Lesson One: Introduction to Aquatic Habitats

Learning Objective:

Students will be able to list and identify a variety of aquatic plants and animals that live in aquatic habitats both inside and outside their community.

Outcomes and Indicators:

Science HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communities.

- a) Identify the plants and animals which can be found in the communities (e.g., house, village, farm, reserve, and city) in which students live
- c) Predict and research the populations of plants and animals that exist in various habitats (e.g., desert, farmland meadow, tree, forest, rain puddle, seashore, lake, river, tropical forest, tundra, river, delta, and mountains).

Connections to Environmental Education:

This lesson is designed for students to identify the variety of species that live within the aquatic ecosystems within Canada. It will allow students to succeed in future lessons within this unit in regards to aquatic ecosystems with Canada.

Key Questions:

What aquatic plants and animals live within our community?

What aquatic plants and animals live within Saskatchewan?

What aquatic species are only found in Canada?

Assessment:

Students will compile a list of various aquatic species that will be shared with the teacher. Students will then keep this list as a resource to be referenced throughout the unit for various activity. No formal assessment for this lesson, but materials will be used for later assignments for assessment.

Learning Plan:

- Begin with a review about the differences between habitats and communities. Brainstorm a list of different types of aquatic habitats that can be found in Canada.
- Watch https://www.youtube.com/watch?v=4fMemcd-VXw - follow up with a discussion about the video (various types of aquatic habitats and species that live there).
- Add more aquatic habitats to the list if able too
- Brainstorm a list of different plants and animals that can be found in different aquatic habitats
- Students will be put into groups of three or four and will sort the lists brainstormed as a class. They will be instructed to work together to separate the species and habitats into what can be found within the community and then what can be found in other locations. (will work on learning what species live in particular habitats).
- Reference https://cwf-fcf.org/en/resources/for-educators/resource-sheets/the-global-aquatic-ecosystem.html to create a handout for the students to reference throughout the unit.

Lesson 2: Populations, Communities, and Habitats

Learning Objective:

Students will be able to differentiate between populations, communities, and habitats within aquatic ecosystems found within our community and surrounding ecosystem.

Outcomes and Indicators:

Science HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communities.

- b) Differentiate between populations, communities, and habitats using local and regional examples.

Connections to Environmental Education:

This lesson is designed to help students learn about the differences between populations, communities, and habitats within aquatic ecosystems. They will use regional ecosystems and species for this lesson in a way to understand more ecosystems in future lessons.

Key Questions:

What species are found in aquatic ecosystems within our area?

What are the differences between populations, communities, and habitats?

Assessment:

Students will spend some time learning about populations, communities, and habitats. Students will fill in a worksheet about the content of the lesson to be

handed in to the teacher at the end to prove their achievement in the outcome and as a checkpoint to gauge their understanding.

Learning Plan:

- Using https://www.mpalalive.org/classroom/lesson/habitats-and-communities-us provide students with a short PowerPoint lesson about what the differences between populations, communities, and habitats are. (Create optional handout to be provided as well if needed.)
- Allow students to take 5-10 minutes to think of aquatic species found in our area and think about how they fit into the three categories
- Do a class example: jackfish (organism), multiple jackfish (population), aquatic plants, frogs, bugs, etc. (community), sun, clouds, water, mud, etc. (habitat).
- Explain the handout to the students and allow time for any questions. (Students will be choosing an organism and drawing it in the same categories as discussed in the class example. Handout from https://www.teacherspayteachers.com/Product/Compare-Levels-of-Organization-Individual-Population-Community-Ecosystem-800778).
- Provide each student a handout and enough time to complete. At the end of class ask students to hand their work in to show their progress and level of understanding. Will be handed back for students to reference during the next lesson.

Lesson Three: Research a Canadian Aquatic Species

Learning Objective:

Students will conduct research on an aquatic species that lives in Canada of their choice to be approved by the teacher. Students will be required to do a small drawing of the species in its natural habitat and write a short paragraph describing the species.

Outcomes and Indicators:

Science HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communities.

- c) Predict and research the populations of plants and animals that exist in various habitats (e.g., desert, farmland, meadow, tree, forest, rain puddle, seashore, lake, river, tropical forest, tundra, river delta, and mountains).

Connections to Environmental Education:

Students are required to choose an aquatic species to research. They are required to draw an image of the species in its habitat and provide a short paragraph describing the species and the research they have found.

Key Questions:

What habitat does the species live in?

Where in Canada is the species found?

What does the species eat/what (if anything) eats the species?

Assessment:

Students will be required to draw an image on 8 ½ x 11 paper of the species in its habitat. They will also be required to write a short paragraph with the information they found about the species. All to be handed in to the teacher.

Learning Plan:

- Prior to the class, generate a short list of aquatic species the children could choose (not limited to this list, they may present their own ideas as well).
- In the list, include plant species, fish species, bird species, and mammal species as all of these contribute to aquatic ecosystems.
- Use https://www.canadiangeographic.ca/kids as an example website that the children can explore to find information about aquatic species.
- Tell the children what they are assigned to do. Tell them their paragraph should be five sentences about their species.
- The image drawn should include the species itself, other species within the environment, and the habitat- this is a way for the children to reflect their understandings of populations, communities, and habitats.

Lesson Four: Food Chains and Food Webs within Aquatic Habitats

Learning Objective:

Students will be able to create a visual representation of a food chain within an aquatic ecosystem found in Canada. Students will also be able to link food chains into food webs within the chosen ecosystem.

Outcomes and Indicators:

Science HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communities.

- g) Construct a visual representation of a specific food chain that exists within a habitat or community.
- h) Analyze food webs as representations of multiple food chains.

Connections to Environmental Education:

Students will spend this class and the rest of the unit understanding food chains and food webs within aquatic ecosystems. Food chains and food webs are an essential aspect of ecosystems and the students will have an assignment to go along with this.

Key Questions:

How are food chains connected to food webs?

How many different species can be within a food chain? A food web?

Assessment:

Students will begin this individually. They will be required to create a food chain of an aquatic ecosystem using at least four species. Following this, they will be put into small groups of three to join their food chains together into food webs. They will be required to hand in their work at the end for the teacher to track their progress.

Learning Plan:

- Begin the lesson with a short recap on populations, communities, and habitats
- Watch https://www.youtube.com/watch?v=MuKs9o1s8h8 about food chains
- Give students a food chain template to fill out with aquatic species of their choice: https://teachables.scholastic.com/teachables/books/food-chain-science-mini-lesson-9780439548960_013.html
- Allow students enough time to fill in their food chains and answer questions
- Watch https://www.youtube.com/watch?v=Vtb3I8Vzlfg about food webs
- Put students into small groups of three and have them combine their food chains into food webs. More time may be necessary at the beginning of next class to complete this.
- Provide each group with a copy of this template to fill in: https://www.exploringnature.org/db/view/Food-Web-Graphic-Organizer ; to be handed in to the teacher once completed.

Lesson Five: Indigenous Worldviews on Aquatic Ecosystems

Learning Objective:

Students will draw from Indigenous worldviews and link that to the interdependence of aquatic species within their own ecosystems and others.

Outcomes and Indicators:

Science: HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communities.

- d) discuss stories that demonstrate the interdependence of land, water, animals, plants, and the sky in traditional worldviews
- e) Draw upon facets of Indigenous worldviews, such as the Medicine Wheel or circle of life, to examine understanding about the interdependence of plants and animals in various habitats and communities.

Connections to Environmental Education:

Indigenous worldviews are very important in preserving the land. By giving students an opportunity to see other people's views on nature it may inspire them in future lessons and assignment requirements.

Key Questions:

What types of things do Indigenous peoples do to preserve nature?

What ways are all aspects of nature interconnected?

Can I use any Indigenous perspectives to help my own perspectives of the environment?

Assessment:

Following the lesson, students will have a class discussion about what the learned from the lesson and what kinds of things Indigenous people do to preserve the environment and show its interconnectedness. Discussion will focus on aquatic environments. No formal assessment for this lesson.

Learning Plan:

- Start by reading out loud Lessons from Mother Earth written by Elaine McLeod (https://www.mcnallyrobinson.com/9780888998323/elaine-mcleod/lessons-from-mother-earth)
- Have a discussion following the reading. Ask the students what they thought the meaning of the story is, what happened in the story, and what we can do to help preserve Mother Earth.
- Watch https://www.youtube.com/watch?v=p7oW9HgIRsI from the perspective of an elder
- Discuss as a class what the video meant and how everything within nature is interconnected
- Connect the book and the video to aquatic systems in Canada as a class.
- Wrap up by answering any questions students may have and providing students with a few notes (from the book and the video) to write down to reference back to at any point throughout the rest of the unit

Lesson Six: Observing and Predicting Outcomes on Aquatic Habitats

Learning Objective:

Students will create their own jar aquatic ecosystems and create observations. Students will also remove components of their ecosystem eventually and predict and observe the outcomes of removal. Students will then visit a real pond at some point within the rest of the unit and write observations on that.

Outcomes and Indicators:

Science HC4.1: Investigate the interdependence of plants and animals, including humans, within habitats and communites.

- k) Predict how the removal of a specific plant or animal population may affect a community in the short- and long-term.
- l) Observe and maintain a habitat such as a terrarium, aquarium, mealworm box, ant farm, pond in a bottle, or vermiculture to examine interactions between plants and animals, and their environments.
- m) Show concern and respect for the safety of self, others, plants, and animals when maintaining a habitat.

Connections to Environmental Education:

This lesson allows students to examine first-hand how pond life works and how it can be affected by the addition or removal of certain aspects. It is interactive for the students. Also, visiting a pond is a great way for students to really see how they function.

Key Questions:

What happens when a part of a pond habitat is removed?

What happens when a part is added?

How does one aspect affect the function of everything else?

Assessment:

The students will be keeping track daily of their water bottle ponds for the remainder of the unit. They will keep track of differences and growth and submit their findings to the teacher at the end of the unit.

Learning Plan:

- Begin by showing the students part of this video: https://www.youtube.com/watch?v=dz4TblBY4IE - play from 1:44 – 9:40
- Ahead of time, have the supplies for the jar ponds for students to choose what they wish to include
- Follow the mini aquatic ecosystem plan (number five) for the rest of the lesson: http://www.torontozoo.com/EducationAndCamps/Elementary/TeacherResources/Grade%204-%20Habitats%20&%20Communities.pdf
- When visiting the pond have students keep in mind what they noticed from their jar ponds and question what would happen in a real pond.

Lesson Seven: Identifying Various Organizations to Benefit Aquatic Habitats

Learning Objective:

Students will research and create a list of various organizations that are aimed towards aquatic habitats at the local, provincial, and national levels. Students will then create a poster on one of the organizations chosen with a partner.

Outcomes and Indicators:

Science HC4.3: Assess the effects of natural and human activities on habitats and communities, and propose actions to maintain or restore habitats.

- b) Identify stakeholders who are likely to adopt different points of view on issues (e.g., sewage treatment, urban expansion, deforestation, water pollution, pipeline construction, grassland stewardship, climate change, and pesticide usage) that are highlighted in the media related to habitat protection, restoration, and management.
- h) Create dramatic, visual, musical, or other representations to show how personal actions can help conserve, honour, and respect natural and constructed habitats.
- j) Identify local, provincial, and national organizations that work to preserve, restore, and provide education about habitats and communities.

Connections to Environmental Education:

Students are required to spend some time researching (with a partner) various organizations that are aimed in aiding aquatic habitats at either a local, provincial, or national level.

Key Questions:

What organizations in my area aide aquatic habitats?

What does the organization do to help aquatic habitats?

Assessment:

In partners, students will be creating a one page informational poster about the organization they chose.

Learning Plan:

- Begin with a review of how everyone's ponds are doing
- Tell students they will be researching an organization with a goal of aiding aquatic systems either locally, provincially, or nationally.
- Provide a list of examples: http://thewaterbrothers.ca/education/water-organizations/ has various Canadian organizations
- Explain the poster portion of the assignment
- Students will be put into partners and set to research, once they have their organization they tell the teacher so no one is doing the same

Lesson Eight: Creating Plans to Preserve/Restore Aquatic Habitats

Learning Objective:

Students will collaborate with a peer to create a plan to preserve or restore a local, provincial, or national aquatic habitat and create a poster creatively detailing their ideas.

Outcomes and Indicators:

Science HC4.3: Assess the effects of natural and human activities on habitats and communities and propose the actions to maintain or restore habitats.

- h) Create dramatic, visual, musical, or other representations to show how personal actions can help conserve, honour, and respect natural and constructed habitats
- i) Collaboratively develop and carry out (if feasible) a plan to preserve or restore one or more components of a local habitat.

Connection to Environmental Education:

This lesson is connected to environmental education because students will have the opportunity to figure out ways they can have a positive impact on the environment, specifically aquatic ecosystems.

Key Questions:

How can I have an impact on the environment?

What kinds of things can I do to have a positive impact on the environment?

Will I be able to actually do what I am planning?

Assessment:

Students will create their action plan for preserving or restoring an aquatic habitat component and hand it in to the teacher.

Learning Plan:

- Using https://www.cnn.com/2019/09/28/world/youth-environment-activists-greta-thunberg-trnd/index.html give the students different examples of kids and teens who have been making a positive difference in the environment.
- Ahead of class, modify this resource into an environmental action plan: https://www.teacherspayteachers.com/Product/Student-Action-Plan-1547822
- Help students with any questions they have and tell them to draw information from past lessons to help them develop their environmental action plan.

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ESCI 302 – Unit Framework