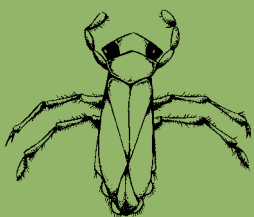




Pond Study

Roe Valley Country Park

NIEA | Northern Ireland
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Ponds

A pond is different from a river. Rivers are generally fast flowing. Ponds are hollows with water in them. There is very little water flow in a pond. In this still water a whole community of plants and animals can grow. The pond at Roe Valley Country Park has been there for a very long time. Old maps as far back as 1782 show the pond. It is thought to have been a quarry from which the stones to build Limavady town were taken. By the year 2000 the pond had been neglected for a long time. It had become completely choked with dead leaves. The pond was cleaned out. Water plants were replanted and wildlife encouraged to develop in the pond. By 2003 the pond had a wide variety of wildlife.

Habitat and Biodiversity

At one time there were many more ponds than we have today. Farmers needed ponds for their cattle. They now have piped water. Ponds were also needed to make linen. These ponds have disappeared. This has reduced the habitat available to wildlife. This means that many pond creatures become rarer. The word for the variety of life is biodiversity. Our native biodiversity is being reduced due to the lack of pond habitat.

Safety

Ponds are very interesting places to study. They are also very dangerous. Steep sides and mud at the bottom can make even the shallowest water very dangerous. Your visit to the pond will have been very carefully supervised. The next few pages will look at some of the things you studied on your visit to the park.

The Pond at Roe Valley Country Park



Pond Identification Chart

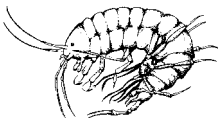
Creature Tally

Total

Snail



Shrimp



Beetle Larva



Whirligig Beetle



Tadpole



Creature Tally

Total

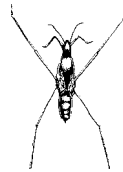
Spider



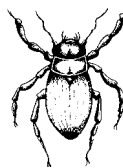
Caddis Fly Larva



Pond Skater



Great Diving Beetle

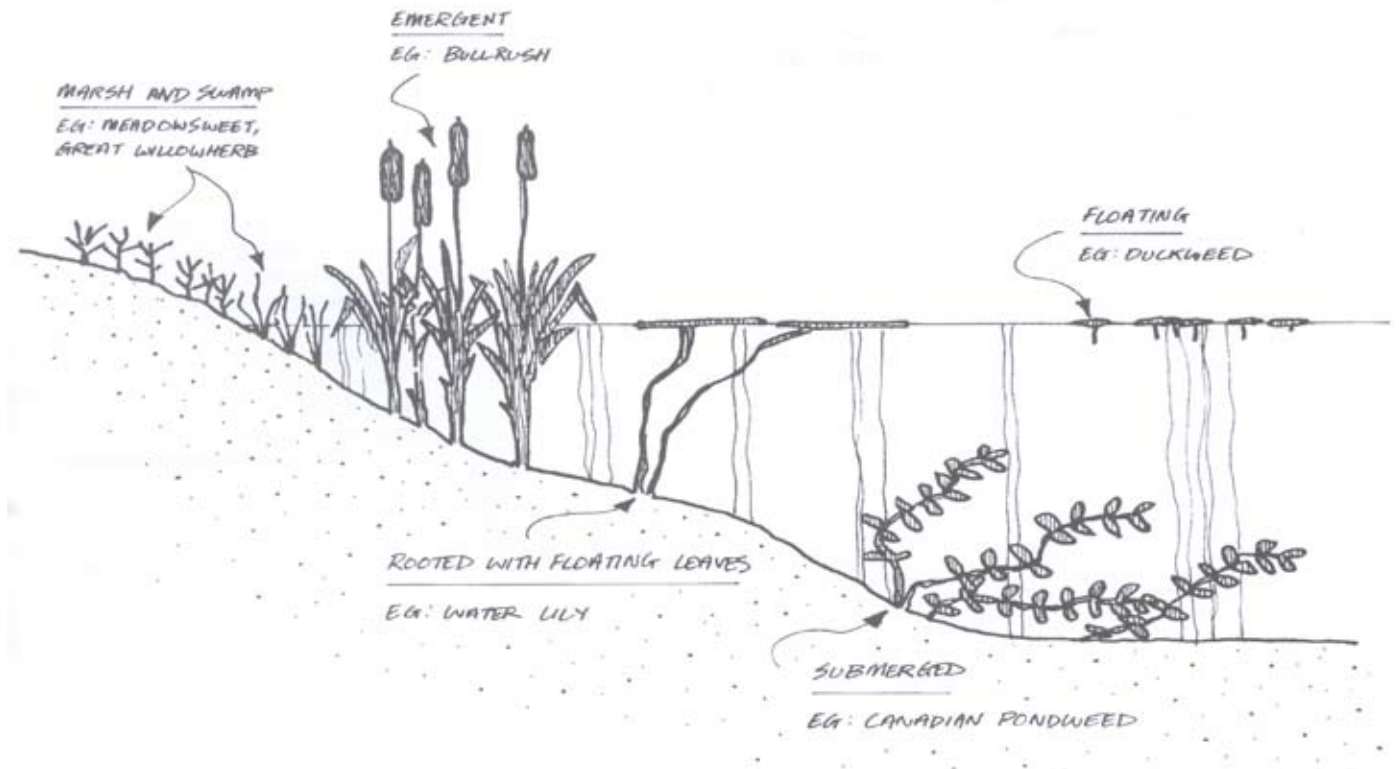


Water Boatman



Other Creatures

POND PLANTS



Pond Plants

The picture above shows many of the plants you would expect to find in a pond. The pond at Roe Valley Country Park does not have all these plants because the pond was scrapped out some years ago. Plants were introduced but not all of them have grown successfully.

Photosynthesis

Plants are different to animals. Plants can make their own food. They do this by using water, minerals and carbon dioxide to absorb the sun's rays. This is called photosynthesis. Plants are essential for all life on earth. They absorb carbon dioxide and produce oxygen which allows animals to breathe. They also provide food for animals to eat. This is true for all ecosystems be it on land or water. A simple way to understand this is to think of a food chain: sun, grass, rabbit and fox. Food chains also exist in ponds and all of them depend upon plants.

Plankton and Algae

The smallest plants in ponds are plankton. These are so tiny that they cannot be seen except with a microscope. They provide for many of the smaller creatures in the pond. Another small plant is algae. This can sometimes be seen floating on ponds as what looks like a green scum. Algae can become a problem in some ponds. Farmers use chemicals called nitrates and phosphates as fertiliser. If too much of these wash into ponds they can cause an increase in algae growth. You can sometimes see this as a carpet of green covering the whole pond. The algae use up all the oxygen in the pond killing off all life in the pond. Pond life can also be destroyed by bacteria. Sometimes a pond can be filled with leaves. Bacteria, which rot the leaves, use up all the oxygen in the pond. This kills off any other life in the pond.

Plant Succession

If you look at the pond you will see that some plants live entirely outside the water and some live entirely in it. Others are partially in the water. Flowers like forget-me-nots and marsh marigolds live in the wet ground around the pond. Reeds have their roots in the pond but most of the plant is above the water. Water lilies float in the pond and are attached to the bottom by long stems. You will also see Canadian pond weed which is completely submerged under the water. Each of these plants need special adaptations to survive where they grow.

POND CREATURES

You will have found many strange looking creatures in the pond. Because they all live in water they are different from land based animals. They are adapted for living in or on water. This means have things on their bodies which allows them to live successfully in this environment. One of the problems they must solve is breathing in the water. They do this in a wide variety of ways. They must all eat. Some eat plants others eat other creatures in the water. You will also be given information about the group of animals to which the creature belongs. A further complication is that some of the creatures you find will be at different stages of development. The most obvious example is the tadpole. The tadpole is part of the life cycle of a frog. Some of the creatures you find will be part of the way through their life cycle. Below is some information about some of the creatures you might have found. This information tells what size they are. What they look like. What type of animal they are. How they breath. What they eat and some of their habits.

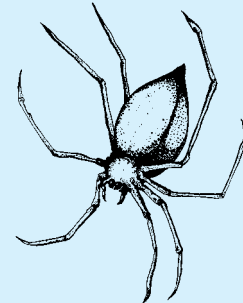
Snail

You will find many snails in the pond. They can vary from 25mm to 50 mm in size. Like all snails they have a hard shell. They are molluscs and are closely related to their land cousins. There are many different kinds of snail to be found in the pond. The water snail floats about. It has gills which allow it to breath under water. The pond snail and the ramshorn snail cannot breath under water. They hold air in their shells and must come to the surface when their air runs out. All the snails eat algae.



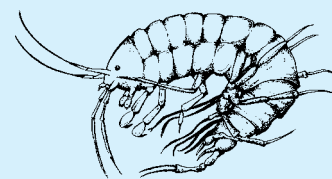
Water Spider

Water spiders can be about 16mm. They are arachnids. They cannot breath under water. They spin a web and use it as an air bell. They are able to breath in this air bell. They spend most of their time in this air bell only coming out to catch the small creatures they eat. You will catch lots of spiders but not all of them will be water spiders. Some of the spiders you catch will simply be hiding in the plants above the water.



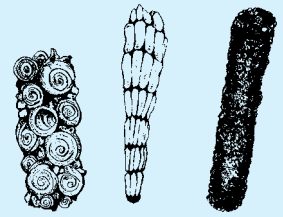
Shrimp

The shrimp is about 16mm long. They have 7 or 9 pairs of legs. They swim on their sides. The shrimp is a crustacean related to crabs, lobsters and woodlice. It breathes using gills. Shrimps eat floating dead matter in the pond. They will not live in polluted water. Their presence means that the pond is not polluted.



Caddis Fly Larva

You will have found various kinds of caddis fly larva cases. They are about 20mm long. They can be made from plants, stones or shells. The caddis fly is moth like fly. Like many insects it has a life cycle of egg, larva, pupa and adult. The adult caddis fly lays its eggs in water. The larva stage makes it own case from silk like material surrounding this inner case with different material. The pupa stage also remains in the case. Eventually the adult fly emerges and begins its short life as a fly.



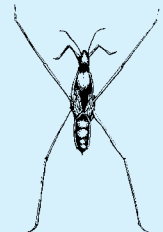
Beetle Larva

Many insects have part of there life cycle in water. Dragonflies, damsel flies, caddis flies and mayflies all leave the water at the adult stage. Others remain in the water only occasionally flying. Their larva stage lives in the water feeding on smaller creatures. You will find various kinds of larva in the water. The one shown here is the larva of the great diving beetle. It is the largest larva in the pond about 50 mm when fully grown. It is fierce predator eating whatever it can catch.



Pond Skater

Pond skaters are the first creatures you will notice on the water. They are about 20mm across. You will be able to tell immediately that they are insects as they have 6 legs. These are held out from the body so it can spread its weight as widely as possible. This allows it to move across the surface very quickly allowing it to catch its prey, the small creatures which live on the surface. Some species of pond skater can fly others cannot.



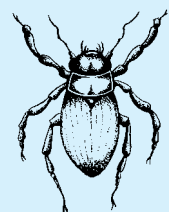
Whirligig Beetle

In spring time and early summer the whirligig beetle is very obvious on the surface of the water. You will see large numbers of them whirling about in the manner that gives them their name. They are small beetles about 15mm long. They whirl about on the surface to disturb the small creatures they eat.



Great Diving Beetle

You will be lucky if you can catch one of these very large beetles. They are about 40 mm long. This beetle is a voracious predator. So far there are no fish in the pond, the great diving beetle is at the very top of the food chain. It eats everything else in the water. It cannot breathe under water. Like a scuba diver,



Water boatman

The water boatman is an insect. It is about 15mm long. It feeds at the bottom of the pond on dead material trapped in the mud. It swims upside down on the surface using its long legs much like a rower on a boat. It cannot breathe under water so it makes frequent trips to the surface to breathe. The adult water boatman is brown. You will also find a smaller creature looking a lot like the water boatman. It is bluish colour. This is the nymph of the water boatman. Nymphs are part of the life cycle of these insects.



Tadpole

In spring time and early summer you will find tadpoles at various stages of development. It takes about 15 weeks for the tadpole to develop from the frogspawn into a fully formed frog. In early spring the frogs come to the pond and lay their spawn. The tiny tadpoles hatch from the spawn and gradually grow bigger. At first they are like fish breathing through gills. Gradually they develop lungs. When they first hatch they graze on algae. As they grow bigger become carnivorous eating smaller creatures and even each other. Many creatures also eat them so as the summer progresses there are less and less of them in the pond. Eventually in early summer they leave the pond as fully formed but tiny frogs.

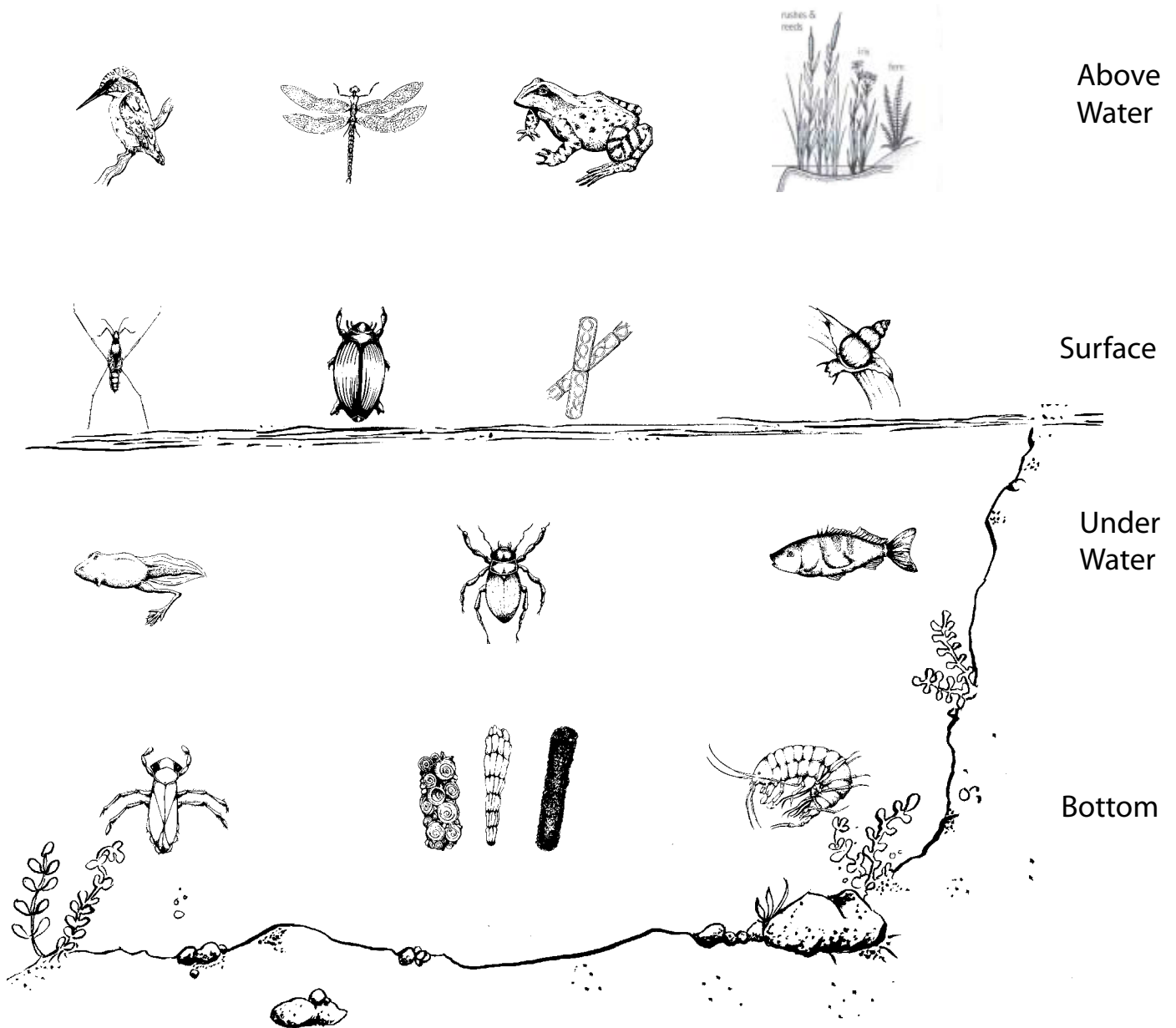


Newt

Newts can easily be mistaken for a small lizard. Adults can be 100 mm long. They are not reptiles. They belong to the same groups of animals as frogs. They are amphibians. Amphibians can breathe both in and out of water. When out of the water they use lungs. Underwater they can absorb oxygen through their skin. Amphibians must return to the water to breathe. Newts lay their spawn in water at the same time as frogs. It does not form clumps like frogspawn but is attached to water plants in a bead like formation. The spawn produces fish like tadpoles which gradually develop into fully formed newts. Newts take much longer to reach the adult form than frogs. They can be fully developed by August but many take a full year to mature. Many people think that frogs and newts live in ponds. This is not true. They spend most of their time on land. They only come to ponds to breed in springtime. Both frogs and newts hibernate in winter.



Life in the Pond



Food Chains and Ecology of the Pond

The picture above illustrates some of the life in the pond. All life in the pond depends upon the ability of the plants to photosynthesise. The animals are then able to feed from the plants. You will be familiar with the idea of a food chain. One simple food chain might be:

Sun- algae- tadpole- kingfisher.

To this we could add the water boatman which eats dead material at the bottom of the pond. There will be many others you could think of. All these food chains added together form an interconnected web that make up the pond ecosystem. The idea of an ecosystem means that all the living things in the pond depend upon one another. We have seen that ponds are very susceptible to pollution. This can destroy the pond ecosystem. Ponds are very important for wildlife of all sorts, biodiversity. It is important that we conserve them.

GLOSSARY

Algae: Tiny plants which live in water.

Adaptation: How an animal or plant fits in with its environment.

Amphibian: A group of animals like frogs, newts and toads which can live either in water or out of it. They need water to lay their eggs.

Arachnid: A group of animals which includes spiders, mites and scorpions. They have 8 legs.

Biodiversity: All the living things on earth, anything from a microbe to a whale.

Carnivore: A meat eating animal.

Conservation: Care for the environment including habitats and biodiversity.

Crustacean: A group of animals including crabs, lobsters, shrimps and woodlice. They usually have jointed bodies many legs and a hard shell.

Ecology: The study of ecosystems.

Ecosystem: All the things, (sunlight, minerals, air, and living things), which act together to maintain a successful habitat.

Fertiliser: Chemicals used to help crops grow.

Insect: A jointed animal with six legs.

Habitat: An particular place like a woodland or a pond which has its own special wildlife.

Herbivore: A plant eating animal.

Metamorphosis: The change of form that some creatures pass through during their life cycle.

Mollusc: A soft bodied creature with a shell.

Nymph: The middle stage of the metamorphosis of some creatures like dragonflies.

Photosynthesis: The ability of plants to use minerals, water and air to absorb the power of the sun and make their own food.

Plankton: Tiny single cell animals and plants which live in water.

Pool: A small area of flat water.

SUGGESTED FOLLOW-UP

1. Write a short account of your visit to the pond. You could include the following things

- The name of your school
- What the date was
- What season of the year it was
- What the weather was like
- What equipment you used
- Describe the park and the pond
- Include a list of all the animals your group found
- Say what you found out about pond life
- Compare the pond with any other habitat you may have visited
- Say if you enjoyed your visit

2. Make graphs of all the species you found

3. Draw one of the creatures you found. Write a short description of it.

4. Odd one out: Here are five groups of creatures. In each case say what is the odd one out. Give a reason for your answer:

- a. Pond weed, frog, dragonfly, kingfisher
- b. Tadpole, beetle larva, dragonfly nymph, frog
- c. Whiligid beetle, dragonfly, pond skater, newt
- d. Frog, newt, lizard, toad
- e. tadpole, stickleback, water boatman, shrimp

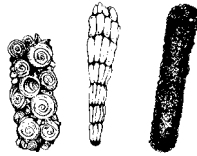
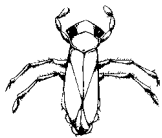
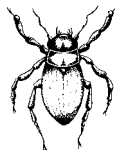
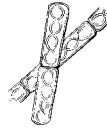
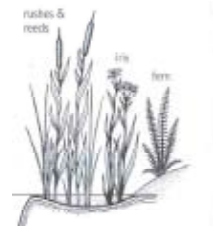
5. Put these lists in the correct sequence:

- a. Butterfly, egg, caterpillar, chrysalis
- b. Egg, pupa, adult, larva
- c. Spawn, frog, tadpole with gills, tadpole with lungs
- d. Egg, dragonfly, nymph

6. Give an example of the following types of living things which you might find in the pond habitat

- Plant
- Mollusc
- Insect
- Crustacean
- Amphibian
- Bird
- Mammal

7. Pond Life



Label the wildlife above: shrimp, caddis fly larva, water boatman, tadpole, great diving beetle, stickleback, kingfisher, dragonfly, frog, snail, algae, whirligig beetle and pond skater. The vegetation has already been done for you.

Discuss the possible food chains between these creatures

8. Imagine a developer wishes to drain the pond to make way for houses, factories or a caravan site. Write a short letter to the local council. Object to the developers plans. Explain why you think the pond is important. Mention the word 'biodiversity'.



Northern Ireland Environment Agency
 Klondyke Building
 Cromac Avenue
 Gasworks Business Park
 Lower Ormeau Road
 Belfast BT7 2JA
 Tel: 0845 3020008

www.ni-environment.gov.uk

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