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| Subject: | Pond | Grade: | 4 | Duration: | 2 hours |

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| Big Ideas: | Summative Assessment: |
| All living things sense and respond to their environment (Science)  | **Students will explore and observe organisms within the pond ecosystem.** * What is a pond?
* How did I notice (observe) the pond organisms?
* What did I notice (observe) in this field study?
* How do pond organisms sense and respond to their environment?
* What questions do I still have about ponds and the organisms that live in them?
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| Unit Understandings: |  | Content: |
| * Use their senses to make observations in the environment
* Connect to place and understand their role and responsibility as stewards of the environment
 |  | Sensing and responding: humans, other animals, plants Biomes (are regions grouped by similar temperature and precipitations (e.g., climate: long-term weather patterns) as large regions with similar environmental |
| Transfer: |  | Essential Questions: |
| * Using your senses to make observations in the environment
* Connect to place and understand their role and responsibility as stewards of the environment
 |  | * How do living things sense and respond to their environment?
* How do my senses compare to the senses of other plants and animals?
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|  | Concepts: |  |  | Curricular Competencies: |
|  | * Senses
* Interactions
 |  |  | * Demonstrate curiosity about the natural world
* Observe objects and events in familiar contexts
* Safety use appropriate tools to make observations and measurements, using formal measurements and digital technology as appropriate
* Make simple inferences based on their results and prior knowledge
* Express and reflect on personal or shared experiences of place
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| First People’s Principles of Learning: |  |
| Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place). **Cheakamus Centre Principles:****Place:** Students will explore and observe organisms within the pond ecosystem. **Inquiry**: students will ask questions that can be answered through observation.**Community:** students participate in citizen science by sharing data with other field study groups.  |  |
| Core Competencies: |
| **Communication:** * I ask and respond to simple, direct questions
* I am an active listener; I support and encourage the person speaking
* I can recount simple experiences and activities and tell something I learned

**Thinking:*** I can ask open-ended questions and gather information
* I get ideas when I use my senses to explore

**Personal and Social Emotional Learning:*** I can participate in classroom schools, community, or natural world
* I can identify how my actions and the actions of others affect my community and the natural environmental and can work to make positive change
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Field Study Planning:

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| Pre-visit connections: | Resources: |
| **Five senses Mind-map:** Ask students to think about their senses and the important information they provide. The following sequence of questions and leading discussion is a guide:* + - What senses do you have? What sense organs do you use for each one?
		- Why is it important to have these senses?
		- Living things use their senses to survive. What are some examples of animals using their senses?
		- Do all these animals use their senses in the same way?
		- How do pond organisms’ senses compare with your own senses?

**Leading questions to discuss with class prior to visit:** * What is a pond?
* What are the primary characteristics of a pond?
* What is a bio blitz?A *Bio Blitz* is an event that focuses on finding and identifying as many species as possible in a specific area over a short period.
* Attend a local pond. Have students interview an organism.
 | **Books:** * ‘Project Wet’ A curriculum and activity guide.
* ‘Over and under the Pond’ by Kate Messner
* ‘Strange Beginnings’ by Karen Needham and Launi Lucas.

**Websites:**<http://kbee.ca/handbook/> See Page 9 – ‘Bio blitz’School yard ponds: <http://www.schoolgrounds.ca/projects/ponds.html>Wetland activities: <https://www.ducks.ca/resources/educators/>* [Beetles: Interview an organism](http://beetlesproject.org/resources/for-field-instructors/interview-an-organism/)
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| **Please see ‘during visit connections’ below for more ideas to explore before your students’ visit ODS** |  |

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| During visit connections: | Resources: |
|  **Walk and Talk to pond:** 1. What is a pond? Bigger than \_\_\_\_\_, smaller than \_\_\_\_\_
2. What are some questions you have about ponds & the organisms that live there?

 **Possible Walk and Talk questions:**1. How did the organisms get into the pond?
2. What adaptations do organisms have to survive in the pond?
3. Where do the majority of organisms live? Why?
4. What do plants growing around the pond tell us?
5. What other mammals, insects, & birds are these organisms supporting?
6. How do you know if the pond is a healthy ecosystem?
 | * [Beetles: Walk and Talk](http://beetlesproject.org/resources/for-field-instructors/walk-and-talk/)
* [Beetles: I notice, I wonder, It reminds me of](http://beetlesproject.org/resources/for-field-instructors/notice-wonder-reminds/)
* [Beetles: Interview an organism](http://beetlesproject.org/resources/for-field-instructors/interview-an-organism/)
* [Beetles: Hand Lens Intro](http://beetlesproject.org/resource/hand-lens-intro/)

**Book:** Lessons from ‘Project Wet ’ A curriculum and activity guide**Apps to help identify organisms:** [Inaturalist](https://www.inaturalist.org/)**Resources Available at Cheakamus:*** Pond life ID cards
* Good water quality indicator cards
* ‘Strange Beginnings’ by Karen Needham and Launi Lucas
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| **Interview an Organism - Preparing to be interviewers (15 minutes):****Today, we will find and interview an organism.** Tell students they are going to explore and check out a bunch of pond organisms in the Pond bio blitz, and then pick one that they are going to “interview” to learn more about it. That means asking the organisms questions that can be answered by looking more closely at the organism, since it cannot talk!**Model an interview of a person who cannot talk**.Choose a student volunteer (or counsellor) and explain that you are going to show demonstrate types of questions to ask by “interviewing” this volunteer. The person will not answer back verbally. Instead, you will observe the volunteer closely and answer your own questions. For example,* *What colour eyes do you have? I see you have greenish brownish eyes.*
* *How tall are you? Let us see, you are about one foot shorter than I am.*
* *What are you doing? Hmmm…you seem to be standing still, fidgeting a little bit; you keep looking over at the wall, interesting…*
* *What are you thinking? Oops! That is not a question that can be answered.*

**Explain the difference between simple and deeper questions – both are useful in an interview.*** *Simple questions can be answered immediately through observation, and don’t have very long answers, e.g. what colour is it? How big is it? What are the main structures of its body? (have students brainstorm some more simple questions)*
* *Deeper questions need more time for observation, and include the organism’s relationship to its habitat and to other organisms, e.g. what is it doing? How many are here? Do they hang out together? What is the climate like in its habitat? (Have students brainstorm some more deep questions).*
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| **Assembling the bio blitz toolkit:*** Arrange students in teams of 2-3. Give each team a net and a small bucket. Tell students that we are going on a short walk to the Canoe Pond, where we will conduct the bio blitz.

**Walking to the Canoe Pond (10 minutes)*** Ask students walk & talk questions while walking to the pond. e.g. What is a Pond? Bigger than a \_\_\_\_\_\_\_, smaller than a \_\_\_\_\_\_\_. What are some questions you have about ponds and the organisms that live there?
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| **Building Ecosystem Literacy at the Canoe Pond:*** **Talk about the importance of thinking about organisms’ surroundings.** Point out to students that it is easier to come up with deeper questions and understand organisms when you know a bit about where an organism lives and what it is like there.
* At the pond, circle students up & perform a ‘Sensory Warmup’. Ask the students the following questions:
* *What does the pond smell like? What caused these smells? (smell)*
* *How many sounds can you hear? (hearing)*
* *What does it look like? (vision)*
* *What is the source of the pond: rainwater, seepage, or stream? (vision)*
* *What kind of plant life is growing in and around the pond (terrestrial versus aquatic plants) (vision)*
* *What mammals, birds, insects use the pond? What evidence is there around the pond? (Tracks, scat, visuals, nests?) (vision)*
* Bring group back together & ask a few students to share their observations with the whole group
* Optional: Students draw a quick sketch of the pond, and surrounding area
* Discuss how pond organisms sense the world around them. Discuss how their sense organs are different from ours, and what this tells us about how the organism lives.

**Preparing to Explore:*** **Invite students to slow down, get down, & look around for organisms.** Encourage students to think about how the surroundings might affect where they find organisms.
* **Explain that students will collect a pond sample.** Let your students know they will have time back at the Aquatics lab (about 10 minutes) to explore and look at different creatures before choosing an organism to focus on.
* **Activity logistics**: student groups natural boundaries, materials and timing. Split students into groups of 2-3. Model sampling technique (counsellor). Remember: mud is not there friend! Take samples from varying depths. The top of the pond, the middle of the pond and close to the bottom of the pond. Set boundaries for exploration, and explain pond safety rules. Choose a signal to call the group back together before releasing them.
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| **Back at Aquatics Lab (45 minutes)****Interviewing Organisms*** Students observe organisms using hand lens, then choose one organism to focus on. As students explore, help those that are having trouble-finding organisms. Focus on being a co-explorer. After 10 minutes, remind students to select an organism to interview.
* **Draw and record information.** Tell students they will sketch their organisms and record the information they find out during their interview. It may be helpful to model what you are saying by drawing it on a white board.
* *When you find an organism, you are going to make a scientific sketch of it. That means you do not have to worry about making a pretty picture –you will be making a diagram showing the organisms’ structures and your observations. Draw the organism as accurately as you can. If your organism is very small, though, you might choose to draw it larger than life on your page.*
* *As you are sketching and interviewing your organism, write down questions you ask the organism, and any information you get as an answer. If you are referring to specific parts of the organism in your writing, you can use arrows to show what part of the organism you are talking about. You could even draw a little map showing the surroundings where you found your organism. Make sure to include the date and location somewhere on your page.*
* Students record questions & answers as they observe organisms. Circulate as students conduct their interviews, and make sure they are asking both simple and deep questions. If students are having trouble coming up with questions, remind them to consider the organisms’ habitat and surroundings. Make sure students use both drawing and writing to record information.
* Individuals share observations and questions with each other. When students have had time to do an in-depth interview, call the groups together, and have each team share their questions and observations with another team.
* Group sharing & discussion: Ask a few students to share an interesting question or observation. Depending on what they say, consider leading a discussion about the difference and similarities between organisms, or make some observations together as a group.
* Briefly discuss what adaptations aquatic organisms have to survive in the pond (relate to how living things sense and respond to their environment). Bug Sense Trivia:
* What are some of the things insects need to do to survive? (Avoid predators/enemies, find food and water, and find a mate.) Are these the same as us?
* Can you think of an example of a pond organism using its sense of seeing/hearing/touch/smell/taste?
* Pond organisms have evolved different sensory organs to do the same job as ours. So insects use the same senses as we do, but do they have the same sensory organs? (Yes and no.)
	+ A male mosquito can tell the difference between a female who is looking for a mate and one who has already laid her eggs by listening to her wingbeat!
	+ Have you ever been to a 3D movie? Some 3D movies, the ones with 3D goggles that look like sunglasses, take advantage of the fact that humans cannot see the polarization of light, but many insects can. This helps them to navigate.
	+ Most insects and spiders taste with their feet. That is why flies like to walk around on your food.
	+ Water striders gliding on the surface of a pond use their sense of touch to detect ripples from predators or prey, much like a spider uses her web.
	+ Insects can use their antennae as feelers, but the main function of antennae is smell! Many insects also have olfactory receptors (a fancy word for “noses”) on their feet.
	+ Insect ears are all over the place! For example, grasshoppers have ears on their knees, praying mantises have them on their bellies, and mosquitoes have them at the base of their antennae.
	+ Insect’s eyes are compound eyes. This means they are made of many little lenses, instead of one big lens (as our eyes have). They cannot see detail as well as us, but they have some advantages: butterflies can see more colors than we can, bees can see something called the polarization of light, and horseflies can respond to movements much, much faster than people can!
	+ Insects can taste with their mouth, just like us, but most also taste with their feet. Would you want to taste the inside of your shoes?
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| **Identifying the Organism (to be completed before or after interview)*** Tell students they will use the Pond ID card to identify their organism.
* Demonstrate how to use the Pond ID card.
* Students use the cards in teams to figure out what their organism is.
* Circulate, trouble-shoot, be a co-investigator, and ask questions.

**Discussing Findings** * Students share what organisms they found. Write list of organisms on white board. Summarize results:
* *What aquatic organisms live in the pond?*
* *Where do we find the organisms? –shallow zone, middle/open water, bottom sediment (mud or sand?), near shoreline*
* *Diversity: - what species are found in pond?*
* *How does this compare to data collected by other field study groups (citizen science)?*
* Focus the discussion on the relationship between organisms.
* *Can we construct a food chain with organisms found (on whiteboard)?*
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| **Wrapping it up*** *Today, we learned about how pond organisms use their senses in different ways, using some of the same sense organs and some different ones. Who can tell me one of the senses that is the same in you and a pond organism? One that is different.*
* Revisit Essential Questions: Circle debrief*. What is a pond? How did I notice (observe) the pond organisms? What did I notice (observe) in this field study? How do pond organisms sense and respond to their environment? What questions do I still have about ponds and the organisms that live in them?*
* Encourage students to keep interviewing organisms while at Cheakamus Centre. Emphasize to students that they now have skills they can use with any organism anytime, and that scientists do this all the time. Ask students to think about simple and deep questions they could ask of organisms they encounter in other field studies.
* Have counsellors release organisms back into the pond habitat as close as possible to where they found them.
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| Post-visit connections: | Resources: |
| * Build a schoolyard pond.
* Organize a bio blitz event in your schoolyard/community.
* Challenge your class or school to get involved in a meaningful action project that encourages pond/stream stewardship. (E.g. Storm drain marking)
* Develop a plan of action to address a selected environmental problem or issues related to water systems around your school.
* My special place (Get Outdoors p.59) students choose and explore a special natural place in their schoolyard, park or other area. They describe the local environmental using sensory details; they reflect on its importance, and they discover their own connections to it. Suggested reading list about special places and connections (Get Outdoors p.63)
 | **Websites:**School Grounds Transformation: <http://www.schoolgrounds.ca/projects/ponds.html>Bio blitz Canada: <http://bioblitzcanada.ca/> The Pacific Stream Keepers’ Federation: <https://www.pskf.ca/>Lynn Canyon Ecology Centre: <http://www.lynncanyonecologycentre.ca/>[Beetles: **Stream Detectives**](http://beetlesproject.org/resources/for-field-instructors/stream-detectives/)**Books:** Get Outdoors – An educators’ guide to outdoor classrooms in parks, school grounds and other special places. |