Science Unit: ***Local Habitats***

Lesson 12: ***Identifying Pond Animals***

Summary: Students learn about **pond organisms** in preparation for a field trip. They examine displays borrowed from the Beaty Biodiversity Museum and practice using a **dichotomous key** to identify pond bugs (printable worksheet included). They also learn about pond animals and **birdcalls** during a slide show (power point included).

School Year: 2013/2014

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

Developed by: Linda Herbert (scientist); Jessica Rosenblatt and Carol Tam (teachers)

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:

- For this lesson, insect displays were borrowed from the Spencer Entomological Collection at the Beaty Biodiversity Museum. Contact http://www.beatymuseum.ubc.ca/entomological-collection.
- The museum loan should be arranged well in advance as these displays are quite popular.
- In advance of the lesson the scientist should obtain pictures of the pond bugs to be identified and resize them to fit the template provided for the worksheet: freshwater shrimp (gammarus), water strider, water beetle, giant water bug, water boatman, water scorpion, dragonfly larva, damselfly larva. These can easily be found online.
- In advance of the lesson the scientist should prepare a slideshow of local pond animals (see references at end of lesson). Suggested animals include: mallard (duck), northern pintail (duck), American wigeon (duck), green-winged teal (duck), raven, crow, red-winged blackbird, pond turtle, raccoon, Eastern grey squirrel, and Douglas (red) squirrel. Pictures of animal specimens can be used alone (as above) or animal specimens can also be borrowed from a local college/university/museum if available.
- For this lesson the animal specimens were borrowed from the Beaty Biodiversity Museum, one of the Scientist in Residence Program partners. The museum is currently in the process of developing educational kits that schools will be able to borrow. Contact http://www.beatymuseum.ubc.ca/ or info@beatymuseum.ubc.ca.

Objectives

Students will be able to:

1. Learn to use a dichotomous key.
2. Learn to identify local pond bugs, birds and animals.
3. Become familiar with local pond bird calls.

Background Information

This lesson will build on Lesson 11 in this unit by providing students with additional knowledge on the organisms that they may encounter or observe on their fieldtrip to Jericho pond (Lesson 4). Students will learn to use a dichotomous key and then practice using one to identify several common pond bugs. For the second part of the lesson students will view a slideshow of local pond animals. During the slideshow students will learn features to help them recognize the animals including listening to bird calls.

Vocabulary

Pond:	A small, closed body of freshwater. Smaller than a lake.
Dichotomous key:	A tool biologists use to help them identify living organisms. Similar to a *Choose Your Own Adventure* book, the key uses a series of questions or statements about an organism that the user must choose between. As dichotomous means dividing into two parts, each question/statement has two possible answers. As the user moves through the series of questions/statements they are guided to the organism's identity.

Materials

- Worksheets & pencils
- Glue sticks & scissors
- Bug pictures for worksheet (template in worksheet file)
- Slideshow of local pond animals
- Internet access (for bird calls) or sound files of bird calls
- Computer/tablet/smart phone with speakers (for above)
- Animal specimens (optional)
- Pond bug display from Beaty Biodiversity Museum (optional)
- Book: Bugs of British Columbia (optional)

In the Classroom

Introductory Discussion

1. Briefly recap previous lesson activities, if applicable. *Today we are going to learn more about the bugs and animals in Jericho pond including how to identify them. Each of us is going to become a pond biologist and become an expert in identifying some of the pond bugs and animals we might see on our fieldtrip next week*.
   - How do you think biologists identify living organisms? Do they just have to memorize all of them?
   - Discuss student ideas. Discuss how biologists, or scientists in general, can't be experts in everything.
   - Introduce the concept of a dichotomous key as a tool to aid in identification. Highlight how a dichotomous key uses detailed observations to help biologists identify living organisms. Go through an example using a simple dichotomous key on the board.
   - Introduce the dichotomous key activity and hand out worksheets. Go through an example as a class. The water strider is a good example as they may not remember from the last lesson that the water strider is found on the pond's surface.

2. Short description of other items to discuss or review.
    - For younger students review the safe use of scissors if necessary.
    - If using the museum specimens, remind students not to pick up the aquatic organism display cases and not to lean on the glass tops.
    - The animal specimens from the museum will mainly be used by the scientist to point out features while the class observes. However, if you plan to have students handle the specimens remind students of the rules for handling. (depends on rules for specific specimens borrowed). In general, if students are allowed to touch specimens remind them how fragile the specimens are and that only the scientist will pick up and move the specimens. Students should only touch specimens lightly, with their pinky finger and if they want to stroke the fur or feathers it should be done lightly (with their pinky finger) and only in the direction that the fur/feathers grow, never in the opposite direction. Remind students not to pull or poke the legs, wings or tails. The wings, beak or claws cannot be opened.
3. Briefly describe science experiment/activity.
    - Students will use a dichotomous key to identify six common pond bugs.
    - Students will have pictures of the six pond bugs and once they have identified all six bugs using the dichotomous key they will glue each picture in the space provided on the worksheet.
    - Following this activity, students will come together on the carpet to view a brief slideshow and learn about local pond animals.
4. Briefly describe the processes of science that the students will focus on: Students will focus on making observations and using those observations to make conclusions.
5. Briefly describe safety guidelines.
    - Students will use scissors. Review safe usage with younger students if necessary.
    - Review safe handling of museum specimens and displays (as above)
    - If museum specimens are being used remind students that they should wash their hands before touching their face and prior to going for recess.

Science Activity

Activity 1: Pond Bug Identification

Purpose of Activity: To gain practice using a dichotomous key to identify six common pond bugs.

Methods and Instructions:

Set-up prior to experiment: In advance of the lesson the scientist should obtain pictures of the pond bugs to be identified and resize them to fit the template provided for the worksheet: freshwater shrimp (gammarus), water strider, water beetle, giant water bug, water boatman, water scorpion, dragonfly larva, damselfly larva. These can easily be found online. Each student should receive a copy of the template with pictures of the six organisms.

Pond Bug specimens – the museum loan should be arranged well in advance as these displays are quite popular.

Brief description of how students will work in groups or pairs: Students can discuss ideas with their table group while completing the dichotomous key but each student should complete their worksheet individually.

1. See detailed instructions on worksheet.
2. Hand out organism pictures and have students cut them into separate pictures. For younger students the scientist or teacher can cut out the pictures in advance if desired.
3. Demonstrate how to use the dichotomous key using an example organism; water strider is a good one to use. At each step ask the question out loud and have students supply the answers. Discuss answers as a class as necessary.
4. Pass out worksheets and have students glue down the example organism.
5. Students will complete the remainder of the worksheet individually. Students should have their answers checked by the scientist or teacher prior to gluing down the pictures.

Activity 2: Learning About Local Pond Animals (~20 minutes)

Purpose of Activity: to learn how to identify common pond animals using visual observations and bird calls.

Methods and Instructions:
Set-up prior to experiment: In advance of the lesson the scientist should prepare a slideshow of local pond animals (see references at end of lesson). Suggested animals include: mallard (duck), northern pintail (duck), American wigeon (duck), green-winged teal (duck), raven, crow, red-winged blackbird, pond turtle, raccoon, Eastern grey squirrel, and Douglas (red) squirrel. For this lesson the following animal specimens were borrowed from Beaty Biodiversity Museum: mallard (duck), northern pintail (duck), green-winged teal (duck), common raven, northwestern crow, and raccoon as well as mallard, northern pintail and green-winged teal wings. As much as possible specimens and pictures should be tailored to the specific pond used for the fieldtrip. Pictures showing specific features of the animals can augment the museum specimens. Museum loan should be arranged well in advance. If possible a computer with internet access and speakers should be used for the presentation so that bird calls can also be played. Bird calls can be listened to on www.allaboutbirds.org. A smart phone or tablet with internet access can also be used if a computer is not available.

The class will sit on the carpet for this presentation.

1. The scientist will go through the animal slides/pictures one at a time. The students will be asked to suggest (visual) characteristics that could be used for identification.
2. The scientist will point out the characteristics that can be used for identification on the pictures/specimens and compare characteristics of similar organisms. For example, how can we tell a mallard from a northern pintail? How can we tell a crow from a raven?
3. When birds are being discussed the scientist can also play the bird's most common call(s).
4. Older students can make notes about how to identify each species during the discussion.

Closure Discussion

1. How did you like using the dichotomous key? What did you learn? (Students generally mention a greater appreciation for more detailed observations, but if not ask more questions to bring about this discussion.)
2. Discuss the differences between male and female bird appearances if not already discussed during the slideshow. Why do male and female birds often look very different? What is the purpose of the different color schemes?
3. Remind students about fieldtrip next week and go over any questions or concerns.

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. <http://www.allaboutbirds.org> The Cornell Lab of Ornithology. All About Birds. [Excellent resource for bird pictures, identification guides and bird calls.] Accessed June 1, 2014.