

Pond Dipping

Dr Forsey's Outdoor Education SmartCases

This kit can be used for Pond Dipping, or more accurately, Freshwater Invertebrate Surveys of ponds and small streams and for pond water sampling by a class of school students lead by a teacher.

In this lesson plan you will find the following information to ensure optimum use of the equipment and help you achieve the best possible learning outcomes for your pupils:

- Equipment list
- Full activity methodology
- Suggested adaptations for age and ability
- Curriculum links
- Suggested follow up activities

The kit and associated methodology has been developed and refined over a number of years, it has been tested by thousands of school students and hundreds of teachers, both in school settings and fieldwork locations.

Kit list –

You will need (for a class of 30 participants working in five groups of six):

- 5 x Gratnells SmartCase
- 10 x Long handled pond net
(plastic handled are lighter and easier for younger participants to manoeuvre)
- 10 x Yellow or Magnolia Shallow Gratnells (F1) tray
- 30 x Heavy duty white plastic dessert spoon
- 30 x Observation dish
(white or transparent plant pot saucers ~13 cm dia. or white shallow plastic bowls work well)
- 20 x Hand magnifying glass
- 10 x ID Guide
(e.g. FSC Freshwater Name Trail or Pond ID Dial)
- 15 x Universal tubes with lid
(30ml capacity)
- An established pond with safe, flat well-defined edges or a dipping platform.

Preparation –

(before the day of the activity):

- Split the equipment equally between the five Gratnells SmartCases.
- If using downloadable ID Dials, print, cut out and laminate the ID Dials and secure with a split pin.
- Select or design a recording sheet/card (examples shown at the end of this guide) suitable for the age and ability of the participants, print or download as required.
- Designate your working area using markers e.g. football cones (not included in kit) if no natural or man-made boundaries exist.
- Split the participants into five groups of six. Each group of six will share one SmartCase of equipment and work in two teams of three, each team of three will have their own shallow tray and net and use half of the equipment in the SmartCase.



Primary National Curriculum Links –

- KS1 Working scientifically
- Year 1 Animals, including humans
- Year 1 Seasonal change
- Year 2 Living things and their habitats
- Year 2 Animals, including humans
- Lower KS2 Working scientifically
- Year 3 Animals, including humans
- Year 4 Living things and their habitats
- Year 4 Animals, including humans
- Upper KS2 Working scientifically
- Year 5 Living things and their habitats
- Year 6 Living things and their habitats
- Year 6 Evolution and inheritance



What to do –

- On the day, prior to the participant's arrival at the pond, carefully fill the shallow Gratnells (F1) trays with clear pond water 3-4cm deep and spread them around the pond at least three meters away from the water's edge being sure to leave enough room to work around each tray. Place one pond net next to each shallow tray.
- When the participants arrive, carrying their SmartCases, they should place one SmartCase between each shallow tray.
- Ask the participants to stand in their groups of three, behind their shallow tray and facing the pond. This keeps them away from the water's edge until you have carried out the introduction.
- Stand between the participants and the water.
- Stay Safe! Participants should not fill or empty the shallow trays at the pond edge themselves, you or other supervising adults should do it for them to reduce the risk of participants falling into the water.
- Top Tip! Have a couple of spare buckets (not included in the kit) of fresh pond water saved to one side in case their shallow trays need refreshing mid-activity because they have mistakenly scooped up pond mud while dipping.

Introduction and Demonstration (10 minutes)

Explain that in this activity session we are going to survey the pond creatures (if appropriate for age/ability call them pond invertebrates, i.e. creatures with no backbone) in their natural habitat. Ask them these questions while at the pond edge or as part of your classroom work ahead of your outdoor session....

What is a habitat?

The place where an animal lives is known as a habitat, and different sorts of animals live in different habitats. Habitats can be very big, like the arctic habitats where polar bears live, or very small such as between two blades of grass where a money spider might make its web. Remember, a habitat is just the place where the animal lives. Your house is your habitat!

This pond will be a habitat for many invertebrates and possibly some larger animals. Can you think what animals we might find?

The participants may say fish, ducks, frogs etc. Depending on their level of advance knowledge, they may name the odd invertebrate. We are going to look for the invertebrates living in the pond today.

Older/higher ability participants might consider how are these animals are adapted to life in the pond?

Gills, streamlining, hairy leg paddles, webbed feet, air bubbles/sacs, siphons that work like snorkels and use of surface tension are all examples of adaptations to life on or in water.

Teacher Demonstration

- Approach the edge of the pond run through the pond dipping method;
- Demonstrate how to dip with the nets and describe how they must stand sideways on to the water with their knees bent. Without moving closer to the pond, ask all the participants to stand sideways on and bend their knees to practice the position. Don't stand straight on to the pond and bend forward, you are more likely to lose balance and 'dive' in this way!
- Dip the pond net below the surface and avoid any bottom mud. Explain that they if they get lots of mud by accident, they should put it straight back in the pond and not put it in their shallow trays as they won't be able to see any pond creatures and neither will the other participants in their group. It is important not to put the net in too deep or rake along the bottom.
- Move the net in long sweeps along the pond edge 'jiggling' it past reeds and vegetation, where creatures like to hide. Describe to the participants what you are doing. Explain that the invertebrates are not usually swimming out in the open water in the middle so there is no need to lean out over the water.
- Explain to the participants that they should not remove the net from the water and spend time looking into it as any creatures captured may suffer from being out of the water. They should move promptly to a shallow tray.
- Move to a shallow tray. Empty your net out carefully by turning it inside out and giving it a swish in the tray water. Put your net down next to the tray. Allow the water to go still so the moving invertebrates will be easy to spot.
- If you find anything, scoop some water into one of the observation dishes and transfer the invertebrate to the dish using the plastic spoon. Do this gently, don't tip the creatures in from height in a 'kamikaze dive' as it may harm them.
- Demonstrate the use of the ID guide.

- Tell them that any creatures they find should be identified and then recorded. Show them a recording sheet or tick card and describe what they should write on it.
- Optional - once identified and recorded, the invertebrates in the observation dishes could be carefully transferred into an additional class/communal shallow tray for reference by the activity leader later (additional tray not included in kit list, suggest using a different colour i.e. pale green, shallow tray half-filled with pond water for this purpose).
- Tell the participants that they should not eat or put their hands in their mouths during the activity and that they will need to wash their hands thoroughly at the end.
- Top Tip! If it's windy, participants should always return the ID guides to the SmartCases so they don't blow away.

Activity (~30 minutes)

- Working in groups of three to a shallow tray, participants should show you the 'sideways on knees bent' position once more. One person from each group can then approach the pond and do a sweep/jiggle with the net, once they have emptied the net into the shallow tray the next team member can take the net and repeat the dipping process. The first participant can start looking in the tray and separating and identifying the creatures while the others dip. Repeat again for the third group member. Only allow as many participants to approach the water's edge as is safe to do so.
- While the participants are dipping, always stand facing them and the water's edge, i.e. never crouch down with your back to the water while looking into a shallow tray. Move between the groups, checking on them as necessary. They should not be dipping for a second time until all the creatures in their trays have been separated and identified. Approximately 80% of their time will be spent at the shallow tray and only 20% by the water.
- Help to identify any creatures they find by encouraging them to find it on the ID guide themselves and read all of the information about the creatures. They should complete their recording sheet (select recording method appropriate to the age and ability of the participants) as they go along. If you are using a class shallow tray, once the creatures are identified and recorded, they can transfer their creatures to the class shallow tray, which should be sited beyond the working area, further away from the water's edge.
- After 20-30 minutes of work. Ask the participants to ensure their nets are clean and not full of plant material and to return the nest to you. They should complete their final separation, ID and recording before emptying their separation dishes back into their shallow trays and placing all other equipment back into their Smart-Case.
- Participants should collect a small sample of pond water in the lidded tubes to take back to the classroom if you wish to carry out the follow up activity looking for microscopic pond life. Supervise them carefully at the water's edge while they do this. To increase your chances of capturing some microorganisms, squeeze the water from water plants into the tube or gently scrape the green or brown growth from plants/pond liner.

Review (~10 minutes)

Please see next page...

- If you have used one, gather the participants around the class shallow tray in a large circle (use the pond nets to form a circle on the ground if needed to keep the participants back) to look at any interesting finds or good examples and to assess their identification skills. You could discuss how finding lots of different invertebrates (biodiversity) is a sign of a healthy pond. While you are doing this, if you have an extra adult with you, they should empty the shallow trays carefully back into the pond, again avoiding kamikaze dives for the invertebrates!
- Finally, empty the class observation tray back into the pond carefully (you might want to take a picture of the contents first).

Other things to try:

Microscopic pond life

To observe pond creatures often found at the bottom of the food chain and too small to see with the naked eye, take the samples of pond water collected at the end of the activity back into the classroom and allow them to settle. Using your microscopy equipment (not provided in kit) use a plastic dropper to collect a small amount from the bottom of the tube and place it into the centre of a well slide, add a cover slip and place under a microscope. Look out for green algae, worms and hydra. For a useful ID guide to microscopic life see <http://www.microscopy-uk.org.uk/pond/> or do a google images search for 'microscopic pond life'.

Food chains/web

Initiate further discussions about pond food chains/webs now or as a follow up in a later lesson. Participants could research what the invertebrates eat, and what they are eaten by, identifying which animals are carnivores, herbivores and omnivores and drawing a food chain before linking several together to form a web. This can also be done as a practical activity outside, with each participant taking on the role of a different invertebrate and linking together using rope or string.

Life cycles

Frog, dragonfly, damselfly and mosquito lifecycles could be further explored depending on which of these animals you find in your pond. Use secondary sources of evidence to research the lifecycles and create a display. The participants could work in groups, each picking a different life cycle to investigate.

Abiotic conditions

During your investigation, record the weather conditions, air and water temperatures using thermometers or data loggers. Repeat the activity and these observations at different times of year and compare the results.

Movement

From their observations, ask the participants to act out the way the pond creatures move. Many pond creatures have distinct ways of moving e.g. leech - extends and contracts, water boatman - swims using led paddles, worms - wiggle. This could be carried out in a P.E. or swimming lesson.

National Projects

You could take part in the OPAL Water Survey, the 'Big Spawn Count' or the 'Big Pond Dip'

Share

Share photographs of your work and your finds using #WhatsInMyTray and #OutdoorLearning on social media.

Health and Safety

As with all Learning Rooms activities, you should carry out your own risk assessment prior to undertaking any activities or demonstrations. In particular, safety around water features and exposure to soil and water borne pathogens should be considered and appropriate precautions taken.

Example recording sheets:

Example ID tick card – great for younger participants – you could create your own with the creatures common to your pond and add pictures to aid identification/recording

Pond Dipping - Tick Card

<input type="checkbox"/> Lesser Water Boatman	<input type="checkbox"/> Water Hog Louse	<input type="checkbox"/> Other.....
<input type="checkbox"/> Freshwater Shrimp	<input type="checkbox"/> Leech	
<input type="checkbox"/> Mayfly Nymph	<input type="checkbox"/> Pond Snail	



Example ID recording sheet – great for older participants – you could create your own to obtain the data you need for post-activity analysis and development of specific numeracy skills or for follow up work on adaptation.

Your name **Date:**.....

Species	Tally	Total	Interesting Features
Worm			
Water Hog Louse			
Water Snail			
Water Beetle			
Lesser Water Boatman			
Freshwater Shrimp			
Damselfly Nymph			
Mayfly Nymph			
Cased Caddis Larva			
Tadpole			