to understand why species are found where they are.

Monitoring the same area over time can show succession from one habitat to another. The current factors affecting species composition such as environmental variables (height of vegetation, proximity to sea, wind exposure, slope etc, whatever you can think of) can be identified with one visit.

The activity
A 100m string transect can be run through grassland that shows variation, such as from a wild area to a species-poor area. 50cm by 50cm quadrats should be placed every 10m. Within each quadrat the species present and their numbers or % cover should be recorded, as well as any environmental factors. The environmental factors, such as wind exposure can be assessed on a qualitative scale such as 1 to 4, for ease of analysis and graphs.

The students can consider how they expect the species composition to change down the transect, and over time. They can test these hypotheses with the survey results. The students can suggest reasons for the patterns they record.

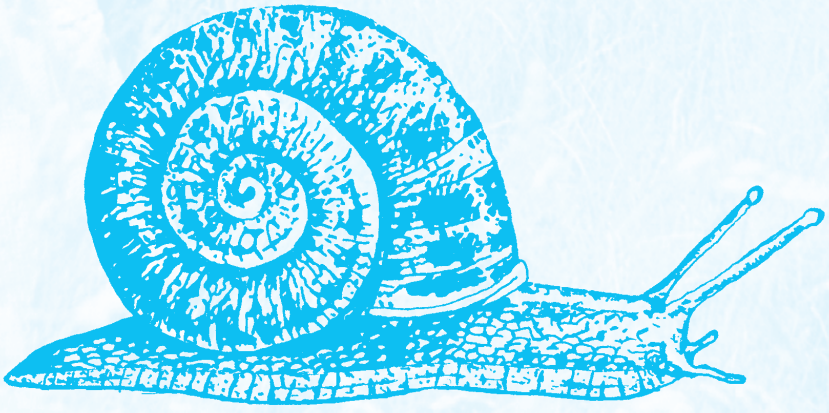
Links to the National Curriculum
Key Stages: 3 and 4

KS3 Science - Scientific enquiry 1b, 2a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, Life processes and living things 4a, b, 5a, c, d, Breadth of study 1a, d, e, f 2a, b

KS4 Science - Scientific enquiry 1d, 2b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, Life processes and living things 4a, b, Breadth of study 1a, d, e, f, 2a, b

Time
Two hours

Ages
11-16



Common garden snail
Helix aspersa

Mudflats

Equipment
This activity should not be attempted without prior contact with the warden who will need to carry out a separate risk assessment for it.

Introduction
Churchtown Farm has a variety of habitats present, from arable fields to soft muddy sediments in its sheltered creeks. Different species are found in each habitat and are adapted to living there. The mudflat habitat's importance is recognised by the candidate Special Area of Conservation designation. It is sensitive to marine pollution and is therefore a good habitat to monitor.

The activity
Transects can be used to see patterns of zonation over space, and changes that may be due to pollution over time. A 100m transect can be run perpendicular to the shore, and 50cm by 50cm quadrats placed every 10m. Within each quadrat the species present and their numbers or % cover should be recorded, as well as any environmental factors (such as salinity, temperature, wave exposure).

The students can consider how they expect the species composition to change down the shore, and over time. They can test these hypotheses with the survey results. The students can suggest reasons for the zonation pattern they record.

Information on the species they are likely to find?

Links to the National Curriculum
Key Stages: 3 and 4

KS3 Science - Scientific enquiry 1b, 2a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, Life processes and living things 4a, b, 5a, c, d, Breadth of study 1a, d, e, f 2a, b

KS4 Science - scientific enquiry 1d, 2b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, Life processes and living things 4a, b, Breadth of study 1a, d, e, f, 2a, b

Time
30 minutes

Ages
11-16

Oystercatchers
Haematopus ostralegus

WILDLIFE QUIZ

1. What energy do plants use to grow?

2. Name one animal or plant you are likely to see in each season.

3. List four different habitats found at Churchtown Farm CNR.

4. Name three flying, three running and three aquatic animals found at Churchtown Farm CNR.

5. What is dock dung?

6. What is a pyramid of numbers?

7. How would you improve Churchtown Farm CNR?

8. How long does it take for a plastic bag to degrade in the sea?

9. Name one common grassland plant species (other than grass!).

10. What can you find living in mudflats?

Links to the National Curriculum
Key Stages: 2, 3 and 4

KS2 Science - Life processes and living things 3a, b, c, 5a, b, c, f

KS3 Science - Life processes and living things 3a, 4b, 5a, b, c, e

KS4 Science - Life processes and living things 4a, b, c

Time
20 minutes plus discussion time

Ages
10-15

Quiz Answers

1. The sun's.
2. Spring: birds/daffodils, summer: butterflies/foxglove, autumn: bats/blackberries, winter: dog/holly.
3. Hedgerows, mudflats, hay meadow, woodland.
4. Flying: bats, butterflies, birds. Running: spider, badger, woodmouse. Aquatic: fish, otter, crab.
5. Street sweepings rich in organic matter were delivered by sailing barge to quays including the ones at Churchtown, to lay on the fields.
6. Foodchains can be quantified as a pyramid of numbers. It represents the feeding relationships between plants and animals in an ecosystem. For example, a hedgerow community could be represented as a pyramid of numbers with the number of plants, herbivores, primary consumers and secondary consumers with boxes showing the relative size of each trophic level. The secondary consumers such as birds would have the smallest box at the top of the pyramid.
7. Any suggestions are welcomed!
8. 10-20 years.
9. Dandelion *(Taraxacum officinale agg.).*
10. Cockles, lugworms, bivalves, molluscs.

SCAVENGER HUNT AROUND CHURCHTOWN FARM 20

Look around on your walk and see if you can spot:

A Bird Box	A snail Shell	A birds nest
A hazelnut shell	Two kinds of butterfly	A bumble bee
Two kinds of pink flower	Two kinds ofyellow flower	Two different kinds of grasses
A black and white bird	Tree bark	A seed