



Conservation Education

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Contents

2 Plants
Animals

3 Is It A Bird?..
Molluscs
Amphibians

4 Newts
Is It A Toad Or A Frog?
Birds
Reptiles
Fish
Mammals

5 Food Chains And Webs
Hold Your
Breath!

6 Fleas & Lice Welcome
Pond Pollution
Frogs' Legs Anyone?
Snails Please, Garçon!
Did You Know?

7 Rubbish!
Your Local Pond Needs You!

8 Nature
News

What Is A Pond?

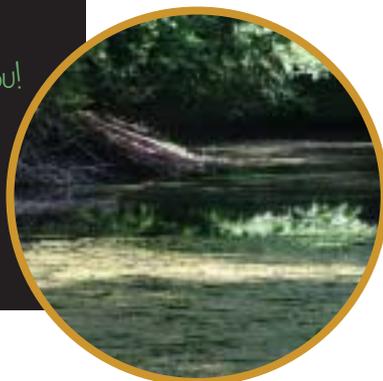
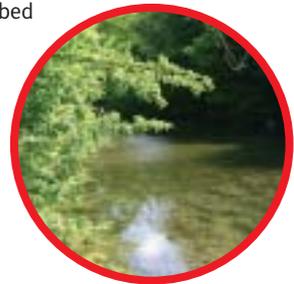
Picture a pond in your mind. What do you see? Frogs on lily pads and a few ducks a-dabbling? Or shrimps, dragonfly larvae and diving beetles scurrying around beneath the surface? Perhaps you see your ornamental goldfish being eyed up by a hungry heron. Whatever the picture in your mind, you will have imagined a fairly small area of still, fresh water. Ponds come in all shapes and sizes but are smaller than lakes and don't have flowing water like a river.

History Of Ponds?

Ponds used to be found throughout Britain, in villages, on farms, in woodlands and in gardens. Most of them were man-made, whether it was for washing and cooking (before the days of pipes and taps), as a place to keep fresh fish to eat, as drinking water for farm animals (dew ponds), or even as water for working mills – a mill pond. Whatever its history, every pond needs regular care and attention if it is to survive. Left to nature, ponds quickly become overgrown, turn into marshy ground and eventually dry up completely.

It is a sad fact that there are half the number of ponds in Britain than there were just 50 years ago due to the building of new

roads, houses and offices. Ponds are now described as endangered. This means there are not many of them left and if ponds are not protected, they may be lost forever.



Plants

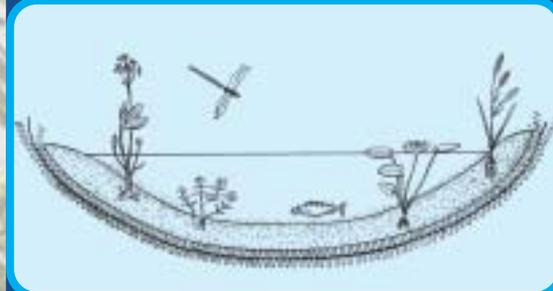
Plants are an essential part of any habitat, as they provide food and oxygen for the animals. If there is not enough oxygen in the water, not many different types of animals are able to live there. Plants also provide valuable shelter for animals as well as an ideal place to lay eggs, particularly for newts and water beetles.

- **Phytoplankton.** These plants are microscopic which means you cannot see them floating in the water – you would need a microscope. They may be small but they are a very important part of the habitat as food and shelter for lots of the smaller animals.
- **'Free floaters'.** These are plants such as duckweed, water fern and frog bit - their roots don't reach the bottom of the pond and they dangle in the water while the leaves and flowers float around on the surface.
- **Some plants grow totally submerged** underwater on the pond bottom. Examples include bladderwort, water violet (which is now very rare) and water milfoil, as well as several pondweeds. These are the plants that provide the pond with most of its oxygen and they need a clear pond surface in order to allow the sunlight through to reach their leaves.

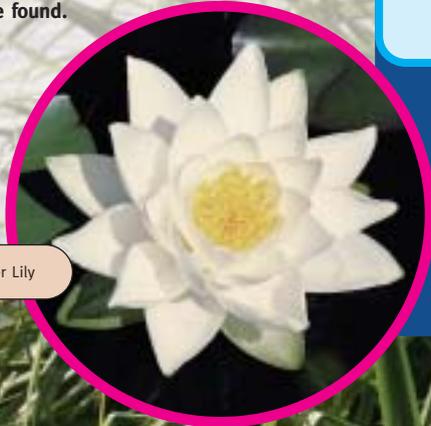


- **Water lilies** are one of the more well-known species found in ponds. They have their roots buried in the mud on the pond floor but their leaves float on the surface. Another example is crowfoot.
- **At the edge of the pond,** where the water is shallow, plants like reed mace, water plantain, sedges, yellow iris and true bulrush like to grow, where their roots are often in the water but the leaves and flowers are in the dry air above. Further up the bank where the ground is wet but the roots won't be permanently waterlogged, species such as willow herb and meadowsweet can be found.

Each area where these plants are found can be called different 'zones' – aquatic, marsh and bank side. Can you identify the zones in your local pond?



To survive these various conditions, the plants are specially adapted. This means they will have special 'designs' to help them survive in their different zones. For example, the lilies have large, flat leaves that help them float at the surface where they will be able to get plenty of light for photosynthesis. This is the process by which plants make food using the sunlight.



Water Lily

Animals

Invertebrates

Most of the animals found in ponds are invertebrates (animals without a backbone). Around the edge of the pond you may see several different types of insect, such as



dragonflies, damselflies and mayflies. One stage of these animals' lives is spent in the water (see 'pond insect life cycles') so as adults they stay near the pond edge.

Pond skater. These are the insects you will see skimming on the water surface. They appear to only have 2 pairs of legs but in fact, like all adult insects, they have 3 pairs. The two long pairs are for moving across the water surface and the other pair is shorter and used for finding and

grabbing food. Have you ever wondered how they are able to 'walk on water'? Well they have a special row of hairs on their feet, which spread their weight better so they don't sink.



Whirligig beetles.

These are the small, shiny, frantic insects whizzing around in circles on the water surface. Their name suits their behaviour as they seem to spend a lot of time in a whirl, although occasionally they do dive into the water, either for food or when they are alarmed. They eat other small insects and have flat, hairy legs to help them whiz about on the surface.



Water boatmen are some of the insects you'll find under the surface. The lesser water boatman swims the right way up and is smaller than the greater water boatman, or 'backswimmer', that swims upside down. The backswimmers have an extra long pair of legs that look like a pair of oars of a rowing boat. These help them swim around looking for prey as well as paying regular visits to the surface for air. The lesser water boatmen eat plants and are therefore herbivores while the backswimmers are fierce meat-eating carnivores.



Animals Continued

You may find the nymphs and larvae of a number of aquatic insects in the pond.

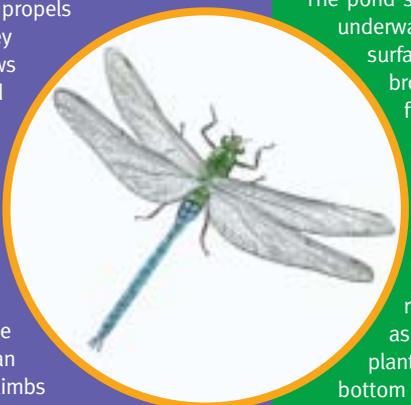
These are the young that undergo some kind of change to become an adult.

Larvae look nothing like their parents and have to undergo a change called metamorphosis in order to turn into an adult (see 'pond insect life-cycles'). An example of an aquatic larva is the great diving beetle. Both the adult and larvae are fierce carnivores and prey on any other animals in the pond, including frogs, newts and sticklebacks!

Nymphs look more like the adult but without wings and do not undergo metamorphosis; instead they shed their skins a number of times during their nymph life, as they grow bigger, before developing wings.

Dragonfly nymphs crawl around on the bottom of the pond and if they want to speed up they squirt water out of their abdomens, which propels them forward! They have fearsome jaws that are concealed within a 'mask' that shoots forward so the jaws can grab the prey – eek!

When the dragonfly nymph is ready to become an adult (which can take 5 years), it climbs out of the water onto a plant stem, and the skin on its back splits open. The squashed looking adult will slowly crawl out. When the wings have unfolded and dried off it will fly off. This usually happens at first light so if you want to see it happening, you'll have to set your alarm very early! Later in the day you may find the empty nymph skin cases still clinging to the reeds.



Is It A Bird? Is It A Plane? No, It's A Dragonfly!

There are several different types of dragonflies and damselflies that are all shapes, sizes and colours. Telling the adults apart can be tricky:

Dragonflies are swift, agile fliers that look fatter and stumper than the damselflies. They catch their prey on the wing and when they rest, they keep their wings opened out flat to the sides.



Dragonfly

Damselflies tend to be longer and thinner and capture their prey in amongst the plants. They are generally smaller than dragonflies and have a more fluttery flight. When they are resting on a leaf, they close their wings together over their back.

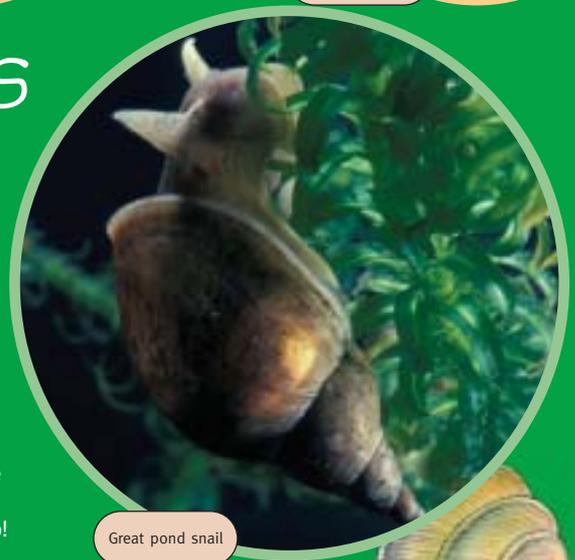


Damselfly

Molluscs

Molluscs that can be found in water include the pond snail, ramshorn snail (so-called because it looks like the curly horns of a male sheep) and freshwater mussels and limpets.

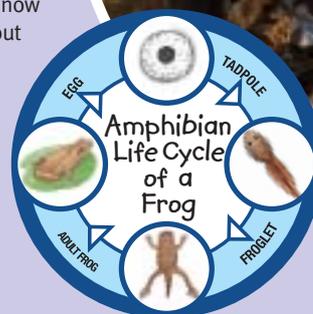
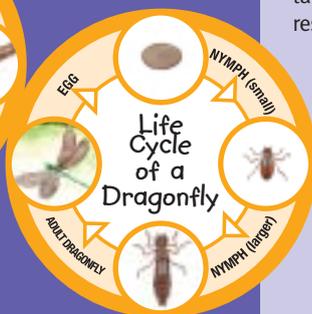
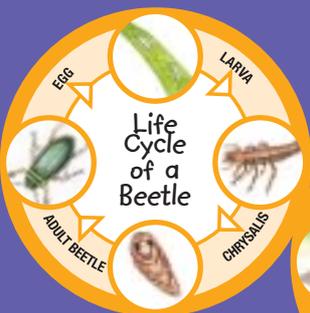
The pond snail cannot breathe underwater and needs to surface regularly to breathe. There are also freshwater crustaceans in ponds, such as the freshwater shrimp. The shrimp has a very important cleaning job! They eat algae (green slime) that grows on rocks and stems as well as the dead leaves and plants that fall to the bottom of the pond.



Great pond snail

Amphibians

Amphibians ('amphi' = 'both' and 'bios' = 'life') are animals such as frogs, toads and newts that have both an underwater and a land phase in their life cycle; the adults can even breathe both underwater and on land. Amphibians lay their eggs (spawn) underwater. They are protected by slippery jelly to keep them warm and to prevent them drying out. Tadpoles hatch out of the spawn - they have gills to breathe under water. Over the next couple of months, they grow legs, lose their gills and tails and develop simple lungs - they now resemble tiny frogs and can breathe out of the water. When they are in the pond, they drink and 'breathe' by absorbing water and oxygen through their skin! This enables frogs to hibernate for several months at the bottom of the pond without surfacing at all.



Is It A Toad Or A Frog?

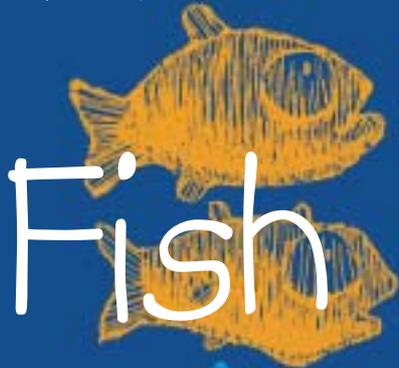
To tell the difference between the Common Frog and Common Toad that live in the UK, here are a few helpful tips:



Frogs appear to have smooth, shiny skin. They have big strong back legs that they use for leaping out of harm's way. They lay their spawn in warm, shallow water and it is laid in clumps. Frog tadpoles are brown and speckled.



Toads tend to have drier, lumpier skin. Their back legs are not as strong and developed as a frog's because they tend to crawl around more. Toads have 'warts' or sacs behind their eyes that contain poison to make any fox or dog spit it out quickly. Toad spawn is laid in strings and the tadpoles are jet black.



Fish

Very few fish inhabit small garden ponds, unless they are stocked with Ornamental Carp (Goldfish). In larger ponds, wild native fish such as sticklebacks may occur. They have spines (stickles) on their back that they stick up to scare off any hungry predator. In spring, the male stickleback develops a bright red belly that is intended to attract the females!

Newts

You may be lucky enough to have newts living in your pond. These are animals that resemble lizards, only they are not reptiles, they are amphibians, like frogs and toads. They too lay eggs in the water, only they lay them singly on the underside of leaves. Newt tadpoles look like miniature adult newts, only with external gills.

There are three types of newt in Britain – the Great Crested, Smooth and Palmate Newts. The Great Crested Newt is the largest and the male has a crest running down his back. The Smooth Newt is the most common and has no crest and the Palmate Newt has webbed hind feet. All three are endangered and protected by law.



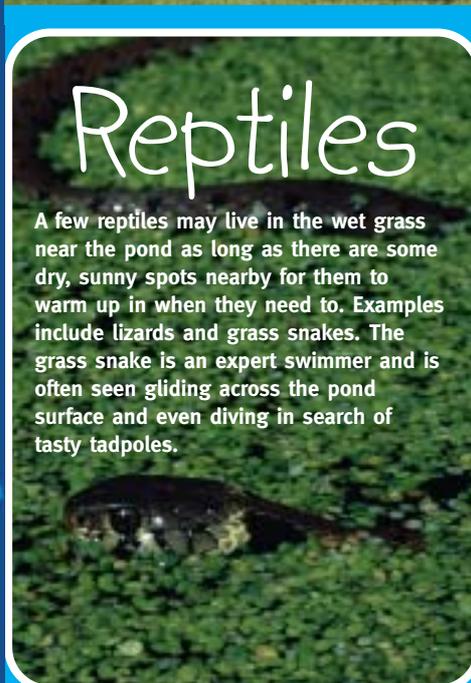
Many garden birds will visit a pond for a drink or a wash, but the ones that are most at home on or near water include ducks, geese and the heron. Small garden ponds will not be big enough to support ducks and geese, but herons may well visit, particularly if there are goldfish in there! On larger village ponds and lakes, mallard ducks, moorhens and coots may set up home. Ducks like to nest on the ground amongst tall vegetation. The female mallard duck has brown speckled feathers that make her very well camouflaged amongst the reeds. Coots and moorhens are not very camouflaged so they often nest on floating vegetation or islands, so that there is water between them and danger!

Birds



Reptiles

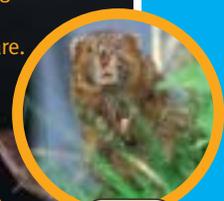
A few reptiles may live in the wet grass near the pond as long as there are some dry, sunny spots nearby for them to warm up in when they need to. Examples include lizards and grass snakes. The grass snake is an expert swimmer and is often seen gliding across the pond surface and even diving in search of tasty tadpoles.



Mammals

In larger village ponds there may be water shrews and water voles scurrying around the inlet stream, although sadly water voles are getting rather rare.

Bats are often seen flying low over ponds, catching the insects flying over the water in the evenings. Hedgehogs may well visit if there is lots of damp grass for slugs and snails and foxes will often hunt out a frog as a tasty snack!



Water Vole



Fox

Food Chains And Webs

Now all these plants and animals don't just live quietly in the pond minding their own business. No, they all need to eat and reproduce and a closer look at life in the water reveals a world of competition, murder and passion! Everything has to eat to survive; let's take a look at who eats what and how they do it:

Herbivores

These are the plant eaters of the pond. Examples include the ramshorn snail and water louse. These animals will have mouthparts suitable for chewing leaf material. For example, did you know that snails have thousands of tiny teeth on their tongues? Any herbivore may in turn find itself becoming dinner for one of the many meat eaters in the water.

Carnivores

Many of these meat-eaters are ferocious predators, many of which have incredible jaws for catching their prey. For example, the water scorpion has big front legs for grabbing smaller creatures. Great diving beetles are famous for their fearsome jaws and huge appetites as are the dragonfly nymphs. There are also smaller carnivores that are just as bloodthirsty as these giants. Examples include the little whirligig beetles and pond skaters. The pond skater can pick up the vibrations of its prey with

its long legs. The water spider is another predator in the pond -it comes out at night to catch its prey under the cover of darkness.

Omnivores

These animals eat both plant and animal matter and a good example in a pond is the tadpole. Tadpoles eat anything, including dead plants and animals, even other dead tadpoles!

Detritivores

Dead plant and animal material is called detritus and the animals that eat it, like the freshwater shrimp, are known as detritivores. This means that any nutrients lost due to the death of plants and animals can be recycled back into the system, to be passed on to the next carnivore that eats the shrimps.

If the feeding relationships in a pond are written down, it would look something like this – it is known as a food chain:



Of course, life is rarely this simple and the animals in the pond will feed off a variety of plants and other animals. The diagram then becomes a food web. Using all this information, plus your own research, can you create your own food chains and webs for a pond?

Hold Your Breath!

We have seen how amphibians are able to get oxygen under water, but what about the other animals? Let's have a look at how some other animals are adapted to breathe without the help of gills:

Water Scorpion - This scary looking insect has a very misleading name, as it is not even related to scorpions (it is an insect with 6 legs; scorpions are an arachnid with 8 legs), nor does it sting. The fearsome looking spike is in fact a 'snorkel' – a tube that it sticks out of the water surface to breathe.

Water Spider - This is a real spider – an arachnid with 8 legs – but like its land cousins, it cannot breathe underwater. This clever fellow spins a 'diving bell' amongst the underwater plants to live in. It fills the bell with air by collecting air bubbles from the surface on its hairy legs, which it carries back down to the diving bell. It then retreats into the bell and seals it up!

Diving Beetle - This sometimes looks silvery – this is because it swims around carrying air bubbles trapped under and around its wings. This supplies it with oxygen that it slowly absorbs as it goes about its underwater business. When it runs out, time to go back to the surface to collect some more!

Water Scorpion

Fleas & Lice Welcome

A healthy habitat needs lots of food at the lower end of the food chain, and freshwater fleas and lice are vital food for several of the carnivorous animals in the water. They also help to keep the amount of algae down as the fleas munch it all and help prevent it getting out of control.



Pond Pollution

Ponds are easily polluted which means they can quickly become 'dirty' with liquids and litter that are not meant to be in there. An example is the chemical sprays (herbicides and pesticides) that farmers use to kill the weeds and pests in their crops. When it rains, these toxic chemicals can get washed off the fields into nearby ponds and rivers, which poison the wildlife in the pond.

Fertilisers can also cause problems. These are sprayed onto the crops to make them grow bigger and faster, but they can also get washed into ponds. This causes the plants, particularly algae, to grow very quickly and it can get out of control. All this extra algae not only blocks out the light for any plants below, but it eventually dies and decomposes with the help of lots and lots of bacteria. These extra bacteria use up a lot of oxygen in the pond, which the other animals need to survive. This problem is called eutrophication.



Did You Know!

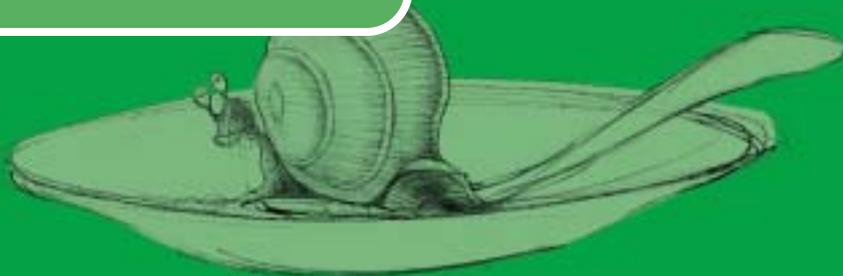
- Frogs and toads can't swallow – they blink and roll the food down their throat with their eyeballs!
- Water boatmen 'sing' to attract a mate. They do this by rubbing their legs along their sides.
- A snail can be both a female and a male all at once!
- Toads can live to be 40 years old.
- Pond skaters have needle like pincers that they use to stab their prey and suck out their insides – nice...
- Whirligig beetles' eyes are divided into two parts – one half looking up so they can see above the water and one half looking down so they can see below the surface.
- There really is an animal called a Cyclops! It has one eye, is as small as a flea and carries its eggs on its sides like bicycle panniers.
- Lily flowers often close up during the day and night in order to trap beetles, bees and flies inside. When they open up again the following day the insects fly out covered in pollen, which is then carried to the next flower. This then rubs off on to the stamens and enables pollination to occur.
- Male great diving beetles have smooth, shiny wing cases while the females' are grooved.

Frogs' Legs, Anyone?

Next time you're hungry, imagine tucking into a juicy set of frog's legs for a snack – it's a delicacy on the menu in many countries, you know!

Snails Please, Garçon!

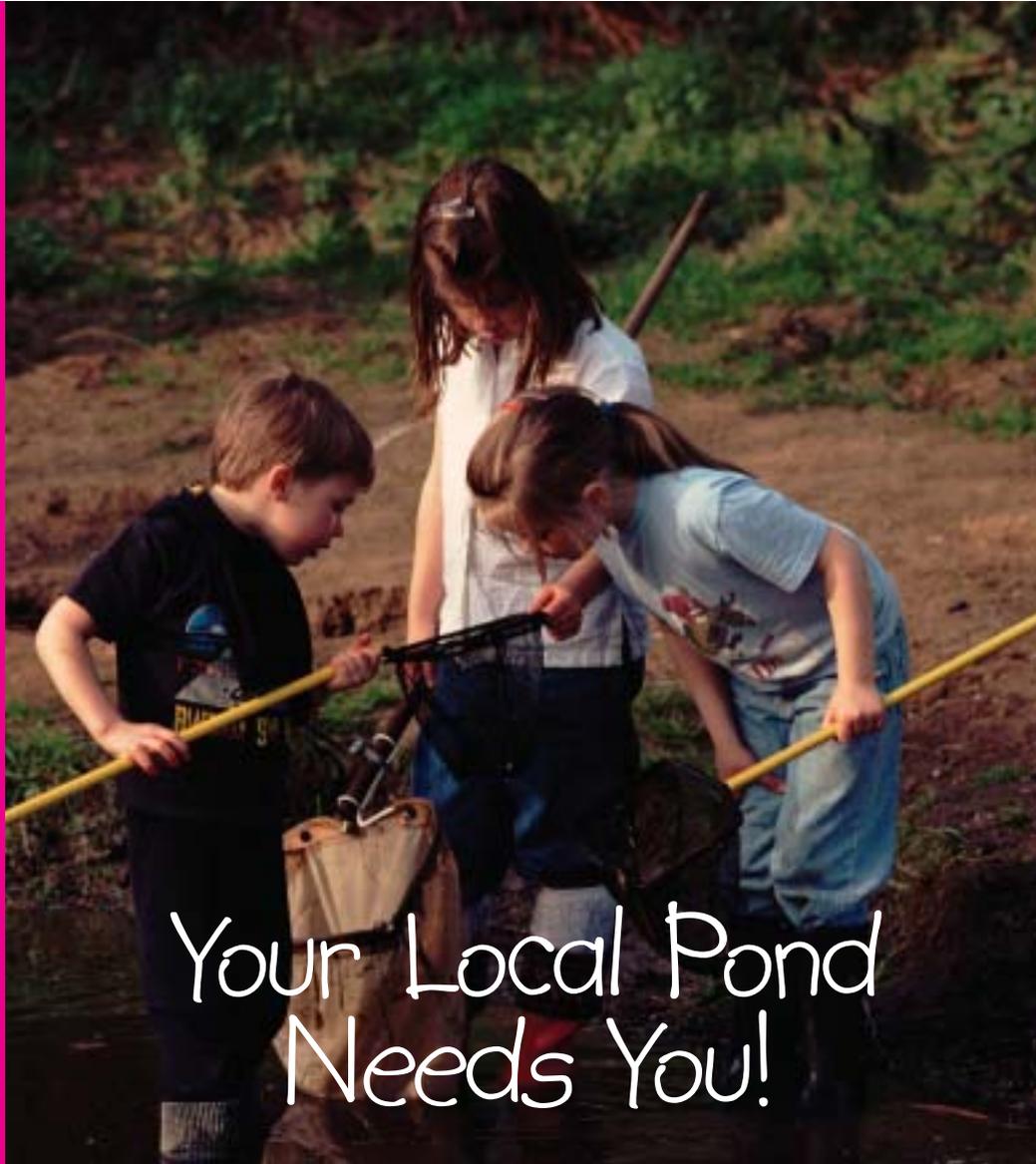
If you see 'Escargot' on the menu next time you are on holiday, don't order them unless you really want to eat snails! Yum.....



Rubbish!

Of course, this kind of pollution is not usually deliberate, but sadly some types of pond pollution are. One example is the dumping of litter and larger items of rubbish (such as scrap metal and old furniture) that thoughtless people want to get rid of. Litter can be a hazard to animals that may try to eat it, and rubbish and scrap can give off harmful chemicals like oil and acid.

Some animals are more sensitive to pollution than others and the 'health' of a pond can often be determined by the species living in it. We call these indicator species and examples include dragonfly nymphs and caddis fly larvae that require very clean water. Those that can survive dirtier water include worms, non-biting midge larvae and water hog lice. However, the presence of these animals does not necessarily mean the water is polluted – they can also be found in clean water.



Your Local Pond Needs You!



We are losing ponds in the UK at a rate of 1% every year – more than 75% have been lost in the last 100 years. So what can you do to help?

1. Build a pond in your garden or school! This is hard work and to create a good wildlife pond you will need to do some research and enlist the help of as many experts and adults as you can. See our website www.yptenc.org.uk for advice.
2. Organise a clean up of a local pond near you! Ask your teacher or parent if you can get in touch with a local expert or conservation group and then get a keen bunch of friends together who may want to help.
3. In the winter, the water sometimes freezes over. This seems disastrous but in fact most of the animals still in there will be ok unless it stays frozen for a number of days. In this case, you can help by keeping a hole in the ice to allow air in. Don't, however, bash the ice with a rock – this causes shock waves like an earthquake that can easily kill the animals. Instead, take a pan of warm water to the pond and sit it on the ice and melt it gently. Remember to keep hold of the saucepan handle! Only do this for a small, shallow pond, where the edge is safe for

you to do so. If there is any danger of slipping into the pond, keep away. Above all, NEVER step onto a frozen pond yourself.

Remember that a neglected pond will slowly but surely dry up so a one-off clear up will not be enough. They need regular maintenance if they are to stay as a pond and not gradually turn into boggy grassland.

Want to find out more? How about having a go at Pond Dipping?

With help and permission from an adult, have a go at 'dipping' in your local pond. Take a long-handled net and sweep it through the vegetation in the pond. Transfer the contents of your net quickly into a tray or tub with water in and see what you have caught! A magnified bug box is often useful as some of the creatures will be very small. You will also need an identification book to help you.

Remember you are dealing with live animals and always treat them carefully and return them to the pond.

For further information on how to help pond conservation and who to contact, check out our website: www.yptenc.org.uk

Find out how 'Super Kids' can save the planet and get your hands on a free copy!

Super Kids is a great new book for children packed with fun ideas for taking action to help the environment. We have been given 20 copies of Super Kids to give away to our member schools. To get your hands on a free copy, send an email entitled 'Super Kids' to awards@yptenc.org.uk before 18th July 2005. Winners will be selected at random from all entries received by the closing date. A list of winners will be available from YPTE.

If you didn't manage to win a free copy of Super Kids, why not give Green Books a call on 01803 863 260 to order your very own copy. When ordering, quote 'Conservation Education' to receive the book for £5.99 with free p&p.

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Get online to find out more about YPTE

For full details of our services for young people and schools, see our website: www.yptenc.org.uk
You can book a free school talk online if your school is within 100 miles of our school speakers, based in Guildford and Penrith.

Conservation Education Goes Electronic!

In an effort to reduce our paper usage, from January 2006, Conservation Education will become an e-bulletin and we will no longer produce printed copies. To ensure that you continue to receive your copy of Conservation Education via email, please send an email with the subject 'Con Ed Yes' to info@yptenc.org.uk giving us details of your name and school/organisation address.

Calling all member schools: Help us to help you!

The Young People's Trust for the Environment provides a range of educational services free of charge to young people and schools including free school talks, information services, our website and news page, and of course, the free provision of Conservation Education to our member schools. We would also like to continue to provide subsidised residential courses for young people from disadvantaged areas. However, all of our services require funding and we are asking our member schools to help us achieve our goals.

Why not hold a MUFTI day at school in aid of YPTE? Perhaps the pupils could wear at least one 'recycled' item of clothing or an accessory? You could also hold a bring and buy sale or a sponsored walk, run or silence? All the funds raised will be used to help support our vital environmental education work.

Young people are our planet's future, and to ensure the viability of that future, we need the next generation of adults to be better informed and more environmentally responsible than their parents. Please help us to make this vision into reality.



NEWS

Nature



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