EXPLORER DAY HOW-TO:

POND DIPPING

Aquatic mini beasts, water quality, and freshwater ecology!

Nothing goes together like kids and water. Kids can explore the underwater life of local lakes, rivers and streams, and make connections to watershed health, conservation, and stewardship. Find out how, with tips from the NatureKids BC club leader community!

NatureKids Club leader Cindy and the Bulkley Valley NatureKids Club checking out aquatic life at the lakeshore.

Text by Jenni Stol with input and photographs from the club leaders at NatureKids BC.
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The power of pond dipping

Pond dipping is an easy and inexpensive way to spark imagination and curiosity about the world below the water's surface. With a few kid-friendly tools you can discover an amazing diversity of miniature creatures, all while getting wet and having fun! Connect the lives of these mini beasts to the health of their habitat and you've got a way to tie in water quality, watershed health, and how our personal actions impact the natural world. So grab a net and start dipping!

Peering into a mysterious underwater world. Photo: J. Stol.

Safety first! Managing risk around water

The most important part of a water-based activity is participant safety. There is no need to be in or near water that is deep or fast moving. Look for shallow creeks, ponds, or lakes with gentle shorelines. Visit the site beforehand to check conditions. Avoid steep drop-offs, slippery banks, or fast flowing water.

Make sure to go over safety expectations. Adults must actively supervise children whenever they are near water. Young children cannot be expected to follow safety instructions, so constant supervision is required.

Ponds can contain harmful bacteria. Ensure children don't drink the water and wash hands before eating. **Watch for harmful algae blooms**. Clean sampling equipment if you move between waterbodies – a dilute bleach solution will do the trick. Learn about stopping the spread of invasive species through the **Clean Drain Dry** program.

Finding mentors

Working with an experienced mentor can enhance your learning outcomes. Local organizations that monitor stream health or work on stream restoration projects may be a good source for mentors. Usually called Streamkeepers, one of their volunteers may be willing to work with your group, or point you in the right direction to find someone.

Check with local post-secondary institutions that offer programs in applied ecology/fisheries/natural resource management and you may find a keen instructor or student. Some suggestions are **BCIT** or **Vancouver Island University**.

A NatureKids mentor in Nelson shows kids in how to use a microscope to investigate aquatic organisms. Photo: J. Stol.

Watch for beach clean-ups in your area and connect with the organizations who run them, especially around BC Rivers Day.

Lead your own activity with some basic water sampling equipment and tools to identify any organisms you find. Keeping it simple allows more freedom for the kids to explore and make their own discoveries.

Where and when?

Ponds and lakes are the easiest choice for exploring with nets and buckets. If you want to allow kids to walk into the water, make sure the bottom isn't too slippery and that the mud isn't too thick as this can make it hard to move around safely. If there is a dock or

bridge, this can be a great place to collect samples without having to wade into the water. As an alternative, an adult can don waders and collect samples from deeper water while the kids watch from shore. Flowing water can also yield interesting results, but be mindful of safety concerns. Spring can be a dangerous time around creeks and rivers as the water levels increase with the spring run-off. As water levels decrease in the summer and fall, you may be able to find flowing water that is shallow and gentle enough for the kids to get their feet wet and collect some samples. Be sure to visit the site near the date of the activity to ensure that there will not be any danger from flowing water. Consider timing to coincide with one of these events:

World Water Day – March 22

www.worldwaterday.org

World Water Day is an annual United Nations observance day that highlights the importance of fresh water. The day is used to advocate for the sustainable management of freshwater resources.

National Lake Blitz – May to September

livinglakescanada.ca/our-programs/lakes/lake-blitz

The goal of the National Lake Blitz is to encourage the widespread monitoring of lakes across Canada so participants can understand the impacts of climate change on lakes.

BC Rivers Day – Late September

www.orcbc.ca/bc-rivers-day

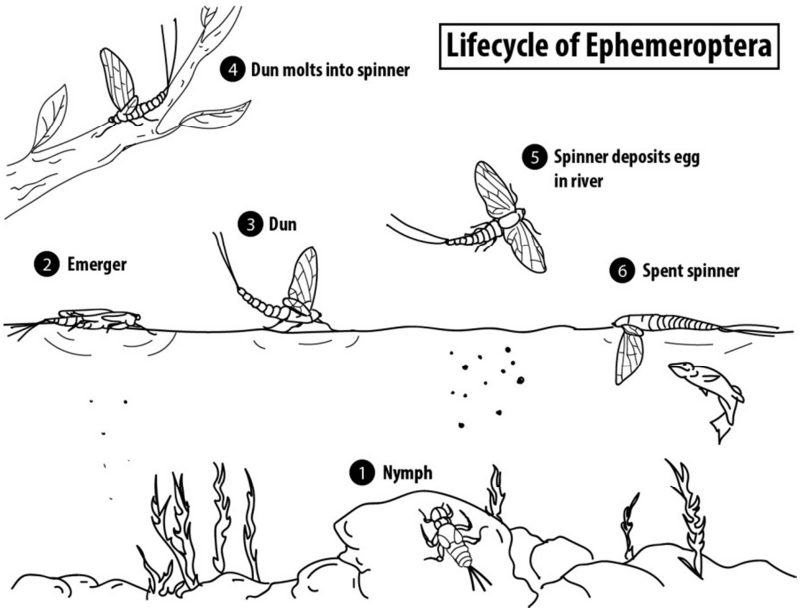
BC Rivers Day celebrates and builds public awareness for British Columbia's waterways. See the website for free resources.

Activities

Pond dipping

Pond dipping is one of the easiest activities. A quick Google search will give you plenty of instructions and ideas for pond dipping with kids. All you need is some inexpensive dip nets and buckets. Kids can wade into shallow water or lean over from docks or the shoreline and scoop up their own samples. Place them in a white bucket and examine your findings! You can use plastic pipettes to suck up interesting specimens and deposit them into smaller containers or sections of egg cartons.

You will primarily be catching aquatic invertebrates in your samples. Many flying insects such as mayflies and dragonflies start their lives underwater before they develop into their adult form. Other species live their whole lives underwater. Have a close look, and wonder at how they move through the water. How are they the same or different? What type of insect will they be as an adult? Can you see any adults flying around nearby? Be sure to have field guides or printed ID sheets available. Discover the different types here: **www.macroinvertebrates.org.**

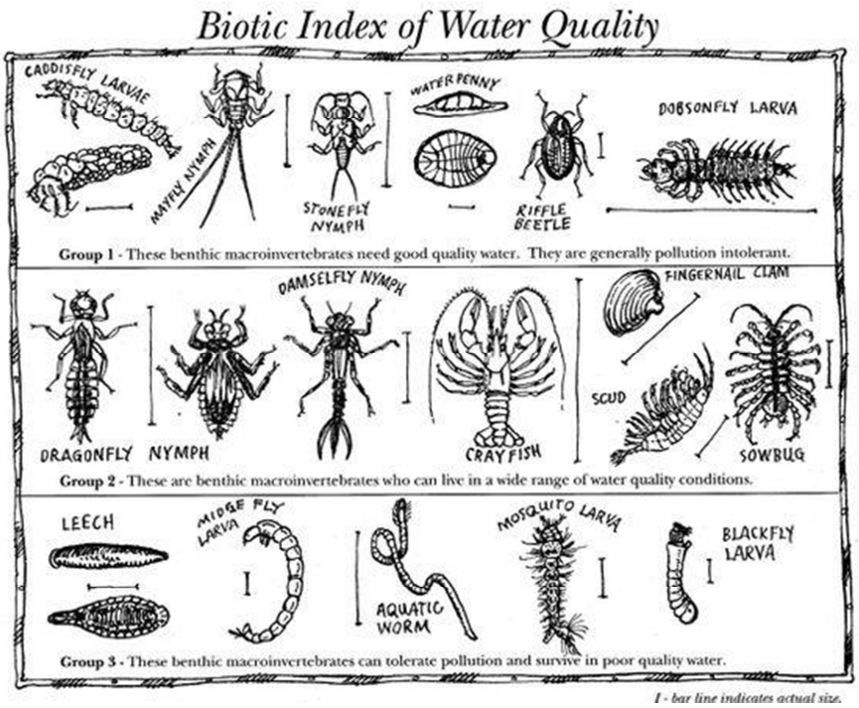


The life cycle of the mayfly, a common benthic macroinvertebrate found in pond dipping samples.

In flowing water, you may find different sampling techniques successful. Caddisflies are fascinating and are often found in flowing water. They are large and visible to the naked eye. Watch the stream bottom for movement, or turn over a medium sized rock and wipe any detritus on the bottom into a container, see if anything is moving!

Another fun activity is to make your own underwater viewer! Find instructions at HCTF Education: **hctfeducation.ca/file/make-underwater-viewer.pdf**

Benthic macroinvertebrates, the community of organisms that live in the substrate at the bottom of a river or stream, are excellent indicators of aquatic health due to their high sensitivity to pollutants and climate change-related impacts. Talk about how the creatures you find might be different if the water is polluted. Find more information at **habitat.fisheries.org/the-importance-of-macroinvertebrates-in-freshwater-streams/**



Macroinvertebrate index chart for water quality. Photo: epa.gov

Return any living organisms back to the water where they were captured.

Caddisfly larvae live on stream bottoms and build their own "house" that they carry with them wherever they go!

Dragon fly nymph. Source: iNaturalist

If you work with a mentor, you may be able to access other supplies used for scientific stream sampling such as Surber samplers. These work very well to sample critters that cling to rocks or live within the substrate. Organizations that conduct stream sampling using **Canadian Aquatic Biomonitoring Network** (CABIN) protocols will have sampling tools for shallow, flowing water.

What about fish?

Can you sample fish? Technically no, not without a **Scientific Fish Collection Permit** or a fishing license. If you want to include fish sampling in your activities, ask your mentor if they can apply for a permit. Catching a bucketful of minnows can be an exciting find!

If you happen to accidentally scoop up a small fish, have a look but don't handle it and make sure not to leave it too long in a bucket. Fish can die if left in water that is too warm or if they use up the available oxygen. A ziplock bag of water makes a handy temporary fish viewer. Return your fish to where it was caught.

East Kootenay club members collecting samples from a local lake. Photo: P. Kolesnichenko.

Water quality

Water quality is a measurement of the cleanliness and healthiness of water. The temperature, pH, clarity, and other parameters have a huge impact on a waterbody's ability to support life. For example, fish can be very sensitive to high summer temperatures or low oxygen levels. Kids can feel like real scientists by collecting and testing water samples. Your mentor may have access to digital probes and meters, but you can also take some basic measurements using simple tools. **Water Rangers** test kits include thermometers and pH test strips (see below). Other easy to use tools

include Secchi disks for measuring water clarity. Your mentor may have access to these or other tools that are sturdy enough for the kids to use (as opposed to digital meters which can be delicate/expensive).

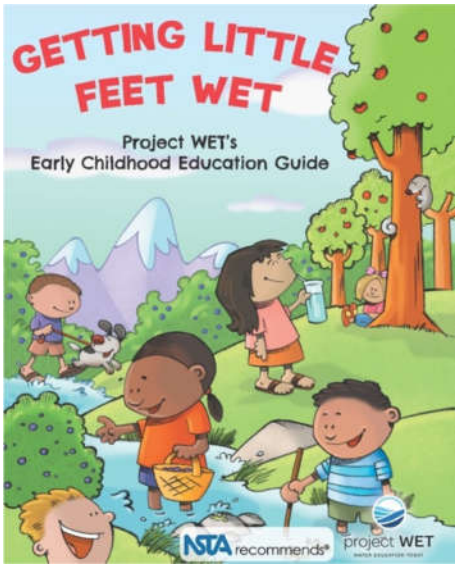
When testing water quality, be sure to include discussions of why it is important. Connect clean water to aquatic animals and plants, which then provide food for fish and other wildlife and ultimately impact the health of our whole ecosystem.

Is your stream a healthy place for fish to live? Combine your observations of aquatic life, water quality, vegetation and human activity into a **Stream Assessment**. A sample data form for kids can be found in Salmon Wild magazine. See the Digital Resources section.

More water quality resources

Water Rangers is a Canadian non-profit that works to give communities the tools to take care of their local watersheds. Their focus is on designing easy to use water quality test kits, training, and building an open source data platform for sharing test results. If your club would like to participate in this citizen science initiative, be sure to familiarize yourself with the **Water Rangers protocol** on their website.

Project WET is an international organization that offers publications, training, events and community connections around water education. Their website includes educator guides and downloadable resources. Find Project WET activities for younger learners in the Getting Little Feet Wet guide, also available from **HCTF Education**.



Fun and games

Try including building a bug with craft supplies or natural materials, or colouring images of wetlands or aquatic organisms. One NatureKids mentor brought dress-up items to turn one of the participants into an awesome aquatic invertebrate! This can be a fun way to talk about how the creatures use their different body parts and how they are adapted to their environment.

Equipment

For pond dipping, at minimum you'll want nets, buckets, magnifiers and ID sheets.

Small aquarium dip nets can be purchased from the Outdoor Learning Store, or from your local pet/aquarium supply. Have several. You can also buy larger and more sturdy stream sampling nets from specialized suppliers (see Where to purchase supplies, below).

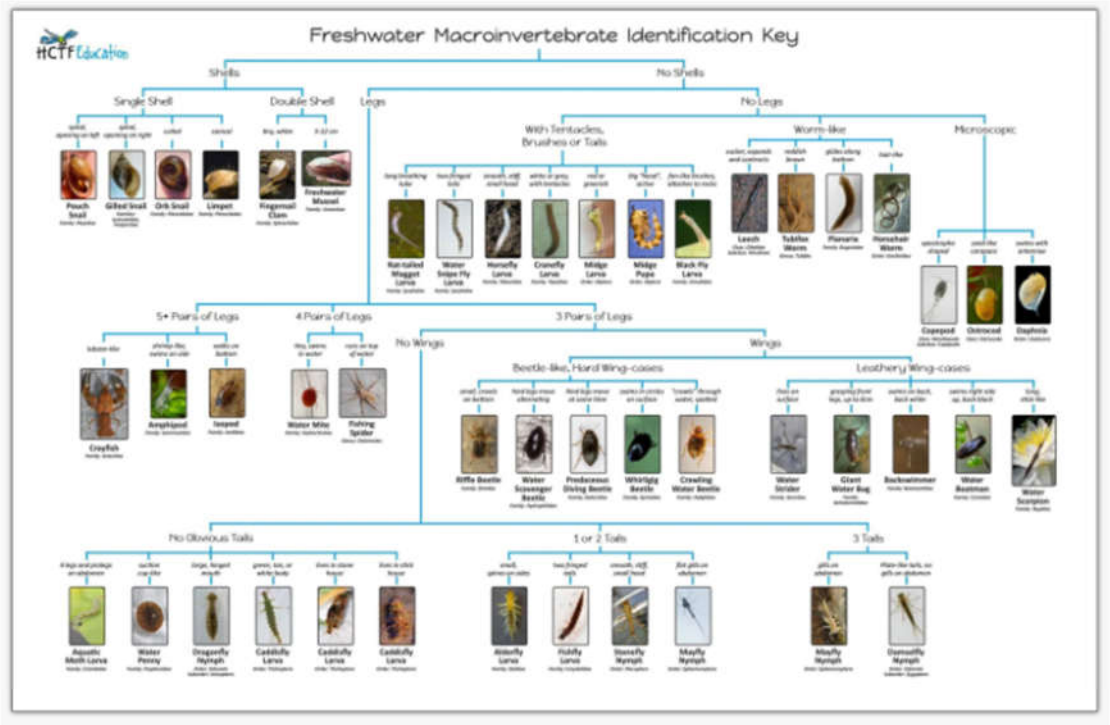
Bring white buckets, egg cartons, or small plastic containers – somewhere to put your discoveries so all can see.

Aquatic critters are tiny! You'll need a few magnifiers. There are several types available. A microscope is also great to have if possible.

Plastic pipettes are useful for transferring small organisms between containers. Available from craft/art supply stores. Spoons or turkey basters can also do the trick!

Have waterproof identification guides available. You can find printable guides online, like this one: **Pond Minibeasts by BackwoodsMama.com**

The guide below is available from **HCTF Education**.



If you are interested in testing water quality, you can measure the temperature and pH with simple tools. pH testing kits designed for pools are sufficiently accurate. **Water Rangers** kits include these tools.

Where to purchase supplies

Water Rangers - Supplier of water quality testing equipment and training.

The Outdoor Learning Store - Sells good quality magnifiers and other supplies.

HCTF Education store - Small, inexpensive hand lenses. Not as effective as the larger ones. Also waterproof ID guides and Project WET resources.

Dynamic Aqua Supply - Everything you can possibly need to sample water or aquatic organisms. Shipping can be expensive. Free pickup from their warehouse in Surrey.

Digital resources

Living Lakes Canada
livinglakescanada.ca

Organization that facilitates water stewardship initiatives in BC and across the country.

Water Rangers
waterrangers.ca

Water testing equipment and citizen science programs for monitoring the health of fresh water.

Salmon Wild Magazine
naturekidsbc.ca/wp-content/uploads/2021/09/SalmonWILD_Fall2021-FINAL.pdf

NatureKids publication includes information about healthy freshwater habitats and a sample stream assessment form.

The Pacific Streamkeepers Federation
www.pskf.ca

Organization that supports streamkeeper groups across the province. Also has a list of **streamkeeper groups by region**.

Stream Side Science
streamsidescience.usu.edu

Lessons on using stream monitoring techniques with school-age children.

Habitat Conservation Trust Foundation Education
www.hctfeducation.ca

The Resources section has instructions on how to make dip nets and underwater viewers, ID guides, workshops for educators, and print resources like Getting Little Feet Wet.

Scientists in Schools
scientistsinschool.ca/wp-content/uploads/Pond-Dipping-Guide-2022.pdf

Short instructional guide including colour photos of common aquatic species.

Project WET and Project WET Canada
www.projectwet.org
cwra.org/en/affiliates-programs/project-wet

Water education resources and training including activity guides.

Canadian Aquatic Biomonitoring Network
www.canada.ca/en/environment-climate-change/services/canadian-aquatic-biomonitoring-network.html

Protocols for measuring freshwater ecosystem health with standardized methods, database, and training. See also **Canadian Rivers Institute.**