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Science Unit: *Local Habitats*

Lesson 11: *Introduction to Ponds - Specimen Study*

Summary: In this lesson, students rotate through 3 stations (**pond plants, pond animals and pond bugs**) to study **collected plants**, photos, and/or **preserved specimens** (rented from a museum). Skills introduced in this lesson are helpful prerequisites for a pond study field trip (described in Lesson 13 of this unit).

Science skills: Making observations, recording observations

School Year: 2013/2014

Developed for: Sir William Osler Elementary School, Vancouver School District

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Grade level: Presented to grade 2/3/4; appropriate for grades 1 – 7 with age appropriate modifications

Duration of lesson: 1 hour and 20 minutes

- Notes:**
- This lesson plan suggests a combination of live plant specimens, rented museum specimens, and photographs. (Using real specimens greatly enhances the experience and is highly recommended!) However, photographs alone can also be used.
 - It is helpful to have an adult to assist with each station (3 stations).
 - See lesson detail for important instructions on collecting plants (e.g., plants should *not* be collected from parks).
 - Animal specimens can also be borrowed from a local college, university or museum. (For this lesson, we used pond bug displays from the Beaty Biodiversity Museum. Visit: <http://www.beatymuseum.ubc.ca/> for more information about their teaching resources.)
 - The animal station requires careful supervision to ensure the specimens are handled appropriately.
 - Museum loans should be arranged well in advance!

Objectives

Students will:

1. Discover what lives in/near local ponds.
2. Make observations of plants, animals and “bugs”.

Background Information

The purpose of this lesson is to introduce students to the organisms that they may encounter or observe on their fieldtrip to Jericho Pond (Lesson 4). Students will observe a variety of plants, bugs and other animals present in and around Jericho pond. The observations are guided by the worksheet such that students will be introduced to some of the characteristics biologists use to identify these organisms. These skills will be added to in the next lesson where students will learn



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to identify aquatic organisms by using a dichotomous key and to identify pond habitat birds by sight and call.

Vocabulary

- Habitat:** The place where a population lives. A habitat must meet the needs an organism requires to survive (food, water, shelter, temperature, oxygen, etc.).
- Microhabitat:** A tiny habitat within a larger habitat.
- Pond:** A small, closed body of freshwater. Smaller than a lake.
- Water column:** Area in the pond where organisms are fully submerged (excluding the pond bottom).

Materials

- Worksheets
- Bug specimens rented from a museum (see below)
- Pond pictures/slideshow
- Pencils and pencil crayons
- Bucket to store and transport plant specimens, if using
- Cloth or plastic sheet to cover table for animal station, if using live animals.
- 5-6 different types of pond plants, 2-3 specimens of each: rushes, grasses, floating plants, algae, duckweed, etc. (see below for detail)
- Station Information Sheets (included)
- Plastic sheet to cover table for plant station
- Animal specimens rented from a museum (optional). See details below.
- Trays with sides to examine wet plant specimens.
- De-chlorinated or distilled water to rinse plant specimens

In the Classroom

Introductory Discussion

1. Review or introduce the concept of a “habitat”. Tell students that today we are going to begin our study of pond habitats.
 - What is a pond? Who has ever been to a pond?
 - Ask for ideas and then show slides/pictures of different types of ponds. (If possible include a picture of the pond that will be visited on the field trip).
 - What lives in a pond? Brainstorm and record on board. Can show slides/pictures of pond organisms that have been named. Talk about where each organism lives to introduce the various pond areas and microhabitats.
 - Show a slide of the pond diagram and have students label it on their worksheet as they identify the different areas.
2. Review safe and respectful handling of museum specimens, if using.
 - Outline the rules for any specific specimens borrowed.
 - In general, if students are allowed to touch specimens remind them how fragile the specimens are and that only adults will pick up and move the specimens.



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- Students should only touch specimens lightly, with their pinky finger. If they want to stroke the fur or feathers, it should be done lightly and only in the direction that the fur/feathers grow, never in the opposite direction.
 - Remind students not to move, open, pull or poke any part of the specimens (including the beaks, claws, legs, wings or tails).
3. Explain that students will focus on the science skills of making and recording observations.

Safety Guidelines

- **Plant Allergies.** If any students have plant allergies they can use pictures to study the organisms or work with a partner and only the partner will touch the plants. Remind students to be respectful of others who may have allergies.
- **Hand washing.** Tell students that pond water can be contaminated with bacteria from duck feces and thus they should wash their hands before touching their faces or eating and immediately after the lesson. Depending on the plants and animals used, it may be appropriate for students to wash their hands in between stations too.

Science Activity

Activity Title: What Lives in a Pond?

Purpose of Activity: Students will learn about a variety of pond organisms, focusing on ones likely to be seen on the fieldtrip.

Set-up prior to experiment:

1. Ideally, arrange for an adult at each station to assist the students with their observations (especially with primary students). The animal specimens rented from a museum will require close supervision to ensure proper handling.

2. Collect materials for the three stations:

a) Pond Plants

- Plants should *not* be collected from parks - not only does it have the potential to cause ecological harm, there are also bylaws prohibiting this type of activity in most cities.
- Live specimens can only be collected from a private pond and with permission.
- If using live specimens, 5-6 different types of pond plants should be collected prior to the lesson (rushes, grasses, floating plants, algae, duckweed, etc.), including 2-3 specimens of each, depending on group size.
- Plants should be collected as close to the lesson as possible and kept in a bucket of pond water. If the pond water is quite dirty or likely to be contaminated with duck feces, the plants should be rinsed and stored in clean, de-chlorinated water (not tap water as the chlorine in it is harmful to plants).
- Use photos of plants if live specimens cannot be collected or purchased.



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b) Pond Animals

- The following animal specimens were rented from Beaty Biodiversity Museum:
 - Mallard (whole duck, wing)
 - Northern pintail (whole duck, wing)
 - Green-winged teal (whole duck, wing)
 - Common raven
 - Northwestern crow
 - Raccoon
- Pictures of the animal specimens above, as well as the following animals, were also used:
 - American wigeon (duck)
 - Western pond turtle
 - Red-winged blackbird
 - Beaver
 - Muskrat
 - Canada goose
 - Great blue heron
 - Bullfrog (this introduced species is common in Metro Vancouver).
- As much as possible, specimens and pictures should be tailored to the specific pond you plan to visit.
- Pictures showing specific features of the animals can augment the museum specimens.

c) Pond “Bugs” – Arrange museum loans well in advance - these displays are quite popular.

Methods and Instructions:

1. Divide the class into three groups (students will travel as a group to each of the three stations).
2. Ask students to use the first 5 minutes at each station to explore all the specimens and photographs and discuss them with their group members. (The adult at each station can lead the discussion and give a brief overview of organisms present at the station, if appropriate).
3. Students will then have 10 minutes to work independently to draw and describe one organism of their choice on their worksheet (see detailed instructions on each worksheet, included).

Closure Discussion

1. What did you like best about today’s lesson?
2. What did you learn about pond plants? Bugs? Animals?
3. Discuss specific organisms and where they might be found in the pond. How does the pond habitat meet the organism’s needs?



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References

1. Acorn, John. 2001. Bugs of British Columbia. Lone Pine Publishing.
2. Campbell, Wayne et al. 2005. British Columbia Birds. Lone Pine Publishing.
3. Eder, Tamara and Don Pattie. Mammals of British Columbia. Lone Pine Publishing.
4. McCloskey, Erin and Gregory Kennedy. British Columbia Nature Guide. Lone Pine Publishing.
5. St. John, Alan. Reptiles of British Columbia. Lone Pine Publishing.
6. Images for leaf shape handouts adapted from leaf morphology.svg from Wikimedia Commons (http://en.wikipedia.org/wiki/File:Leaf_morphology.svg). This file is licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported](#) license.

Extension of Lesson Plan

1. Students can choose one pond insects or animal to research further.
2. Experiment to examine how gammarus (an aquatic organism) is affected by temperature. See Animal Growth and Changes Unit, Lesson 2: How does temperature affect animals?



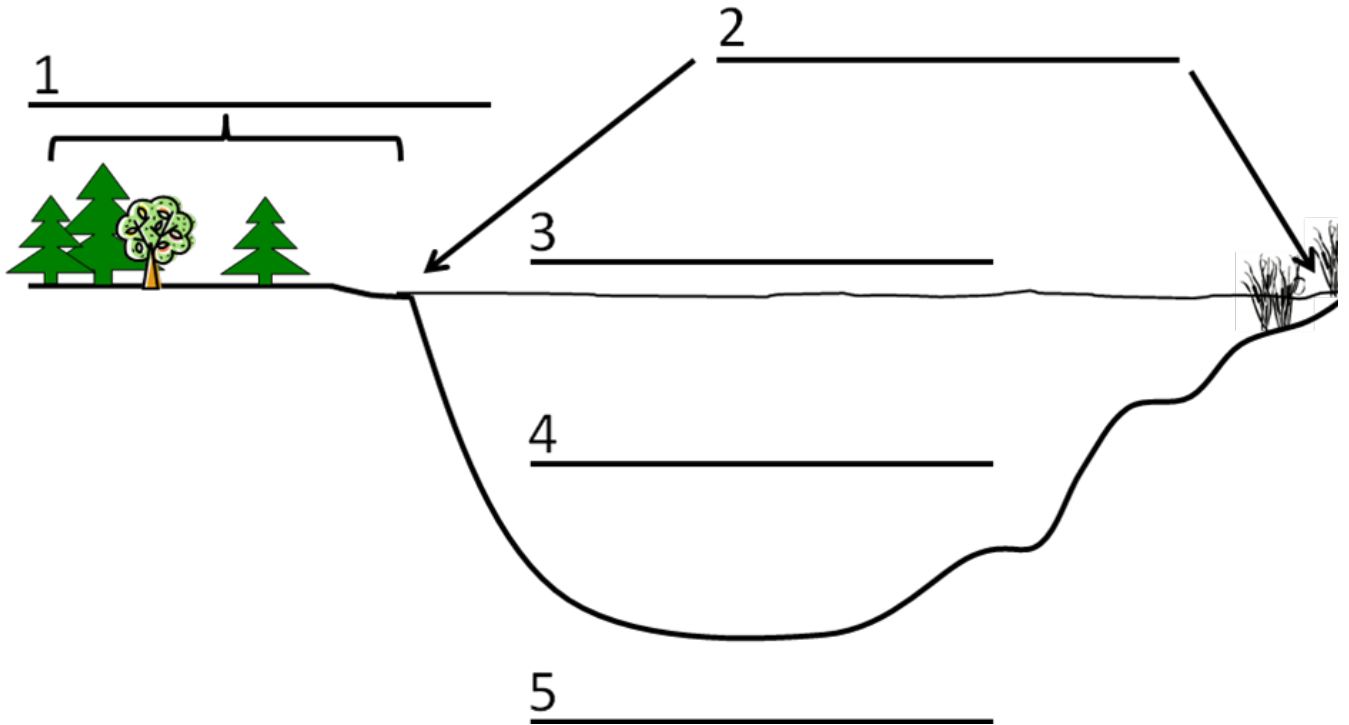
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WHAT LIVES IN A POND?

Label the pond habitat using the labels below

bottom **surface** **surroundings** **water column**
edge



Brainstorm. What do you think lives in a pond?



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POND PLANTS

Pick 1 plant to observe. Draw a picture and describe it.

What colour (or colours) is it? _____

Is the colour solid or is there a pattern? If there is a pattern describe the pattern: _____

What size are the leaves? _____

What shape are the leaves? _____

Do the leaves have smooth edges, lobes or teeth?

Are there many leaves or few leaves? _____

How are the leaves arranged on the stem? _____

What pattern are the leaf veins? _____

Two more observations

1. _____

2. _____



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POND BUGS

Pick 1 bug to observe. Draw a picture and describe it. Use the magnifiers to help you see better.

How big is it? _____

Does it have legs? How many? _____

Does it have feet? What do they look like? _____

Does it have a tail? wings? antennae? Describe them:

Two more observations

1. _____

2. _____

Do you think it swims, flies, walks? Why? _____



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POND ANIMALS

Pick one animal to describe

Name of animal _____

What size is it? _____

What kind of coat does it have? Fur, feathers, scales?

Describe it:

What colour(s) is it? Is the colour solid or is there a pattern?:

Does it have legs? How many? _____

Does it have feet? What do they look like? _____

Does it have fins? A tail? Wings? Antennae? A beak?

Something else? Describe: _____

Two more observations

1. _____

2. _____

Predict what type of microhabitat do you think it might live in?

Explain why: _____
