

# The OPAL Water Survey

By **University College London** with **Pond Conservation** and **Buglife**

## Introduction


Ponds and lakes are important havens for freshwater wildlife, but many are badly affected by air pollution, by nutrients washing in from the land around them and by our rubbish. Amazingly, we still know very little about the condition of most of our lakes and ponds, especially the small ones.

The types of animals that live in ponds and lakes can tell us about how healthy the pond is. By taking part in this survey and sending in your results, you can help us find out more about the health of ponds and lakes in your area. We can put this information together to understand more about ponds and lakes across the country.

## About the Water Survey

- There are four activities in the Water Survey:
- **Activity 1** How clear is the water?
  - **Activity 2** Is the water acid or alkaline?
  - **Activity 3** How healthy is the pond? Look at the aquatic invertebrates
  - **Activity 4** What else lives at the pond?

Feel free to choose any of the activities or do all four. However, **Activity 3** may disturb the bottom of the pond so do that one after 1 and 2.

Instructions for carrying out all the Activities are on this guide. The workbook contains more background information and space to write down your results. This symbol  shows you when you need to write something down.

## The survey starts here

### You will need

- **The OPAL Water Survey pack**
- **A net.** You can use a net like one you may have used rock-pooling on the beach or you can attach a fine-meshed plastic sieve to a pole. Look on Page 3 of the workbook for some ideas on how to make a net. For garden ponds, a sieve on its own may be fine
- **A shallow tray** to sort out your animals. You will see them best if the tray is white. You could use a large white ice-cream tub, or you could even make one by putting a piece of white plastic or paper in the bottom of a baking tray
- For **Activity 1** you will need a large (2 litre) clear empty plastic drinks bottle, a 1p coin and some sticky tape

### Useful items to take with you (if you have them)

- A map and/or GPS device if available
- A mobile phone (in case of emergencies)
- A camera

Remember to take everything home with you.



### Choosing a lake or pond

Choose a lake or pond. If you don't know of one near where you live, there are some ideas on page 2 of the workbook to help you.

## + Safe fieldwork

Exploring ponds and lakes is great fun. However, it is important to be safe close to water.

- **Young children must be supervised at all times when near water.**
- **Do not do this survey on your own.**
- **Make sure that the ground is firm and not steep or overhanging. Choose a place where you can easily get close to the water.**
- **If you find broken glass, litter with sharp edges or discarded fish hooks find another spot to do the survey.**
- **Cover any open cuts before starting and wash your hands thoroughly afterwards and especially before eating.**

More safety guidance can be found on page 3 of the workbook. Read this before you start.

### Describe the pond

Record information about the pond or lake by answering Questions 1-10 on page 6 of the workbook.

You could also take a photograph of the pond and upload it with your results to the OPAL website.

## Activity 1: How clear is the water?

Test how clear the water is by using the Opalometer disc. Tape a 1p coin to the back of the disc. Roll it up and push through the neck of your 2 litre bottle.

Fill the bottle with water from the pond to the height of the Water Survey workbook. Make sure the disc is face up in the bottom.



Using the Opalometer

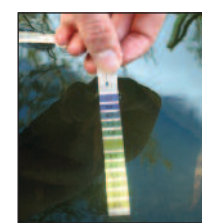
Wait a few moments then look in the top of the bottle and count the number of OPAL logos you can see.

Record this number and the colour of the water (if any) in your workbook (Questions 11-12).

If you are not going to use the bottle again, dispose of it responsibly.

## Activity 2: Is the water acid or alkaline?

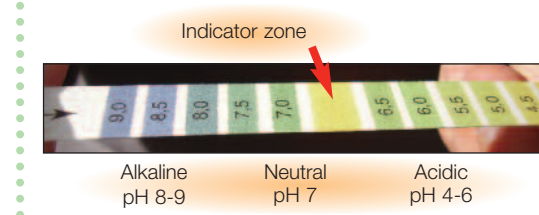
Find out whether the water is acid, alkaline or neutral by using one of the pH test strips in your pack. Holding the strip by the arrow, put the whole strip in the water for 3 seconds.



Using the pH strip

Remove the strip from the water and match the colour of the indicator zone (unprinted middle area) to the colour scale. Read off the printed pH value that matches the colour.

Record this number in your workbook (Question 13).



## Activity 3: How healthy is the pond?

Measure the health of the pond using freshwater invertebrates. Freshwater invertebrates are the small animals without backbones that live in ponds, lakes and rivers. You can find them in the water among plants, stones, dead wood and leaves. Different types of animal may live in these habitats so try to look in as many different places as possible.

1 Look for animals skating about on the surface. You might not catch these in your net so look first to see what is there.

2 Add some pond water to your tray so that it is ready for the animals you catch.

3 Vigorously sweep your pond net in and around the plants or other habitats for about 15-20 seconds.



Sampling with a net

You will need to disturb the plants with your net, but try not to damage them.

Try to avoid disturbing the bottom of the pond too much or you may get a lot of mud in the net.



Emptying into a tray

4 After each sweep wash the net through with pond water to get rid of any mud and empty the contents of your net into the tray. Remove any large bits of plant, checking first that there are no animals attached.

Repeat your net sweep several times in different places and habitats around the pond.

## Identifying the animals

Leave the tray to settle for about a minute. It will be much easier to identify the animals once you see them moving. Use the other side of this guide to help you identify the animals in your tray. Make

sure you look carefully. Some animals make their homes from sand grains or bits of plant and many are quite small. Use the OPAL magnifier to help you.



Identifying animals

Record the different types of animals you have found on Page 7 of the workbook.

Be gentle with all the animals and make sure you return them to where you found them. Don't leave them in the sun as they will get too hot.

## Calculate the Pond Health Score

Use the table on page 7 of the workbook to calculate the Pond Health Score.

## Activity 4: What else lives at the pond?

Use the other charts in the pack to identify any amphibians, adult dragonflies and damselflies or duckweeds you see while doing your survey.

Record these on page 7 of the workbook.

## Now complete your survey

To complete the survey, either send us your results through the OPAL website [www.OPALexplorenature.org](http://www.OPALexplorenature.org), or send the workbook back to us by using the Freepost address given on page 7 of the workbook.

## What do your results mean?

The Activities in the OPAL Water Survey tell us about the health of ponds and lakes. You may have collected information from a lake or pond that has never been investigated before. By putting this new information together we will be able to see which ponds and lakes are in good condition and which need improving.

Your information will be very useful to help us find out more about ponds and lakes across the country. The results of Activities 1 and 2 will help us see why some animals and plants live in certain ponds or lakes and not others.

**Activity 1** measures how clear the water is. A high number of 'OPALS' means more light can get through the water and that is important for plants that provide habitats for animals. A low number means that little light is getting into the pond and this affects where plants can grow. This can be due to many things such as soil washed in from around the edges, peat staining, waves disturbing the mud on the bottom (especially in large shallow lakes) or lots of algae in the water.


In **Activity 2**, the pH of the water measures how acidic or alkaline the lake or pond is. If the number is

less than 7 then the pond is slightly acidic. If it is more than 7 then it is slightly alkaline.

Rain water is naturally slightly acidic (around pH 5.6) because of carbon dioxide absorbed in it, but this is altered as the water moves through the soil into lakes, ponds and rivers. As pH controls many of the processes in a lake, and also affects the animals and plants that are able to live in the water, it is very important. Acidic ponds and lakes can be especially good wildlife habitats and often need special protection.

**Activity 3** uses the animals you have found to work out a **Pond Health Score**. A high score (more than 31) means the pond is very healthy. If it scores lower than this there may be ways to try and improve it. Visit the OPAL website to find out ways in which the health of a pond can be improved.

All the information from this survey will be useful to our partner organisations Pond Conservation and Buglife, but the results of **Activity 4** will be especially useful to Amphibian and Reptile Conservation, the Botanical Society of the British Isles and the British Dragonfly Society, who will use the information you provide to produce a new Atlas. Visit the OPAL website to find out more about what your results mean and to compare them with others.



The OPAL Water Survey is the third national survey from the OPAL project. You can also take part in other OPAL surveys, including the OPAL Soil and Earthworm Survey and the OPAL Air Survey, by downloading materials from [www.OPALexplorenature.org](http://www.OPALexplorenature.org)

OPAL has received a grant from The Big Lottery Fund to encourage people to get in touch with nature by enabling them to explore and study their local environments. Through partnerships nation-wide, OPAL is running fun, free projects which anyone can get involved with. OPAL wants to inspire a new generation of nature-lovers by encouraging people to spend more time outdoors understanding the world around them.

**Credits**  
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Photographs: Cyril Bennett, Steve Cham, Niels Sloth (Biopix), Simon Pawley (FBA), Jeremy Biggs, Roberto Scherini ([www.linea.it/](http://www.linea.it/)), Robert Żóralski ([www.insects.pl/](http://www.insects.pl/)), Alexander Grau and David Kohler (<http://heteropterologie.de/>), Anna McCann, Malcolm Storey ([www.bioimages.org.uk/](http://www.bioimages.org.uk/)), Simon Turner, Morten DD Hansen, Neil Rose, Roger Key, Brian Jones, Tim Apps, Michael R Clapp ([nwnature.net/](http://nwnature.net/)), Frank Köhler ([www.koleopterologie.de/](http://www.koleopterologie.de/)).



# Guide to the main groups of pond invertebrates

**Cased caddisfly larvae** **POND-HEALTH SCORE 10**

- Body within a case; insect hides when disturbed
- Case can be made of small stones, sand grains or plant material
- Look for sticks that crawl!

**Caseless caddisfly larvae** **POND-HEALTH SCORE 10**

- A bit like a thin caterpillar
- 3 pairs of legs at the front
- Hooks at the end of body
- Crawls rather than swims

**Dragonfly larvae** **POND-HEALTH SCORE 10**

- Angular head
- Fat body
- No tails but 5 short spines at the end of the body

**Damselfly larvae** **POND-HEALTH SCORE 10**

leaf-shaped tails

- Angular head
- 3 leaf-shaped tails (one or more may be lost)

Larvae are the young of aquatic insects

**Alderfly larvae** **POND-HEALTH SCORE 10**

gills

- One tail
- Tapering body
- Pincer-like jaws
- Fine gills along the body

**Mayfly larvae** **POND-HEALTH SCORE 5**

thin tails

- 3 thin tails
- Swims in short darting movements

**Water beetles** **POND-HEALTH SCORE 5**

size range

- Hard shiny wing cases covering the body
- Oval-shaped, 6 legs
- May have bubble attached to the back
- Scavenging water beetles have a less stream-lined shape

**Beetle larvae**

- Larvae are very varied; some have distinct heads, pincer-like jaws, tapering bodies and obvious legs
- Many have two tails (check these are not mayflies that have lost a tail)
- Others are more caterpillar-like with very short legs and fat bodies

**Water bugs** **POND-HEALTH SCORE 5**

**Backswimmers**

- Swim on their backs, just under the water surface
- Use long hair-fringed legs as oars

**Lesser water boatmen**

- Swim the right way up
- Wing cases look black/brown but close up are speckled or striped

**Water scorpion**

- Dark-coloured crawling insect
- Front legs pincer-like
- Long thin breathing tube at back of body (in adult)

body length up to 5 cm

**Water stick insect**

- Long thin body
- Thin breathing tube at back

**Pond skaters** **POND-HEALTH SCORE 5**

- Skate on the water surface
- 4 long skating legs and 2 short legs at the front
- Pair of antennae

**Water shrimps** **POND-HEALTH SCORE 5**

- Curved, flattened bodies
- Long antennae
- May appear slightly transparent
- Swim quickly on their sides

**Water slaters** **POND-HEALTH SCORE 1**

- Looks like a woodlouse
- Flattened body
- Moves by crawling

**Worm-like animals** **POND-HEALTH SCORE 1**

**Midge larvae**

- Red, green, brown or transparent
- Wriggling movement

**Flatworms**

- Often black or grey
- Move by gliding

**Leeches**

- Suckers at either end
- Moves by stretching out body

**Rat-tailed maggots (hoverfly larvae)**

- Long thin breathing tube
- Lives in mud

**Worms**

- Earthworm-like

**Snails** **POND-HEALTH SCORE 1**

(a) (b) (c)

- Hard shell covering body
- Shell may be (a) pointed, (b) a flat coil or (c) limpet shaped
- Can vary greatly in size

**Other animals**

**Water flea**

- Tiny animal
- Often in very large numbers

**Water mite**

- Tiny spider-like animal

**Water spider**

- Silvery bubble over the body
- Lives under the water

Note: you may find these other animals in your survey. While they are very interesting creatures, they do not give information about pond health, so they have no score.