



Booterstown Marsh and Beach

Biodiversity Education Programme

An action of Dún Laoghaire-Rathdown Biodiversity Plan 2009-2013



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Biodiversity includes all living things from the tiniest micro-organisms to the largest whales in the sea. The relationship between plants and animals and their surroundings create the environment in which we live, and they are an essential component of our daily lives.

With the dazzling technology and busy nature of modern life it is easy to become disconnected from nature and to lose sight of how heavily we rely on our natural environment. We forget that trees and other plants provide us with oxygen, food, fuel, medicines and much, much more! Playing and relaxing in natural surroundings benefits our health and contributes to a greater sense of wellbeing.

Our parks and wild areas provide us with the space to play and have fun. These areas also provide homes and habitats for biodiversity. It is important that we share these places with biodiversity and allow space for wild plants and animals to live and thrive.

The Dún Laoghaire-Rathdown Biodiversity Education Programme is intended to increase children's awareness of the local environment, encouraging them to learn about and experience nature in stimulating and creative ways. It provides children, teachers and youth leaders with the opportunities and the tools to explore their local parks and green spaces as well as fostering a greater appreciation for these areas and the wildlife they support.

I would like to take this opportunity to thank Heritage Council for supporting the development of our Biodiversity Education Programme. I would also like to say a big thank you to everyone who provided advice and support during its preparation including the Irish Wildlife Trust, Blackrock Education Centre and Airfield Trust.

Mary Toomey, Biodiversity Officer
Dún Laoghaire-Rathdown County Council

1	Introduction	4
2	Map of Booterstown Marsh	5
3	Booterstown Marsh and Beach nature trail	6
4	Biodiversity information sheet	11
5	Teachers' instructions	12
6	Student activity sheets	22
7	Youth and community activities	33
8	Identification guides and information sources	35
9	Outdoor safety guidelines & tide times	36
10	Curriculum Links	38

Dun Laoghaire Rathdown County Council (DLRCC) commissioned The Irish Wildlife Trust to develop a biodiversity education programme for Booterstown Marsh and Beach to be used by primary schools and community/youth groups in the area. This is an action of the DLRCC Biodiversity Plan. This programme enables teachers to fulfil practical elements of the school curriculum whilst getting active in the beautiful Booterstown surroundings. The pack comprises a self-guided handbook which links activities to the habitat types found around Booterstown Marsh and Beach.

Aim of the project

The aim of the Booterstown Marsh and Beach Biodiversity Education Programme is to highlight the value of, and promote the use and care of biodiversity in the local area through learning exercises and activities at Booterstown Marsh and Beach. We hope to heighten awareness of the value of green space and wildlife within the DLRCC area. We hope that this handbook will provide a useful resource to teachers and community/group leaders by fulfilling elements of the curriculum, and encouraging regular visits to Booterstown Marsh and Beach.

How to use the biodiversity pack

This handbook includes a series of teachers' notes and student activity sheets that provide useful information and guidance on investigating wildlife while visiting Booterstown Marsh and Beach. The first two sections of the pack contain a map and nature trail for Booterstown Marsh and Beach which includes information about the site and various trail stops. The map is provided to guide you to the different habitats, viewing points, and the coastal access point at Booterstown DART Station.

The next section of the pack explains the concept of biodiversity and provides some useful information and facts about it.

The teachers' instructions in section 5 include background information, instructions and a list of materials for all student activities.

Section 6 comprises student activity sheets, which contain exercises and activities designed to encourage students to actively explore and learn about nature.

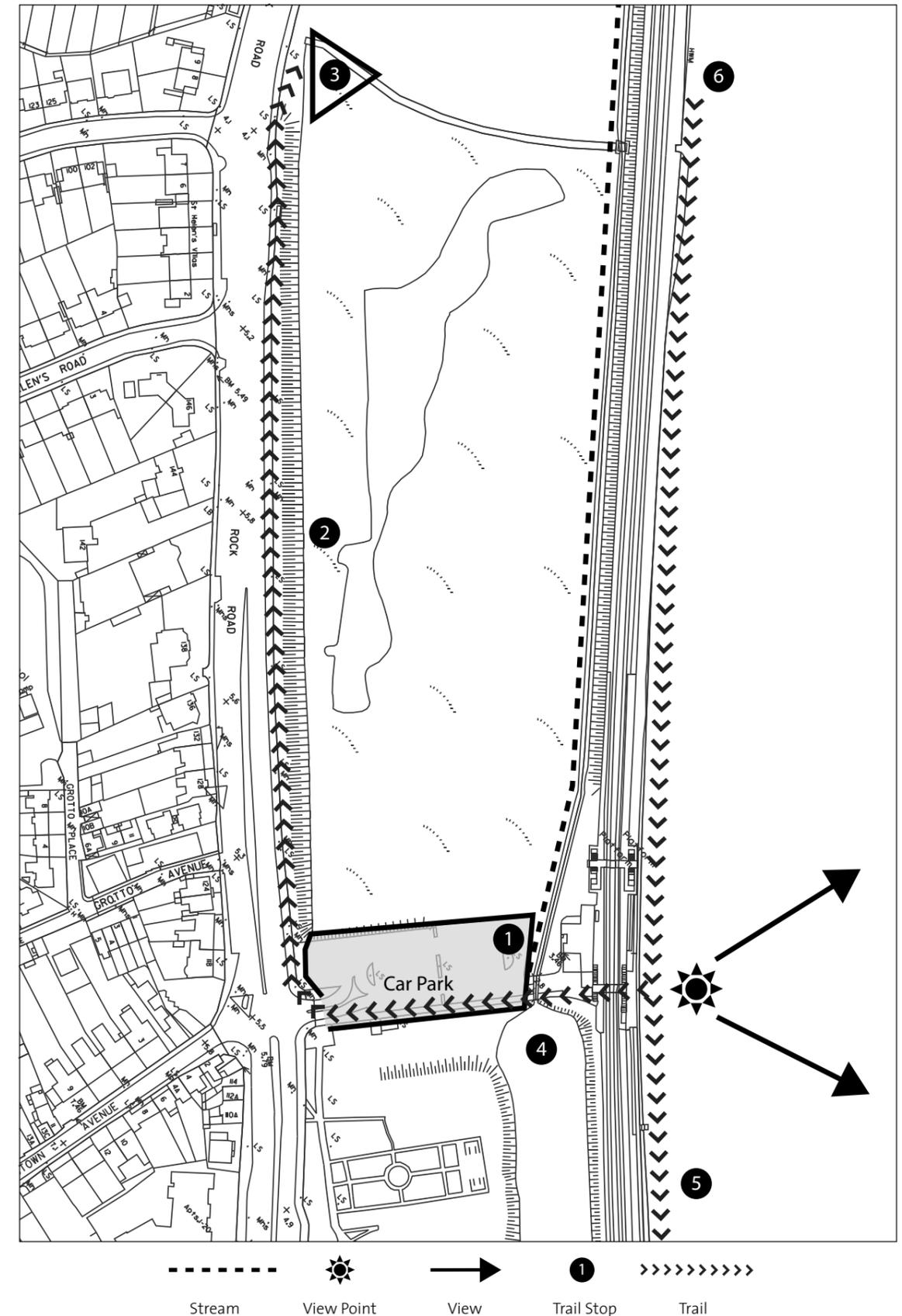
The youth and community activities in section 7 outline fun games and activities for all.

Section 8 lists useful field guides, books, and websites that can be used for your field trips to help identify species of plants and animals.

Outdoor safety guidelines are provided in section 9, and should be consulted before each trip to minimise potential risks to programme participants.

Section 10 provides information about how to look up daily tide times, which will help plan trips more effectively.

Lastly, a checklist is provided which links each activity to relevant topics in the primary school curriculum.



Boosterstown Marsh is situated within South Dublin Bay; which is an extensive area of coastal wetland protected under EU environmental legislation. The marsh is an area of national and international importance for birdlife; including numerous long distance migratory species such as the Brent Goose. While access to the marsh itself would be impractical, disruptive to the wildlife and also very muddy, this nature trail will provide you with a fantastic understanding of the marsh ecosystem and its importance from a number of safe and dry viewing points. The trail also includes access to the beach at Boosterstown which provides panoramic views of Dublin Bay and is a perfect location for developing an appreciation of the role Boosterstown Marsh plays in the greater Dublin Bay protected area. The beach section of the trail covers the sandflats, and a developing sand dune system to the north of the marsh. Please note that the beach section is only accessible during low tide (see information on tide times in section 9).

1. Car park

The trail begins at the Boosterstown DART Station car park, which is accessible from the Rock Road or the DART. The new crossing bridge within the DART station itself provides an excellent location for viewing both the marsh and Dublin Bay. It is recommended that you take a moment to use this ideal viewing platform if you are travelling to the site by DART.



At the northeast corner of the car park, there is a thinning in the hedgerow; from this corner you can see the southern end of the marsh. Make your way to this corner of the car park, and have a look into the marsh. Be careful not to go too close to the edge of the marsh, as it is not fenced off and one could fall in! This marsh is fed by both seawater and freshwater. You should be able to see a stream running along the eastern edge of the marsh parallel to the DART line (marked on the map). This is the Nutley Stream and is the main source of freshwater for the marsh; it exits the marsh at this corner and continues on to the sea. It is along this river that the seawater makes its way into the marsh, flowing up it at high tide. The marsh supports salt tolerant species such as Saltmarsh Rush, Sea Milkwort and False Fox Sedge and Sea Spurrey.

From here, if you look toward the centre of the marsh, you will be able to see two small low-lying islands. These are manmade islands that were built in 2006 to provide an area for the birds to rest and to roost.

2. Trees and shrubs

The observation area is situated at the northeast corner of the marsh. It is accessed from the footpath on the Rock Road, so you will have to make your way out of the car park and follow the footpath to the right (see map). Be careful on this footpath, as the Rock Road can have very heavy traffic. This footpath skirts along the entire western side of the marsh on the way to the observation area. Trees and shrubs run all the way along this side of the marsh. These trees and shrubs are a welcome addition to the marsh nature reserve as they play a vital role in sheltering the marsh from disturbance by the busy road running alongside it.

As you walk alongside the trees and shrubs keep an eye out for birds. You can expect to see many common urban species of bird inhabiting this hedgerow such as Robin, Blackbird, finches and tits. About halfway along the path, the vegetation thins out and there is a good spot for viewing the marsh; you might get your first close up views of the marsh's birdlife from here. **Do you spot any birds on the marsh? Do they look anything like the birds you see in gardens, school grounds or in the hedgerow?**



Robin



Bullfinch



Blue Tit

3. Observation area

At the end of the trees and shrubs, you will find the observation area on the right hand side. It is a grassy area with benches provided, separated from the road by a low wall. Make your way up to the wooden fence to get a good look at the marsh and its different habitats. The majority of the marsh is made up of *open mud*; this is the flat exposed layer of mud you can see. The mud is covered in a layer of algae (giving the surface a green colour) and is rich in aquatic invertebrates. Worms and insects live in the mud, and are an important source of food for many of the birds using the marsh. Another habitat that can be seen from here is the *marginal vegetation*, where sedges, rushes and other wetland plants are growing. Some smaller species of waterbird such as Coot and Moorhen use the marsh edge for shelter and nesting.

Within the marsh itself, you can see two *islands*. The islands were created to provide somewhere for the birds to roost and to provide a safe site for wildfowl to nest. If you look at the islands now, you may spot birds such as the Grey Heron and Little Egret standing on them. Little Egrets are related to herons and were quite rare in Ireland until recent years. The Grey Heron is common in all Irish wetlands and is a major predator in this ecosystem; feeding on fish, amphibians, small mammals and insects. You will often see Grey Herons standing still for long periods of time; if so they are probably either drying their feathers in the sun, or watching the water for prey to swoop down on.

Take a moment now to scan the entire marsh and conduct your own brief bird survey. Nineteen different species of waterbirds were recorded here last winter. Try to identify the birds you see. If you don't know them straight away, don't worry, you can always do a quick sketch or take some notes to help identify them later. Noting a bird's features such as the size and shape of its bill or the colour of its legs can help you identify it, as different species have features adapted to different lifestyles.

Some birds have adapted to a life wading through mud and wet sand, searching through it for food with their bills. These are called waders and have long thin legs and long bills for probing deep in the mud. Waders to look out for here are the Oystercatcher, Redshank, Greenshank and Knot. Look out for the red coloured legs of the Redshank.



Heron



Oystercatcher



Redshank

Booterstown Marsh and Beach nature trail

Ducks, swans and geese are also found at Booterstown Marsh. They haven't specialised in probing the mud and sand; so their bills are not as long. Rather than wading through mud, ducks spend a lot of time on the water, often diving under in search of food. They have shorter, stronger legs used for propelling themselves through the water.

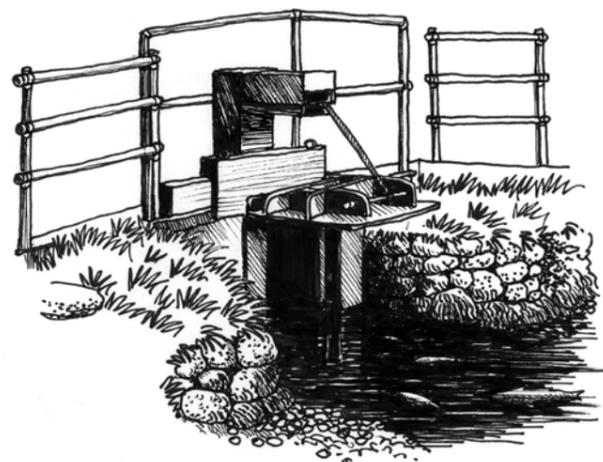
Other birds to look out for are the gulls; the Common Gull, Herring Gull and Black-headed Gull have all been seen here. Gulls are both hunters and scavengers, and spend a lot of time at sea. They have strong powerful bills especially the Herring Gull which is the biggest of the three. Another beautiful waterbird that has been seen on this marsh is the Kingfisher. Kingfishers are small brightly coloured birds that hunt fish in slow moving or still water. They can be seen perched on a branch scanning the water for fish. Keep an eye out for this beautiful bird.

When you are finished your bird survey, make your way back to the car park by the way you came. To find out how the water flow of the marsh is controlled, we need to head back the sluice gate at the DART station. Keep an eye out again for birds in the hedgerow. If you spot one, stop to have a closer look at it. **Does the bird have a long bill like the waders, or a sharp, powerful one like the gulls, or is it different altogether?**

4. Sluice gate

On entering the car park, make your way toward the DART station using the footpath that runs along the right hand side of the car park. At the end of this footpath is the bottom of the railway crossing bridge. Stop here and look over the stone wall to your right; you will see a body of water running parallel to the DART line. This is the continuation of the Nutley Stream. The Nutley Stream exits the marsh at the corner behind you, flows right underneath the car park and makes its way to the sea via the channel in front of us. This channel is a good place to spot fish, so have a look in the water to see if you can see any fish glistening as they swim around.

At high tide, the level of the sea on the other side of the DART line rises, and the seawater actually flows up this stream and into the marsh, while at low tide freshwater flows out of the marsh down this stream to the sea. This flow of saltwater in and out of the marsh is what changes the salinity of the marsh ecosystem (i.e. the amount of salt present). It creates a *salinity* gradient within the marsh. The end of the marsh closest to the stream exit is the saltiest, while the end furthest from the stream exit is the least salty and more of a freshwater ecosystem. **Would you expect the plants that live at the two ends of the marsh to be different?** Yes, because some plants are more salt tolerant than others.



Sluice Gates

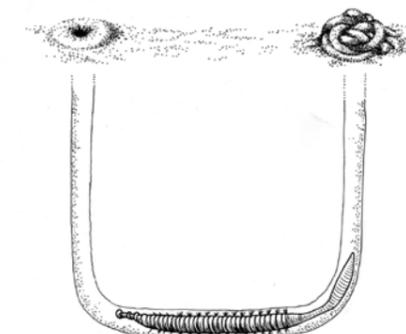
Beneath us right now is a manmade barrier called a sluice that controls the flow of water in and out of the marsh. Look over the wall again, and you may be able to see the metal flaps of the sluice gate. This barrier was built to keep seawater out of the marsh so it could be drained and used to grow crops in the past. However, the water flow has since been changed to allow more seawater back into the marsh to return it to its salt marsh condition. We will now cross the DART line, and discuss the marsh as a component of the South Dublin Bay Special Protection Area (SPA).

5. Beach/sand flats/Dublin Bay

Cross over the DART line via the footbridge, taking care on the steps on the way down. On the other side of the DART line, you will find a concrete platform running along the seafront. Stay on this platform for the moment; if the tide is out you will be able to go down onto the sandflats. From this platform there is a fantastic view of Dublin Bay. Look at the landscape all around you; why not draw what you can see and try to label what you have drawn. To the South, you should be able to see Dun Laoghaire Harbour while the island of Howth lies to the north. If the tide is out, a large area of mud and sandflats will be exposed stretching out in front of you to Poolbeg Power Station, with its red and white towers. To the left, Merrion Strand stretches away toward the city passing Sandymount Village and reaching as far as Irishtown. This area of coastal habitat with its extensive sand and mudflats stretching from South Wall to Dun Laoghaire Pier is used by a huge number of seabirds, many of which are migratory species coming from as far away as the Canadian Arctic. The entire South Dublin Bay intertidal zone is protected under European Law and makes up the South Dublin Bay SAC/SPA. **But what is an SAC or SPA and why are they important?**

Over the years, the European Union has created laws for the protection of European birds and other wildlife, and these laws provide for the designation of protected sites. First came the Birds Directive in 1979, legislation that was brought about to protect Europe's wild birds. A list of birds that need special protection was drawn up and certain areas were designated as Special Protection Areas (SPAs) to protect these bird species. The next major European wildlife law was the Habitats Directive in 1992; this legislation was brought in as a way of protecting the rest of Europe's wildlife. It drew up a list of plants, animals and habitats in need of protection such as the inter-tidal sand and mudflats in Dublin Bay. Certain areas containing these habitats and species were designated as Special Areas of Conservation (SACs). South Dublin Bay is both an SAC and an SPA because of the extensive sand and mudflats and important bird populations it contains. Booterstown Marsh is important because it offers shelter and feeding to birds using the South Dublin Bay. Together, SACs and SPAs form a network of protected sites across Europe known as Natura 2000.

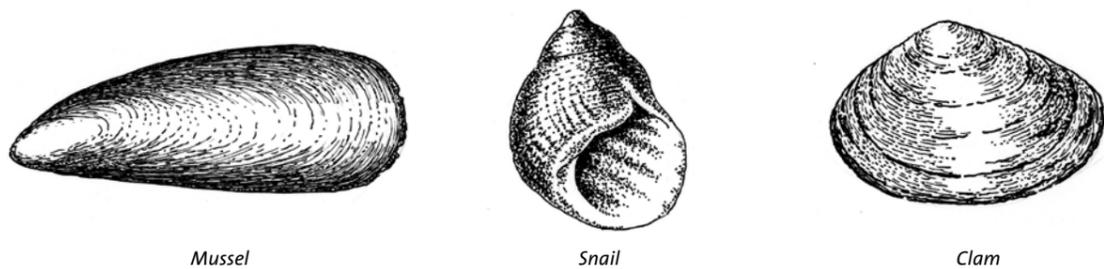
If the tide is safely out (see tide times), then make your way down onto the beach via the steps further down the concrete platform. The sand and mudflats appear flat and barren but there is plenty of life to be found here, most of it lives under the sand. There are species of worms living in the sand here called Lugworms. Lugworms live under the sand in a U-shaped tunnel. Look out for small holes on the surface of the sand; lugworms make small holes to breathe through. You can tell it is a lugworm hole if there is a small spiral of sand nearby (about a foot away), this is called a cast and is sand deposited on the surface by the worm as it burrows through the sand. Worms are very adaptable creatures. There are many different types, some of which can live on land like the Earthworm, and some here in the intertidal zone like the Lugworm. The intertidal zone is the part of a beach that is submerged and exposed every day as the tide moves in and out.



Lugworm

Look for shells on the sand or washed up at the base of the sea wall. Nearly all the shells that you will find on a beach belong to creatures called molluscs. *Molluscs* are a group of animals which include species that live in the sea and on the land. Although they are all members of the same animal group, they are very diverse in their shape and size. They include creatures such as octopus, squid, snails and clams. The shells we find on the beach belong to two types of mollusc; the *gastropods* and the *bivalves*. **Bivalves are molluscs with two shells joined together with a hinge; can you think of any shells that look like this?** They are called filter feeders because they pump water through their bodies and

filter out tiny bits of food from the water. Types of bivalve shells you may recognise on the beach are mussels, clams and Razor Shells. The shells of the gastropods are just as easy to recognise. Gastropods have only one shell, and the most recognisable type are snails. Snails have one large coiled shell that they pull their body into for protection, and although we are used to seeing snails in our gardens, they can also live in water and lots of species live in the sea. Other gastropod shells are not coiled and have a simple cone shape. A marine example of this is the Limpet, which is often seen stuck to rocks when the tide is out.



Mussel

Snail

Clam

6. Sand dunes

Further north, adjacent to the northern end of the marsh, an area of sand dune is developing. Sand dunes develop slowly over time in a number of stages. Wind blows sand along the surface of the beach, and sometimes deposits it in piles or ridges. Some species of plants referred to as *pioneer species* colonise these ridges. The plants catch sand from the wind and cause the dune to grow in size. Pioneer dune plants include Sand Couch Grass, Lyme Grass and Marram Grass. Such pioneering species are adapted to growing in very salty conditions. The presence of the pioneer plants stabilises the dune, and changes the conditions of the sand making it suitable for more species of plant to grow there. Plant species growing on this new dunes' system include Sea Mayweed and Scurvy Grass.



Sand Couch Grass

Scurvy Grass

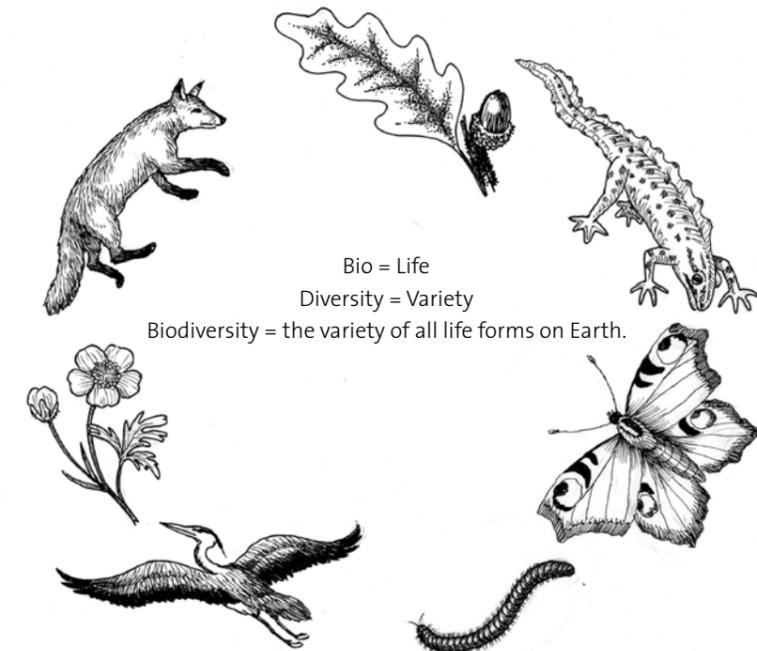
Sea Mayweed

Sand dunes are ecologically important habitats and also play an important role in sea defence, providing protection from coastal erosion. A variety of insects live on sand dunes and amongst the dune vegetation. Solitary bees and wasps can make burrows in the more stable dune systems, as can small mammals such as rabbits. These dunes are important as they add yet another habitat to the South Dublin Bay SAC/SPA.

Hopefully, you have developed an understanding of the importance of this wetland habitat to the biodiversity of Ireland, Europe and the World! Migratory species of bird come here from as far off as Iceland, Russia and Greenland. These birds use Dublin Bay and Boosterstown Marsh as a site to spend the winter (this is called overwintering), or as a stop off point on even greater migrations. Species that stop off mid-migration are called passage migrants; such as the Dunlin, a wader that stops here on its migration from Greenland to Africa.

When you have finished observing the sand dunes and their plants make your way back to the car park and the end of the trail.

WHAT IS BIODIVERSITY?



Bio = Life
Diversity = Variety
Biodiversity = the variety of all life forms on Earth.

Our life forms can vary from the tiniest bacteria and bugs to humans up to the biggest whales in the sea.

WHY BIODIVERSITY IS IMPORTANT:

Biodiversity is our **life support system**.
Ecosystems regulate **climatic processes**.
Animals and plants breakdown waste and **recycle nutrients**.
Animals and plants filter and **clean water**.

Natural habitats buffer against **flooding**.
Ecosystem services maintain **soil fertility**.
Biodiversity provides **natural resources**.
Biodiversity provides essential **medicines**.

BIODIVERSITY LOSS:

- Biodiversity is currently being lost at an unprecedented rate globally, and Ireland is no exception.
- Scientists estimate that species extinctions are occurring **100 to 1000 times faster** than without human influence.
- Without a change in our actions, half of the world's species may be lost by 2100.

SOME OF OUR NATIONALLY THREATENED SPECIES:

- Kerry Slug.
- Lesser Horseshoe Bat.
- Natterjack Toad.
- Otter.
- Pearl Mussel.
- Red Squirrel.
- Salmon.

CAUSES OF BIODIVERSITY LOSS:

- Habitat destruction.
- Water pollution.
- Unsustainable consumption.
- Climate change.
- Invasive alien species.

PROTECTING BIODIVERSITY LOCALLY AND GLOBALLY:

- Change consumption patterns,
- Buy local, and seasonal produce where possible.
- Do not buy peat based gardening products.
- Do not use slug pellets, as they not only kill slugs but the birds that eat them too.
- Reduce your energy consumption as climate change and biodiversity concerns are inextricably linked.

5.1 Getting started

- Step 1:** Read the nature trail information provided in section 3.
Step 2: Prepare for the activities outlined in activity sheets 1-4 in the classroom.
Step 3: During the visit to Booterstown Marsh and Beach, you can pick and choose which other activities you would like to concentrate on.

The following are teachers' notes for activity sheets 1-4.

These activities are designed to introduce each student to the programme and to Booterstown Marsh and Beach.

- Activity 1.** "Making a Nature Diary" will provide a catalogue of what the students have discovered and studied. It can be used as a reference notebook for the different words and skills that are introduced to them. All good ecologists have their notebooks to describe, illustrate and catalogue their findings in the field. The Nature Diary is a good way of keeping all of the students' discoveries in one notebook.
- Activity 2.** Journey to Booterstown Marsh and Beach.
- Activity 3.** Making a map.
- Activity 4.** Be a Booterstown Marsh and Beach explorer.

5.2 Birds of Booterstown Marsh and Beach

The following are teachers' notes for activity sheets 5 - 7 and are applicable to trail stops 1, 3 and 5.

Background information for activity sheet 5 – Become a Booterstown birder!

Many wetlands like Booterstown Marsh are like airports with daily arrivals and departures as birds fly in and out. Most wetlands have a core of resident bird species that live there throughout the year. Others may come for a particular season. For example, Brent Geese arrive at Booterstown for the Autumn and Winter. Knowing which bird species visit Irish wetlands is important, as is counting their numbers. By doing this, we learn about the birds and their conservation needs, e.g. are their populations increasing or decreasing? How can we manage our wetland habitats to create the right conditions for water birds? Identifying birds takes skill and practice - binoculars, telescopes and field guides help as well.

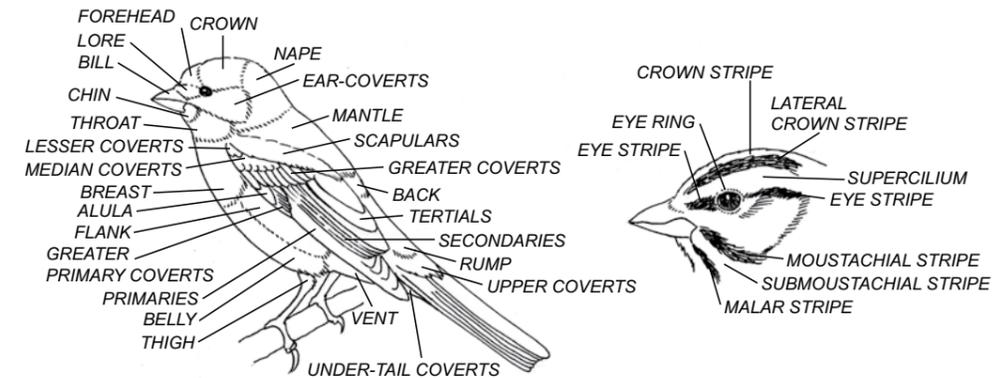
You will need:

- Binoculars (if available).
- Bird Identification Field Guide (see section 8).

What to do:

1. Set up a viewing point at trail stops 1, 3 or 5.
2. Ask the students to record their sightings on activity sheet 5.
3. Compare the different findings among the students.
4. Finish the visit to Booterstown Marsh with a discussion on the different birds, what makes them different, for example, size of the beak, size of birds and what are they doing.
5. Back in the classroom, get each student to draw one of the birds on the recording list, and do a seek and discover project to learn more about that bird. You could pool class data and use it for numeracy work, scientific enquiry and data handling. You might consider:
 - The number of species in a given habitat.
 - The number of individuals of a species over time and between different habitats.
 - Habitat preferences of species.
 - Whether populations are increasing or decreasing in a given habitat(s) over time.

Body Parts and Feather Types of Birds for Identification



What to look for - tips for identifying birds

- Size - relative to a common bird (e.g. Sparrow-sized, Starling-sized, Crow-sized etc).
- Colour and patterns, and where they are on the body.
- Size and shape of bill, legs, wings, tail and neck relative to the body size/shape.
- Colour of bill, legs, feet, wings and eyes.
- How the bird flies - (e.g. Kestrel hovering; Swift soaring) and moves on the ground (e.g. waddling Duck, running Starling, hopping Thrush or Blackbird).
- General behaviour and characteristic movements (e.g. tail wagging of Wagtails).
- Calls and songs.
- Where you saw the bird - its habitat.
- Date, time, place, weather, distance from you and what the bird was doing.
- Bird bodies - bird watchers and people who study birds (ornithologists) have special names for different parts of a bird's body.

2008 BOOTERSRTOWN MARSH WINTER SURVEY

	Species	Diet	Status	Origin / Destination
1	Light-bellied Brent Goose	Eel grass.	W	High-arctic Canada.
	Ducks			
2	Teal	Small seeds, invertebrates.	R, W	Iceland, Fennoscandia, Northern Russia.
3	Shelduck	Invertebrates.	R, W	Scandinavia, Baltic.
4	Mallard	Variable, seeds, invertebrates	R, W	Northern Europe.
5	Mute Swan	Water plants, invertebrates, Amphibians.	R	
6	Moorhen	Omnivore.	R, W	Continent.
	Hérons			
7	Grey Herron	Fish, amphibians, mammals, insects, reptiles	R	
8	Little Egret	Fish, amphibians, insects, reptiles.	R	
	Gulls			
9	Herring Gull	Fish, scavenge	R	

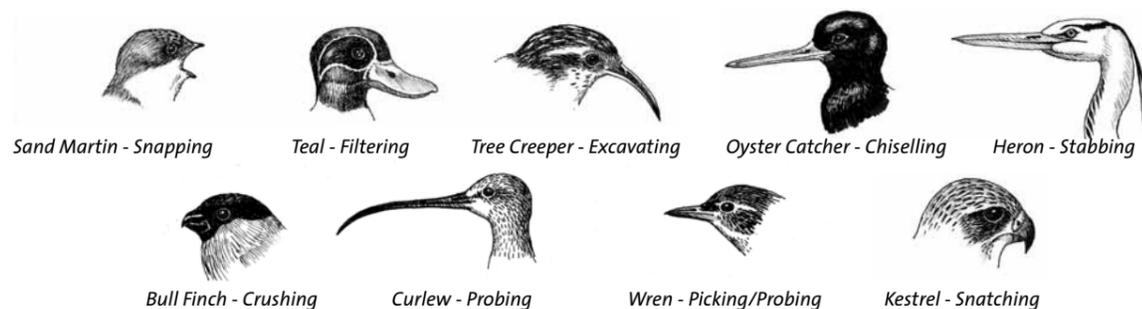
	Species	Diet	Status	Origin / Destination
10	Common Gull	Invertebrates, fish.	R, W	Scotland, Iceland, Scandinavia, Baltic.
11	Black-headed Gull	Insects, fisheries waste.	R, W	Britain, Northern Europe.
	Waders			
12	Oystercatcher	Mussels, cockles, invertebrates.	R, W	Iceland, Faeroes.
13	Redshank	Aquatic invertebrates.	R, W, PM	Iceland to West Africa.
14	Greenshank	Aquatic invertebrates, small fish.	W	Scandinavia, Scotland.
15	Black-tailed Godwit	Bivalves, invertebrates, grain	W	Iceland.
16	Dunlin	Small mudflat worms, gastropods.	W, PM	Greenland to Africa.
17	Knot	Bivalves, crustaceans.	W	Greenland, High-arctic Canada.
18	Turnstone	Sand hoppers, invertebrates, fish carrion.	W	Canada, Greenland.

R: resident population of species in Ireland. **W:** migratory population spends the winter in Ireland (wintering). **PM:** migratory population stops in Ireland temporarily on its way to another destination (passage migrant).

Background information for activity sheet 6 - Birds of a different feather / Bill bits

Some of the most notable things about birds are their feathers and bill (beak) shapes. Different shaped bills serve different ecological purposes, and are a good indication of the birds' feeding habits. Short thin bills suit insect eaters, short thick bills suit seed eaters, long thin bills can be for probing flowers for nectar, or probing soft mud for worms or shellfish and the strong hooked bills are for tearing meat.

The top and bottom parts of birds' bills are called mandibles. All birds have their nostrils at the basal end of the top mandible. The edges of the bill are especially hard and sharp so birds can chew their food. They will use their bills to tear chunks off, or to crush lumpy items before swallowing them. A bird's bill continues growing throughout the bird's life, this is necessary to replace the wearing that happens to the tips of their bills. A bird's bill is very sensitive, especially at the tips. Birds like Curlews can open the tips of their bill deep in the mud without getting a mouthful of mud.



Feathers are one of the most prominent features of a bird's anatomy and unique to birds. Feathers perform a number of functions for a bird. Firstly, they provide insulation, this is very important in a warm blooded animal. Secondly, feathers also protect birds from UV light from the sun. Thirdly, feathers allow for flight. Fourthly, feathers determine what a bird looks like. Feathers give birds their colours allowing them to camouflage and hide or attract the females with displays of colour. Feathers grow quickly and are sealed at the base. They have muscles attached at the base of each feather. They do not last forever, and each year birds go through a moulting process replacing their old feathers with new ones. They have different types of feathers on their bodies that perform different jobs. For example, some feathers located

on the wings are called the flight feathers which they use to fly. Feathers are made from *keratin*, a protein, which is also used to make hair on different animals and beaks on birds. Birds have good eyesight and colour is important to them. As a general rule, the male birds are more colourful than the female birds.

Bill bits

You will need:

- Tweezers (to illustrate picking of priser beaks) and strainer (to show filtering birds).

What to do:

1. Explain the background information of the different bird bills. Use the tweezers and a strainer to simulate the actions of the bills of the birds.
2. Ask each student, or group of students, to pick two birds and to study their bills.
3. Ask the students to fill out activity sheet 6.

Birds of a Different Feather

What to do:

1. Explain the background information of the different bird features.
2. Ask each student, or group of students, to pick two birds and to study their plumage.
3. Ask the students to fill out activity sheet 6.

Background information for activity sheet 7 - Species focus: counting Brent Geese

This activity is can only be carried out between October and March when Brent Geese are overwintering in Ireland.

Pale-bellied Brent Geese spend the winter in Ireland after making a very long and difficult journey from North Eastern Canada. This is because the winter in Northern Canada is too cold and there is not enough food for them to survive! During the summer Brent Geese nest in arctic Canada. They lay their eggs in mid-June, and build up their weight over the summer to prepare for their long journey to Ireland. The first birds usually start arriving in September/October; many more arrive in November. Firstly, they settle in the mudflats at Booterstown Beach and eat eel grass. The geese move to various other locations throughout the winter/early spring, including saltmarshes and flooded fields. For example, Blackrock Park, the football pitches at Springdale Park, St Anne's Park, and Bull Island.

Ireland's wetlands are very important for almost all of the world's population of Pale-bellied Brent Geese. The Brent Goose is a protected bird in Europe. When feeding and flying, Brent Geese are very loud and their "cronking" calls can be heard from very far away!

How does it look?

Brent Geese can be recognised by their black neck and head with a white collar around the neck.



What to do:

Make a record of the Brent Geese at Booterstown Marsh. When you record a sighting of this bird, you can record information about the time, date, weather, activity and habitat on activity sheet 7. You can use this sheet every time you visit Booterstown Marsh. This way, you will build up lots of information about the Brent Geese. Try going back at different times of the year to see if the Brent Geese can still be seen. They usually stay in Ireland from October to April each year. See if your students can spot the first birds to arrive, or notice when the last birds depart.

5.3 Trees and shrubs

The following are teachers' notes for activity sheet 8 and are applicable to trail stop 2.

Background information for activity sheet 8 – Getting to know a tree

This activity is designed to introduce the students to different types of trees. Trees are extremely important for wildlife as they provide habitats for mammals, birds and insects to live. Collecting and drawing leaves will teach children to identify local trees. This exercise will also introduce them to a visual form of recording, and help them maintain confidence and interest in drawing as a means of communication.

You will need:

- Leaves from different types of trees.
- Tree Name I.D. Guide (see section 8 for details).
- A pen.

What to do:

1. Ask your students to collect some leaves. They should choose ones with no holes or tears and which are not too dry or scrunched up.
2. Ask your students to examine one leaf and fill in activity sheet 8.
3. The students can then organise the leaves into a line; start with the smallest, simplest leaf, then the next smallest and so on.
4. On a new page in their nature diary, they can write the date and the title "My Leaf Guide". On the next page, they should stick their first leaf.
5. They should continue sticking the leaves in their book, one or two on each page.
6. Use a tree identification guide to identify which tree each leaf belongs to (see section 8 for more details).

5.4 Functions of Booterstown Marsh and the benefits of wetlands

There is no corresponding activity sheets for this section; the activities are outlined in the notes below.

Background information - The importance of saltmarshes

What is a saltmarsh?

Saltmarshes are habitats which develop on alluvial sediments along the edge of salty waterbodies whose water levels fluctuate, usually tidally. At Booterstown, both the local stream and the sea bring nutrients and soil into the marsh. Saltmarsh plants rely on the sediment deposits from the river and sea to anchor them and to absorb nutrients. Saltmarsh plants are adapted to living in an environment whose salinity varies daily. When the tide goes out, the seawater drains from the marsh and when the tide comes in, the saltwater re-enters the marsh.

Why is the saltmarsh so important?

Saltmarshes are one of the most biologically productive habitats in the world. The plants and animals that are found in saltmarshes are adapted to a harsh environment. Not all plants and animals can live in coastal areas due to wind exposure, saline conditions and changing tides which result in daily changes in the habitat from salty water to exposed, dry conditions.

Saltmarshes are important areas for fish and invertebrates. Some fish that live in the open sea will return to feed and breed in the shallows and protection of the marsh. Therefore, saltmarshes function as nursery areas giving protection to young fish. Saltmarshes also serve as protective habitats for migratory birds that depend on them for food and shelter.

Saltmarshes provide a number of ecological services which benefit people. They capture nutrients, purifying the freshwater entering the sea - protecting our water quality. The plants and grasses also help to protect and stabilise shorelines from erosion and prevent flooding.

You will need:

- A little pillow.
- A sponge.
- Soap.
- A doll's cradle or something to represent a nursery.
- A kitchen sieve.
- A small box of cereal.
- A wire whisk.

What to do?

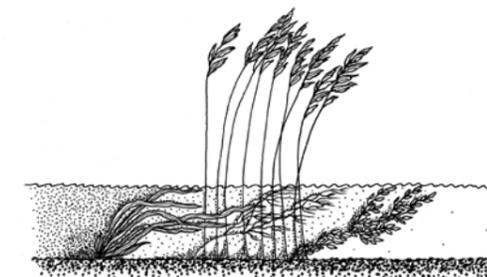
From the observation point overlooking Booterstown Marsh, explain to the students what a saltmarsh is, why it is important for wildlife and, the benefits it provides to people living in the area using the background information provided.

Using the items listed above, emphasise the facts about and functions of a saltmarsh. Each item represents an important function of a saltmarsh.

1. A little pillow (resting place for birds and animals).
2. A sponge (aids in flood control by absorbing water).
3. A piece of soap (cleans freshwater entering the sea).
4. A doll's cradle (represents a nursery for fish, shellfish, birds etc.).
5. A kitchen sieve (filters out pollutants).
6. A small box of cereal (food for coastal animals).
7. A wire whisk (a place where salt and fresh water mix).

Background information – The benefits of wetlands

Wetlands have a very important role in maintaining good water quality standards as they trap silt and nutrients produced by human activities before reaching the sea. They also absorb excess rainfall thus reducing flooding of houses and towns. However, wetlands are under threat from land reclamation, drainage and infilling for development or farming.



Wetland Plants Capturing Silt from the Water

Nutrients are a natural part of a plant and animal's life, and when they die and decompose, the nutrients are returned to the soil and water, where they can be "recycled" or used again by other living things. People also add nutrients to the land. The two main nutrients (nitrogen and phosphorus) are used as fertilisers. They end up in the water when the land is washed by rain and loose soil escapes into the rivers, lakes and stream to eventually end up in the sea. Soil is also eroded from the banks of rivers and streams that meander through the land. Nutrients occur naturally, but too many make the water unhealthy. Water from our streams and rivers is filtered as it passes through wetlands. Wetland plants trap soil and nutrients, thus cleansing the water. The following game will demonstrate this function.

Let's play the nutrient game!

Conduct this game after explaining this background information in detail through observation and a talk at the sluice gate area at stop 4. Find an open space such as the park area behind the sluice gate to carry out the activity. Alternatively, you can do this back on school grounds.

You will need:

- Coloured tags with N for Nitrogen or P for Phosphorus printed on them (enough for everyone in the class).

What to do:

Take the class to the open park area beside the sluice gates at trail stop 4. Divide the class into two teams:

Team 1. Will be "plants growing in a wetland".

Team 2. Will be "soil particles with nutrients attached" - this team will wear a nutrient tag (a coloured tag with N or P printed on it).

- The plants form an irregular line at one end of the open park area, spaced so their outstretched arms do not touch.
- The area behind the plants is designated as the waterway, i.e. the sea.
- The soil particles line up facing the plants and, on signal, must make their way to the waterway without being touched by a plant. The soil particles must drag one foot as they run or hop on one foot (so they don't move too quickly).
- The plants may bend, stretch and stoop, but may not move their feet (roots) in order to tag the soil particles. Soil particles may not go around the end of the plant line.
- When a soil particle is tagged, he or she becomes a plant at the exact spot, and must remove the nutrient tag and give it to another plant (plants use up nutrients).
- Any particles that escaped to the waterway will then go back to the starting line and, on a signal, will try to "safely" pass through the wetland again. The game continues until all of the particles have been caught.

Explain the rules and play a few rounds. Repeat the game several times, using student suggestions for modifying the plant spacing to change the results. Keep count of the number of rounds required to complete each game with the modified spacing. Give each student a chance to play both roles. After the game, discuss the roles played and relate the results to the rounds and to what actually happens when it rains or when water flows through a wetland, e.g. a saltmarsh.

Discussion:

- Were the plants able to trap more particles in areas where they grew closer together?
- What happened when there were gaps or bare spots in the line of the plants? Would it have helped if you had more plants?
- Why are shoreline or wetland plants important to the water that they border?
- Why is it important to plant and have plants, even on lawns and areas near pavements?

Conclusion:

Plants hold soil in place and keep it from washing away. They also help to use up nutrients and filter pollutants, just as wetland plants do. Any place that has plants growing on it, instead of being paved, will help to reduce the amount of run-off that flows off the land and reduce flooding.

5.5 Discovering Booterstown Beach

The following are teachers' notes for activity sheets 9 and 10 and are applicable to trail stop 5.

Background information for activity sheet 9 - Beach scavenger hunt

When at Booterstown Beach, try to find the items listed on activity sheet 9. Bring the items back to a central location, and discuss what you have found with the group. You can also tell the group about the various features and zones of the beach as outlined below:

Strandline:

The strandline is the highest point on the beach that the tide reaches; it is marked by a wavy line of marine debris. Various items get washed up, e.g. empty egg cases, dead crabs and fish, seaweeds, and even unfortunate whales on occasion! Many creatures such as gulls, sandhoppers and flies come to feed on the decaying matter along the strandline. Unfortunately, litter can also be deposited by the sea, creating a hazard for many creatures. Litter and its impact on wildlife is an excellent topic for class discussion. Children rarely consider that litter is anything other than ugly and are not always aware of the hazard to wildlife. Examples of this impact would be birds that get entangled in plastic can holders, or fish and birds eating small pieces of plastic, mistaking them for food.

Sand dunes:

Sand dunes occur where sand has been pushed into hills or ridges. Salt-tolerant plants grow on sand dunes and their roots help make the dunes more stable. Marram grass is a very important plant in Ireland for sand dunes as its roots bind the sand together. Dunes are very important homes for many different plants and animals. They are very fragile environments, and can be damaged easily by members of the public trampling over the dunes.

Types of shores:

There are many different types of shores: rocky, sandy, muddy and shingle beaches. Some of these are perfect habitats for creatures to live in, but in some, the conditions can be too rough for organisms to survive.

Sandy and muddy shores:

At first glance, it may look like there is no life on these shores but most life will be found beneath the surface. Booterstown Beach is a muddy shore. Worms and molluscs (animals in shells) live in the sand and mud where there is more protection. To find where they are, you look for holes, mounds, trails and burrows in the sand or mud.

Shingle beaches:

A shingle beach is the hardest of all for organisms to live on. Seaweeds cannot hold onto the moving stones, and creatures can easily be crushed by them. If there are larger stones, which are less easily moved by the waves, then some creatures may be found. Booterstown Beach is not a shingle beach.

You will need:

- A Nature Diary.
- A pencil.
- A Beach Name Trail Guide (see section 8 for details).
- It would also be useful to check tide times before your trip to make sure the beach is accessible, check section 9 for details.

Preparation:

1. Gather together the above materials.
2. It is recommended that the students work together in small groups of approx. 4-5.
3. Ask your students to follow the instructions in activity sheet 9.

Background information for activity sheet 10 - Molly & Mike Mollusc

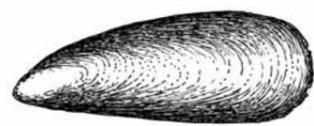
This activity is designed to introduce students to the life of a mollusc (shells). A mollusc is a soft-bodied creature that lives in an outer skeleton, its shell. There are two different types of mollusc, bivalves and gastropods. Through this activity, you will introduce the students to the life of two molluscs, Molly and Mike, and they will seek to discover other molluscs, their different shapes, colours and sizes. A mollusc builds its shell to protect itself from predators and to give it shelter.

Bivalves:

Molluscs that have two shells joined by a hinge. They are filter feeders and bury themselves in the ground by extending their muscular foot (e.g., mussel, razor shell).

Gastropods:

Molluscs that have a single shell in a spiral shape. They feed by their radula (tongue) that acts like a conveyor belt passing food into its digestive tract. They move by using their muscular foot, which drags them along (e.g. snail).



Mussel (Bivalve)



Snail (Gastropod)



Razor Shell (Bivalve)

You will need:

- A bucket.
- A white tray.
- A spade.

What to do:

1. Find an example of a bivalve and a gastropod shell on the beach. Explain to your students what molluscs are, what the terms bivalve and gastropod mean, and what is the purpose of a shell.
2. Go for a walk along Booterstown Beach at low tide, and look for shells.
3. Each student should collect different shells and sort them between bivalves and gastropods.
4. Sit down on the beach and fill out activity sheet 10 to record Molly and Mike.
5. Once you have completed the first part, you should take a bucket, white tray and spade and dig into the mud or sandbar to look for molluscs and worms.
6. Fill up the white tray with saltwater and some sand. Put the creatures you find into the white tray.
7. What size is it? Measure it with a ruler. What shape is it?
8. Can you identify it?

At the end of the lesson, explain how Dublin has a long history of harvesting shellfish such as cockles and mussels that are sold for people to eat as a source of food. They are also a source of food for birds on Booterstown Marsh such as Oystercatchers who dig the sandy beach for cockles buried in the sand. You can finish the lesson by singing *Molly Malone*, a traditional Dublin song about a shellfish seller.

5.6 Wave power

The following are teachers' notes for activity sheet 11 and are applicable to trail stop 6.

Background information for activity sheet 11 – Wave power

The purpose of this activity sheet is to illustrate the power of the sea and its waves that crash onto land. The aim is to show that the sea can build, e.g. the newly forming dunes and sand spit at Booterstown Beach, and can also take land away by eroding. It introduces the students to the terms erosion and deposition. *Erosion* is the breaking down of materials such as rock and soil by the forces of nature such as rivers, wind and the sea. *Deposition* is the natural process of laying down material. Ask the students to read activity sheet 11, and to fill in their observations to the questions from looking at the sea from Booterstown Beach. Direct their attention to the new sand spit which is forming on the beach and the plants which are colonising and stabilising this new piece of land (see stop 6 in the nature trail for more information).

You can also ask extra questions regarding sporting activities that rely on waves and winds of the sea, e.g. surfing or kite flying. As Booterstown Beach is an area that has been built up, ask the students to think of somewhere in Ireland or Dublin where the sea has taken land away by erosion e.g. Shanganagh Cliffs, Cliffs of Moher or Howth Head.

ACTIVITY SHEET 1 - MAKING A NATURE DIARY

A good way to study nature is simply to look and listen! If you write things down that you see and hear, you will remember them afterwards. Make a nature diary and you will soon see how nature changes during the different seasons.

To make your nature diary, you will need:

- A notebook.
- A pencil.
- Colouring pencils/ crayons.

What to do:

1. Every time you visit Booterstown Marsh and Beach, you are visiting a variety of habitats. A habitat is where animals and plants live e.g. wetland, grassland and stone walls.

Include the following information:

- Date (e.g. Wednesday 21st June 2010).
 - Weather (e.g. cloudy).
 - Season (e.g. Autumn).
 - Habitat (e.g. woodland).
2. Make a list on a different page of all the different types of animals and plants that you see. Each type of animal or plant is called a species. Where do you see the animals? What are they doing?
 3. You might see something unusual, such as a rare bird like a kingfisher. Write about it, draw it or take a photo. Stick your photos into your diary.
 4. Sometimes you might see an animal or a bird that you do not recognise. Make a drawing of it in your diary, or take a photograph. Then you can identify it with a field guide when you get back to class. Make a note of the different colours and patterns and write about where you saw it and what it was doing.

Happy Nature Watching!



ACTIVITY SHEET 2 - JOURNEY TO BOOTERSTOWN MARSH AND BEACH

Before you begin your journey to Booterstown Marsh and Beach, try to find a map of the area.

Instructions:

1. Locate your school on the map.

2. What is the distance from your school to Booterstown Marsh and Beach in kilometres?

3. Are you travelling by bus, walking, or getting a lift in a car?

4. How much time did your journey to Booterstown Marsh and Beach take, and record the direction travelled, e.g. North, South, East or West?

5. Do you pass by any public buildings such as a library, a courthouse, or county council offices? If so, what are they called?

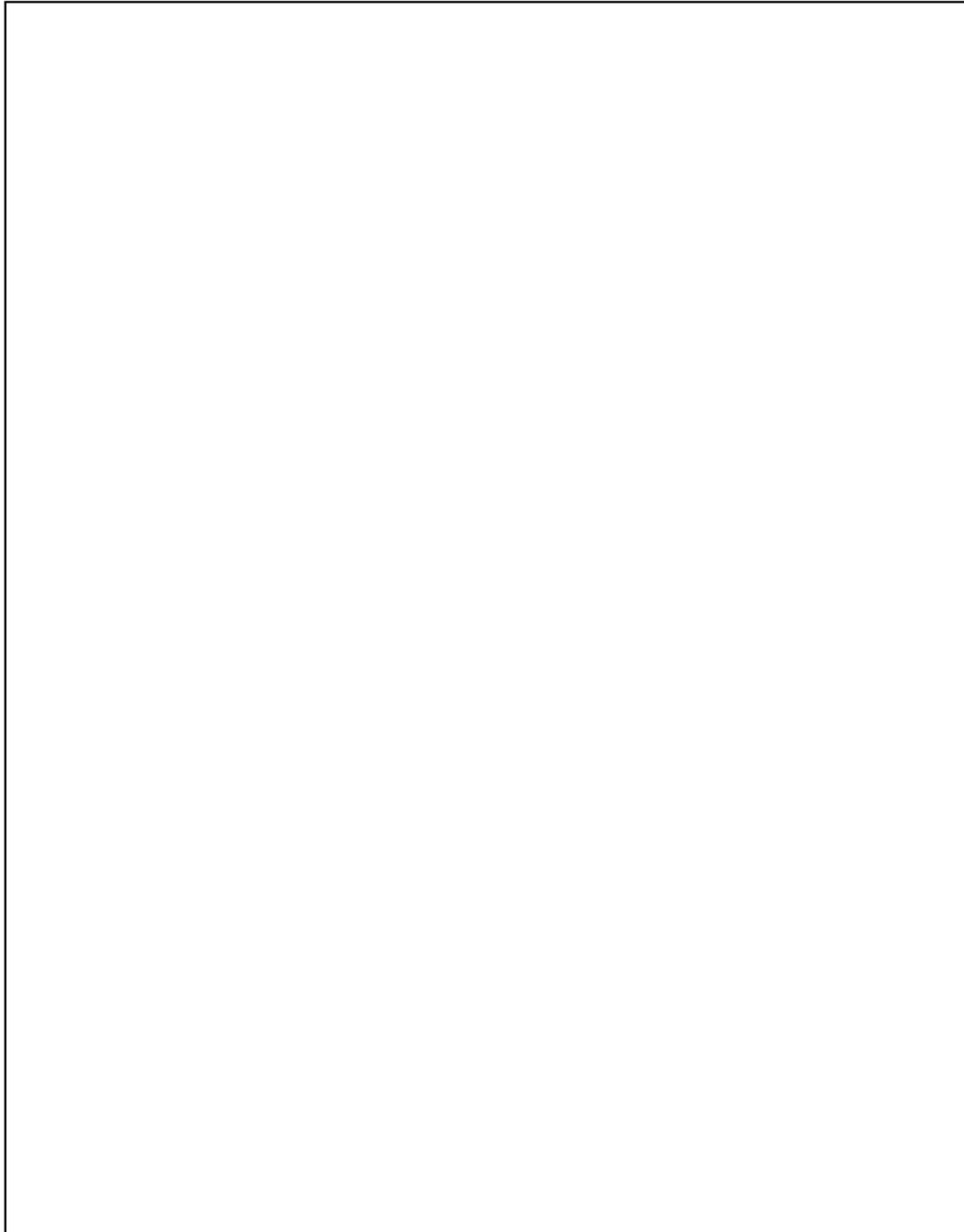
6. Make a list of habitats that you see on your journey in the spaces provided below, e.g. do you pass by a river, a beach, a woodland, or a pond?
1. _____
2. _____
3. _____
4. _____



ACTIVITY SHEET 3 - MAKING A MAP

It is important to first get a good idea of your study area by drawing a map of it. Draw a map of your study area in the box provided, and include the different nature features such as the marsh, beach, trees and man made features such as a car park or path.

Draw and label any important features. For example, the location of a river.



ACTIVITY SHEET 4 - BE A BOOTERSTOWN MARSH AND BEACH EXPLORER

Open your Senses - Touch, Listen, Smell.

You will need:

- A pencil and Nature Diary.
- A camera (if available).
- A magnifying glass (if available).

What to do:

Follow the instructions 1 - 10 and write the answers to the questions in your Nature Diary:

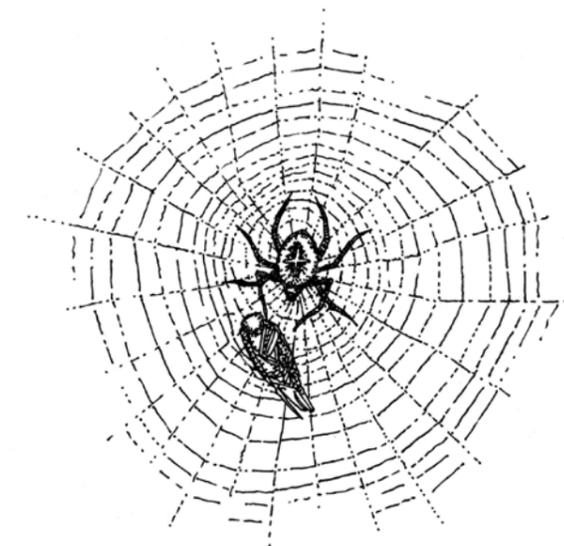
1. Using your Nature Diary, write down the name of your area, date of your visit and what the weather is like on that day.
2. Jump up and down on the ground. Is the ground hard or soft?
3. What can you smell in the area? Breathe through your nose!
4. Listen for sounds! What do you hear? Make a list of the different sounds.
5. Listen for bird songs. How many do you hear?
6. Feel a patch of grass or a piece of seaweed. How does it feel to the touch?
7. Feel some stones and sand. How does it feel to touch?
8. What colours can you find in the area? Make a list of the different colours.
9. How many shapes can you see? Look at the rocks, sea and river.
10. Find nature in action, record what you saw in your nature diary.

For Example:

- A spider trapping a fly in its web.
- A lugworm leaving shapes in the sand.
- A bird diving for food in the sea.

Back in class:

Write about your time spent in Booterstown Marsh and Beach using the words you learned during the visit.



ACTIVITY SHEET 5 - BECOME A BOOTERSTOWN MARSH AND BEACH BIRDER!

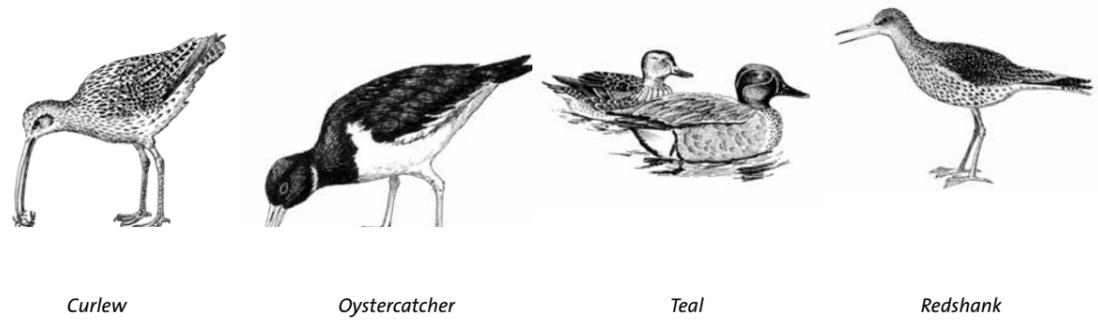
Discover the different birds that are around Booterstown Marsh and Beach. When you see one of the following birds, tick it off on your record sheet below.

Date of Visit: _____ Season: _____

Birds sighting list: Insert tick

- Brent Goose
- Curlew
- Godwit
- Gull
- Heron
- Kestrel
- Little Egret
- Meadow Pipit
- Oystercatcher
- Peregrine Falcon
- Pigeon
- Pintail
- Plover
- Redshank
- Shelduck
- Skylark
- Teal

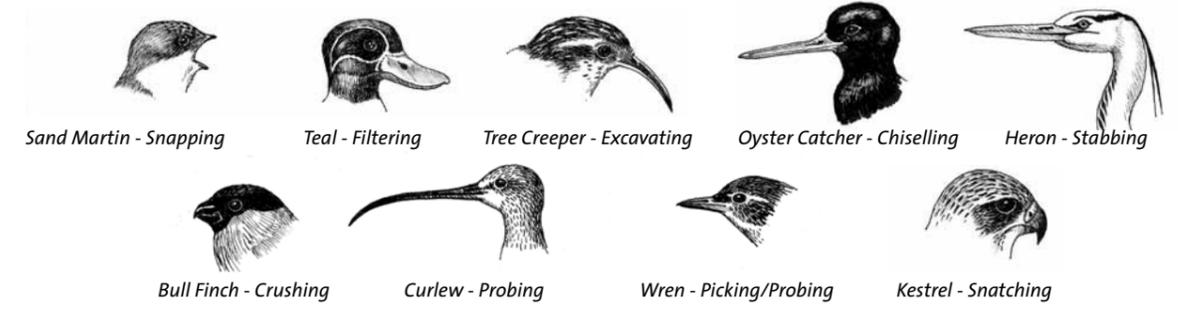
Any new ones?



ACTIVITY SHEET 6 - FEATHERS AND BILL BITS

Bill bits

Different birds have different bills (beaks) that they use for reaching different food in the mudflats and salt marsh. Some are long and others are small. Some are used for prising open the shells of molluscs, others are used for bashing open shells or filtering the food from the seawater. The variety of beak shapes allows large numbers of birds to feed in one area, as the different shapes allow them to eat different things, which reduces competition for food.



Pick two different birds and look closely at their bills. Make the following record.

Name of bird 1: _____

Describe the bill: _____

What food does the bird eat? _____

Name of bird 2: _____

Describe the bill: _____

What food does the bird eat? _____

Birds of a different feather

Pick two different birds and look closely at their feathers. How are different birds alike, and how are they different?

Name of Bird 1: _____

What does it look like? _____

Name of Bird 2: _____

What does it look like? _____

How are the birds the same? _____

How are they different? _____

ACTIVITY SHEET 7 - COUNTING BRENT GEESE

Make a record of the Brent Geese at Booterstown Marsh.

Record Details:

Name of area: _____

Date: _____

Animal to be studied: _____

How many Brent Geese can you see? _____

What is the weather like? _____

Time of day: _____

What are the birds doing? e.g. flying or feeding _____

Describe the habitat:

Any other information:



Brent Goose

ACTIVITY SHEET 8 - GETTING TO KNOW A TREE

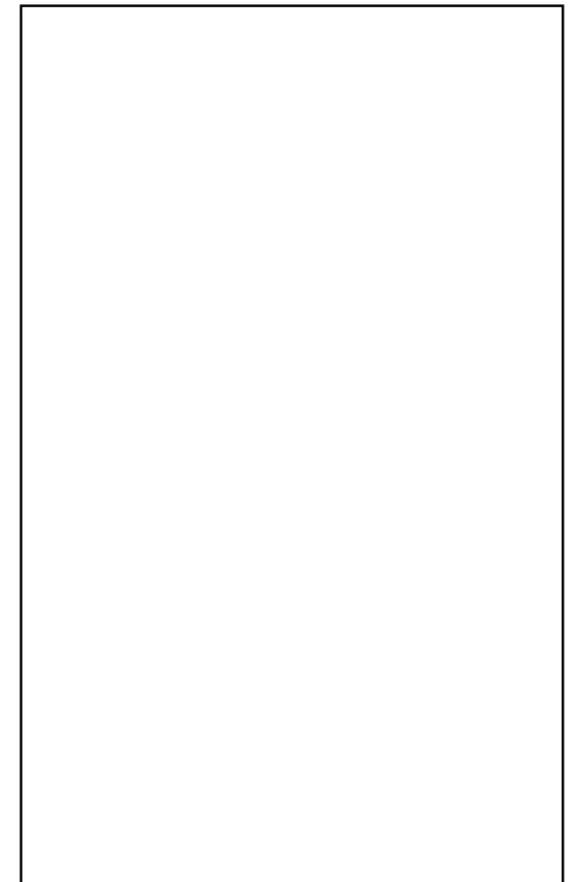
You will need:

- A Pencil.
- A Tree I.D. Guide (see section 8 for details).

1. Choose a tree to study in the hedgerow.
2. Collect and examine a leaf from your tree and if available, some seeds and fruit (the best time for seeds and fruit is late summer/ autumn).
3. What is the name of your tree? _____

(Use the Tree Name Trail Guide to identify your tree from the leaves, bark or seeds). Trees are divided into two main groups. A flattened and wide broadleaf tree loses its leaves every Autumn and are called deciduous, but a conifer is evergreen and keeps its needle like leaves all year round.

4. Is your tree a broadleaf or a conifer? _____
5. Draw and label two things that have been found from your tree. (e.g. leaf, fruit, cone, flower).



ACTIVITY SHEET 9 - BEACH TRANSECT

Many creatures make their home on the beach but we have to search hard to find them. The sea moves up and down the beach with the tides, so different animals and plants are found at different levels of the beach - from the top to the bottom, nearest to the sea.

You will need:

- A Nature Diary.
- A pencil.
- The Beach Name Trail Guide (see section 8 for details of field guides).

Try to find:

- A beautiful shell.
- A stone with a hole.
- Something white.
- A feather.
- Something changed by the sea.
- A work of art.
- Something that has no use in nature.
- Something you like.
- Something with a distinctive smell.
- Something rough.

Choose two items and draw a picture of them in your nature diary. How do they relate to the animals and plants that live in this area?

Safety tips!

Take care around water, no matter how shallow it seems. Wear old clothes and wellingtons.



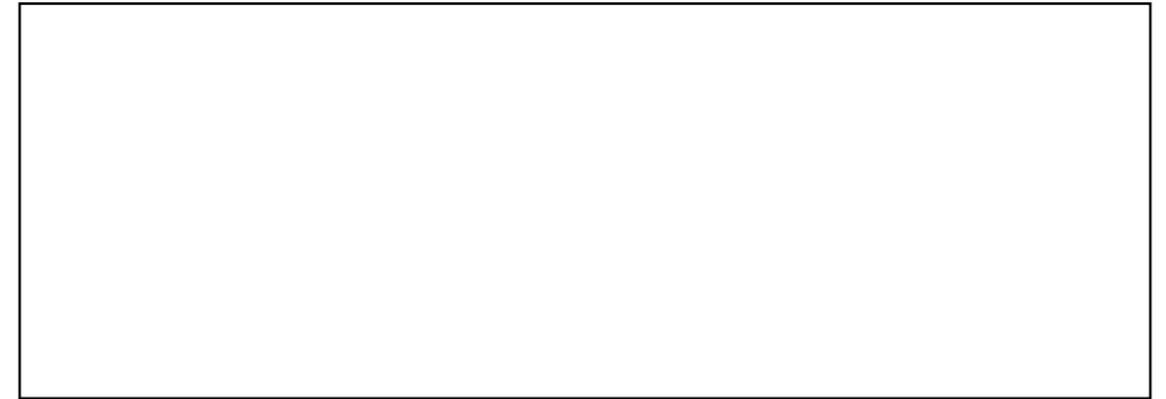
ACTIVITY SHEET 10 - MOLLY & MIKE MOLLUSC

Hi, my name is Molly and I'm a *bivalve* mollusc.

I live in the sand and mudflats where the seawater comes in and out with the tides. I really like Booterstown Beach, there is lots of food but also lots of birds who would like to eat me.

Can you find me?

Draw a picture of Molly:



Hi, my name is Mike and I'm a *gastropod* mollusc. I live on the sea floor and among the seaweed and rocks. You can find me on the beach washed in from the waves. Hermit crabs like to use my shell as their home when I'm finished with it, and carry it on their backs.

Can you find me?

Draw a picture of Mike:



ACTIVITY SHEET 11 - WAVE POWER

The action of the wind and waves on the Irish Sea and Dublin coastline has created Booterstown Beach, a sand spit and young dunes. The sea is both a builder creating new areas, and a taker as it can erode creating new features and taking some of the land back to the sea. The power of the sea is driven by the high and low tides, wind and waves. The waves of the sea cut, carry and deposit material, and this is how we get such features as beaches, sand dunes, headland cliffs, sea stacks, sea arches, sand spits, sand bars, lagoons. Sometimes, the sea erodes material from one place and deposits it further along the shore. This is known as long shore drift.

Waves are caused by friction between the wind and the surface of the sea. When there are strong winds, we get big waves. When the wind is gentle, we get small, gentle waves.

Answer the following questions, while looking at the sea from the beach.

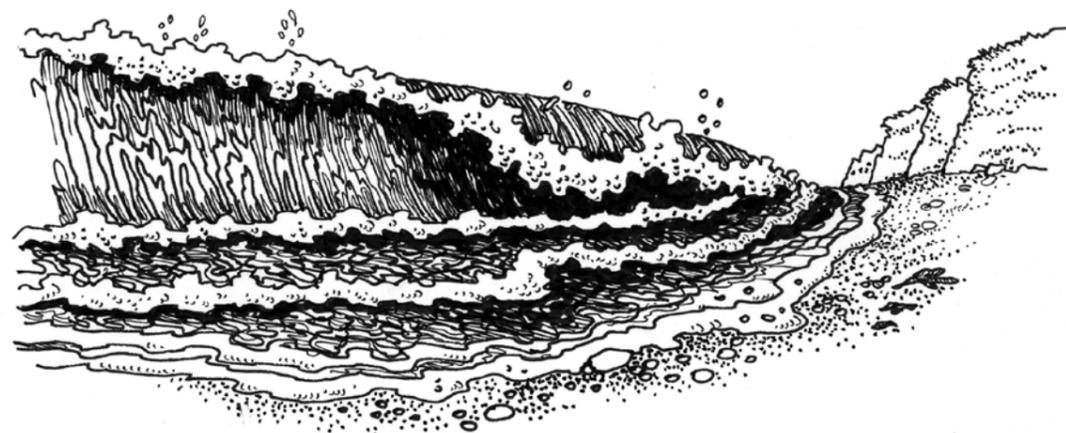
1. What is the weather like on your visit? Describe.

2. What are the waves like at Booterstown Beach? Describe.

3. Can you identify a feature on the beach that was created by wave power?

4. Can you name an animal and plant which relies on this feature?

5. The actions of the Irish Sea helped create Booterstown Beach, True or False?



A. SEASIDE NAME GAME

You will need: 2 small soft balls.

This is a warm up ball game that helps everyone get to know each other and get everyone in the seaside frame of mind. Instruct participants to stand in a circle. Each participant picks a sea creature matching the first initial of their name, e.g. Jessica, a jellyfish. Then the first person with one of the balls throws it gently to another person while shouting out their own seaside name. The next person with the ball calls out their name until everyone has received the ball. Then we repeat the process at speed and try and break our speed record. You can make it even more interesting by adding a second ball 10 seconds after the first one goes around. It helps build up team spirit and gets participants warmed up before other activities are carried out.

B. LIFE OF A SEABIRD

You will need: lengths of string around 6 cm long that resembles worms.

Divide participants into 4 groups that will compete in a relay race for string worms in a central location. Each group member takes a turn at pretending to be a bird running into a middle area, picking up a worm with their beak (hand set in beak shape in front of nose with other hand behind back). The quickest group wins, only one worm can be taken by each person. This demonstrates the life of a bird and competition for food, whilst having fun!

C. HOW LONG DOES LITTER LAST IN THE ENVIRONMENT?

The items of litter and their estimated breakdown time have been jumbled up below. Draw a line between the item of litter and how long you think it will take to break down.

Cigarette ends
Leather
Glass bottle
Orange peel
Tin cans
Wool socks
Plastic

Up to 2 years
Up to 50 years
1-5 years
Indefinitely
1 million years
50 years
1-5 years

Try to find out:

- Which items take the longest to break down?
- Which item do you think will be most damaging to the environment?
- What should be done to reduce the amount of rubbish thrown away?

Answers:

- Cigarette ends – 1-5 years
- Leather – up to 50 years
- Glass bottle – 1 million years
- Orange peel – up to 2 years
- Tin cans – 75 years
- Wool socks – 1-5 years
- Plastic – indefinitely

D. HOW LITTER HARMS WILDLIFE

	Type of litter In this column, draw a different type of beach litter in each box	Dangerous to... Draw an animal it can harm.	Why? Write down the reasons why the litter is dangerous.
1			
2			
3			
4			

There are many different books, guides and websites available to help you identify our native species in the field. Here are a few suggestions but feel free to try others.

Your local library is a good place to start, drop in and check out what they have in their natural history section.

IWT: The Irish Wildlife Trust has information packs available on our native animals. Just contact them and ask for "Fact files on Nature".

ENFO: The Centre for Information on the Environment is an online resource with loads of information on Ireland's biodiversity. Look at their poster and leaflets' section for great information on specific habitat types, and the flora and fauna you can expect to find there.

Websites

- <http://www.iwt.ie> - The Irish Wildlife Trust
- <http://www.enfo.ie> - ENFO Website
- <http://www.iwdg.ie> - The Irish Whale and Dolphin Group
- <http://www.batconservationireland.org> - Bat Conservation Ireland
- <http://www.birdwatchireland.ie> - Birdwatch Ireland
- <http://www.noticenature.ie>
- <http://www.biodiversityireland.ie>

Books

- Habitats:** - Fossitt, J. (2000). *"A Guide to Habitats in Ireland"*. The Heritage Council.
- General:** - Mooney, D. & Sterry, P. (2004). *"Complete Irish Wildlife: Photo guide"*. HarperCollins Publisher Ltd.
- Tracks and signs:** - Preben B. & Preben D. (2006). *"Animal Tracks and Signs"*. Oxford University Press.
- Birds:**
 - Svensson, L., Grant, P.J., Mullarney, J. & Zetterstrom, D. (1999). *"The Most Complete Guide to the Birds of Britain and Europe"*. Harper Collins Publisher Ltd.
 - Caboy, D. (2004). *"Irish Birds"*. HarperCollins Publisher Ltd.
- Plants:**
 - Johnson, O. (2006). *"Tree Guide"*. HarperCollins Publisher Ltd.
 - Blamey, M., Fitter, R. & Fitter, A. (2003). *"The Wildflowers of Britain and Ireland"*. A & C Black Publishers Ltd.
 - Rose, F. & O'Reilly, C. (2006). *"The Wild Flower Key: How to identify wild plants, trees and shrubs in Britain and Ireland"*. Penguin Group.
- Invertebrates:**
 - Chinery, M. (2004). *"Butterflies"*. HarperCollins Publisher Ltd.
 - Chinery, M. (1993). *"Insects of Britain and Northern Europe"* HarperCollins Publisher Ltd.

Field Charts

The Field Studies Council (FSC) is a British organisation that publishes a wide range of well illustrated identification guides. Most of these will be useful for Irish species too, for example;

- | | |
|--|--|
| 1. A guide to mammal tracks and signs. | 8. Urban lichens on stone and soil. |
| 2. Butterflies. | 9. Urban lichens on trees and wood. |
| 3. British land mammals. | 10. A guide to hedgerows. |
| 4. Day flying moths. | 11. A key to the major groups of freshwater invertebrates. |
| 5. Bugs on bushes. | 12. The rocky shore name trail. |
| 6. The woodland name trail. | 13. Common seaweeds. |
| 7. Tree name trail. | |

They can be bought directly from their website at the following address:
<http://field-studies-council.org/publications/foldout.aspx>

The tide comes in and out twice every day, so there are two low tides and two high tides each day. The time of these tides changes each day and varies with location. The daily tide times for Dublin or Dun Laoghaire can be found in the daily newspapers such as on the Bulletin Page of The Irish Times or on the following websites:

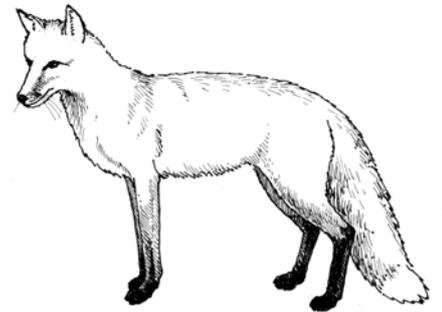
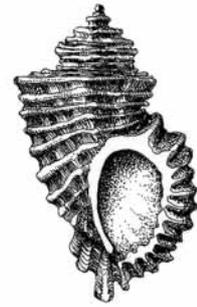
<http://www.irishtimes.com/weather/tides.html>

<http://www.dusac.org/node/12>

<http://www.sailing.ie/inside/default.asp?pageld=309>

1. Please advise students to wear appropriate footwear, i.e. runners or waterproof footwear. If it has been raining, advise Wellingtons.
2. Ask students to wear clothing that is appropriate i.e. school tracksuit or otherwise just in case they dirty their clothes.
3. Please ask the students to bring their coats or rain gear to school especially as the weather can be unpredictable.
4. Please instruct the students to not run away from the group and to stay in eye sight of their teacher or an instructor and listen to the instructions at all times.
5. Students must stay behind their teacher or instructor at all times on the site visit as they know the way.
6. If the students see something outside of the immediate area, they must seek permission and let it be known where they are going.
7. Bring a first aid kit with you for any cuts or stings.
8. Let them enjoy themselves and learn lots about nature.

Curriculum Title	Social, Environmental, Scientific, Education					Arts Education (Visual Arts)	
	Skills and concept Developments	Strands				Skills and concept Developments	Strand
Activity sheet	Geographical investigation skills including questioning, observing, recording and communicating, analysing sorting and classifying	Natural environments including the local environment	Environmental awareness and care	Living things including plants and animals	Human environment including natural environmental features and people, settlements including homes and other buildings	An awareness of form, texture, pattern and rhythm	Drawing including making a drawing, looking and responding
1	√	√	√	√		√	√
2	√	√			√		
3	√	√	√	√	√	√	√
4	√	√	√	√		√	
5	√	√	√	√		√	
6	√	√	√	√			
7	√	√	√	√			
8	√	√	√	√		√	√
9	√	√	√	√		√	√
10	√	√	√	√		√	√
11	√	√	√	√			



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