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Experiential Science 30
Sustainability and
Freshwater Resources
Indigenous Knowledge Lesson Plan

Local and Traditional Knowledge in Watershed Governance
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Experiential Science 30: Sustainability and Freshwater Resources

UNIT 4: RESOURCE MANAGEMENT

Purpose

Ecotourism is increasingly promoted in the Mackenzie River basin as a means of boosting local economies while maintaining sustainable practices. It is important for students to recognize different definitions of “sustainability” in order to determine whether (and how) ecotourism would fit within their local community. Students will learn to listen to Elders and/or local fish harvesters definitions of sustainability and apply local and Indigenous knowledge to decision-making around ecotourism.

Focusing Questions: How can freshwater resources be managed to ensure a sustainable future for generations to come?

- Students will gain an understanding of ethical issues concerning freshwater resources by:
 - Discussing the need and ways of balancing one's cultural values and to ensure a sustainable future
 - Researching and discussing, with elders or other subject matter experts, the historical values and traditions used by Aboriginal people of harvesting the freshwater ecosystems to ensure sustainability
 - Comparing and contrasting the traditional values and practices of harvesting fish, and the cost benefits to the ecosystem and economy of ecotourism vs. industrial harvesting of a fish stock
 - Preparing a defence to support the advantages or disadvantages of ecotourism to the local economy

Teacher Resources

- “Brundtland, G.H. (1987) Our Common Future: Report of the World Commission on Environment and Development. <http://www.un-documents.net/our-common-future.pdf>
- School protocols for engaging elders and community members.
- Elders in Schools Handbook https://www.ntassembly.ca/sites/assembly/files/13-06-3td_84-174.pdf
- Mackenzie River Basin (location and introduction): <http://www.trackingchange.ca/river-basins/mackenzie/>
- This lesson is based on research from Tracking Change: Local and Traditional Knowledge in Watershed Governance: <http://www.trackingchange.ca/>.

Materials Needed:

- Copies of "People's Perspectives of Sustainability in the Mackenzie River Basin" (attached)
- Screen and projector to play one of two ecotourism videos (optional):
 - Tundra North Tours (Inuvik, NT): <https://spectacularnwt.com/story/indigenous-stories-tundra-north-tours>
 - NARWAL Northern Adventures (Yellowknife, NT): <https://spectacularnwt.com/story/indigenous-stories-narwal-northern-adventures>
- Copies of "How to Conduct an Interview" (attached)
- Release forms (as applicable to your school) for interview recordings and photography
- Copies of "Ecotourism Consultant"
- Printouts or digital access to:
 - Northwest Territories Ecotourism Lodges and Resorts Vacations <http://www.lodgesresorts.com/nwt-ecotourism.html>
 - Nahanni River Adventures: <https://nahanni.com/about/why-choose-us/> and <https://nahanni.com/about/commitment-to-the-environment/>
 - Is Arctic tourism sustainable? <https://www.canadiangeographic.ca/article/arctic-tourism-sustainable>
 - Tourism Potential in the Deh Cho, NWT: A Literature Review and Spatial Analysis (p. 8-13) <http://www.dehcholands.org/docs/reports/Contractor%20Reports/Tourism/Final%20report%20May%2028.pdf>
 - Ecotourism: Definition, Meaning And Examples <https://youmatter.world/en/definition/ecotourism/>
- Sport Fishing in the Mackenzie (attached)
 - Sport Fishing Guide (p. 3-9, 11-12, 21) https://www.enr.gov.nt.ca/sites/enr/files/nwt_sport_fishing_guide_2017-18.pdf

Links to all the PDFs are available on the curriculum materials section of the Tracking Change Website.

INTRODUCTION

A common definition of “sustainability” is: “meeting the needs of the present without compromising the ability of future generations to meet their needs” (Brundtland, 1987). Sustainability often involves three pillars: economic, environment, and social sustainability. Only recently have western institutions recognized the importance of sustainability. Indigenous peoples have lived in a sustainable way since time immemorial. This lesson will introduce students to the concept of sustainability from Indigenous perspectives, as well as how the principle can be applied to ecotourism in northern communities.

Key questions for student inquiry:

- Should we have ecotourism in my community? How do Indigenous definitions of sustainability help me decide whether ecotourism is a sustainable option or not?

LESSON PLAN PROPER

- **Location:** In classroom and in the school/community (survey)
- **Length of activity:** 180-300 minutes
- **Activating Strategies:**
 - *Introduction:* Conduct a class brainstorm on the meaning of “sustainability” by creating a mind map together as a class. Students may draw on their own understandings, as well as things they see in the public. Have the students consider environmental, economic, and social components of sustainability. They should provide examples of sustainable practices they see in their community. Students should consider which values, practices, and traditions would help build the sustainable futures they imagine.
- **Learning Experiences:**
 - *NOTE:* As this lesson spans multiple classes, consider ways to review material and activate student knowledge at the beginning of each class. Some options include:
 - Think/pair/share to review key concepts from the previous class.
 - Revisit class notes/posters from the previous class and modify according to any new thoughts students have had in the interim.
 - Create a class portfolio on sustainability, where students collectively add notes, diagrams, summaries, and responses as they move through the activities. The class selects the strongest evidence to include in the portfolio. If a student misses a class, they can take a few minutes to read through the sustainability portfolio.
 - *Individual or Group Activity: Consider the meaning of Sustainability.* Distribute and introduce “People’s Perspectives of Sustainability in the Mackenzie River Basin.” This handout will help the students reconsider and expand the definitions they developed based on their own perspectives/experiences in the opening activity. Provide students some time to engage with the material, either individually or in groups. Options:
 - Individual response: write a paragraph explaining the definition of sustainability according to the excerpts on the handout, making reference to

both values and practices.

- Group response: using poster paper, map/draw/describe the definition of sustainability according to the excerpts on the handout, making reference to both values and practices. Share your findings with the class.
- As a class, discuss how the people's statements on the handout expanded the students' concept of sustainability. Make a list of questions about sustainability that this handout raised. Record these notes on the board or poster paper as a frame of reference for the remainder of the activity.
- *Group Activity: Research about sustainable fish harvest.*
 - Introduction: the excerpts contained in "People's Perspectives of Sustainability in the Mackenzie River Basin" were gathered during a research project on the health of the Mackenzie River Basin. Interviewing is a key research method for understanding the values and practices involved in sustainable freshwater management. In this activity, students will interview Elders and land users to understand sustainable fish harvesting in relation to ecotourism and industrial harvesting, as well as values/traditions/practices that contribute to sustainable harvest.
 - Open by providing students with a brief definition of ecotourism. The International Ecotourism Society (TIES) defines ecotourism as "responsible travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education" (<https://ecotourism.org/>). Ecotourism in the Mackenzie River basin involves many activities, including sport fishing, river cruises, hunting, cultural tourism, adventure travel, and more. This lesson will focus on sport fishing specifically
 - Display either of the provided videos on Indigenous ecotourism videos in the Northwest Territories (optional). These videos provide a visual representation of ecotourism and also show young Indigenous peoples as the owners/operators of these thriving businesses.
 - Tundra North Tours (Inuvik, NT): <https://spectacularnwt.com/story/indigenous-stories-tundra-north-tours>
 - NARWAL Northern Adventures (Yellowknife, NT): <https://spectacularnwt.com/story/indigenous-stories-narwal-northern-adventures>
- Divide the class into small groups and have each group read one of the following articles/websites as an introduction to the ecosystem and economy of ecotourism in Canada's north. Using poster paper, each group will:
 - (a) summarize the aim and key points of the article/website
 - (b) compare and contrast with "People's Perspectives of Sustainability in the Mackenzie River Basin" how "sustainability" is addressed in the article/website, and
 - (c) list 2-3 questions the article/website raises about sustainability and decision-making for sustainability.
- Articles/websites:
 - Northwest Territories Ecotourism Lodges and Resorts Vacations <http://www.lodgesresorts.com/nwt-ecotourism.html>
 - Nahanni River Adventures: <https://nahanni.com/about/why-choose-us/>

- and <https://nahanni.com/about/commitment-to-the-environment/>
- Is Arctic tourism sustainable? <https://www.canadiangeographic.ca/article/arctic-tourism-sustainable>
 - Tourism Potential in the Deh Cho, NWT: A Literature Review and Spatial Analysis (p. 8-13) <http://www.dehcholands.org/docs/reports/Contractor%20Reports/Tourism/Final%20report%20May%2028.pdf>
 - Ecotourism: Definition, Meaning And Examples <https://youmatter.world/en/definition/ecotourism/>
 - Sport Fishing in the Mackenzie (attached)
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 - When students are finished working in their groups, have them share their summaries with the class. Discuss as a class the potential benefits and costs of ecotourism in your community. Raise questions together as a class: what more do you need to understand about the local environment, culture, economy, traditions, and values in order to make sound and sustainable decisions about ecotourism?
 - Record the class discussion on the board or poster paper and display for the remainder of the lesson as a reference point. If students miss this activity, they may reference the class notes.
 - Discuss as a class which Elders, knowledge holders, or fish harvesters might be best able to help them understand sustainability, fish harvesting, and ecotourism. Select an option:
 - Either individually or in small groups, have students identify an interviewee to help them further understand sustainable fish harvesting in their community. In this option, students develop and carry out their own interviews independently on their own time.
 - Identify a guest speaker and invite them to speak to the entire class, rather than having students conduct interviews independently. In this option, students develop interview questions together as a class, and each student asks one or more questions of the guest speaker.
 - Prepare for the interview using "How to Conduct an Interview." Walk through the handout, "Best Practices for Interviews." Role play interview best practices in pairs.
 - NOTE: Interviews may take place in school or outside of school. If students are inviting the guest(s) to the school, prepare to welcome them and create a hospitable environment in the classroom. Information for engaging Elders and community members in the NWT is available here: https://www.ntassembly.ca/sites/assembly/files/13-06-3td_84-174.pdf.
 - Students who complete their own individual interviews should share their findings with the class. If a guest speaker comes to the school, take the time to debrief

CONCLUSION/REFLECTION

Individual Written Piece: Distribute "Ecotourism Consultant" and outline the assignment. This is the students' opportunity to evaluate ecotourism in their community using the knowledge they have acquired in this lesson!

INDIGENOUS LANGUAGES - WORD BANK

Indigenous knowledge of the land is interwoven with language. The following are key terms in northern languages that are directly related to this lesson. Following the NWT's whole-school approach to language learning, we recommend bringing these terms into the science classroom, according to the language(s) spoken in your community. In this way, it is possible to provide students with a holistic understanding of the land, language, and culture in ways that support their own identities.

To use any of the Northern Indigenous languages fluently means that the speaker observes and interacts with their environment. They are relational languages. The connection between the speaker, their actions and the environment speaks to a worldview where relationships are important – relationships with self, others, the land and one's spirituality - Our Languages, 2020, p. 5

We encourage collaboration with language teachers where available to support student learning. A few ideas to bring northern languages into science classrooms include:

- Creating classroom displays that highlight terms from this list using diagrams, photographs, artwork, and/or definitions.
- As a teacher, using these words in conjunction with or in place of English words throughout the lesson (and others) where possible.
- Encouraging students to incorporate these terms into written and oral components of this lesson (and others).
- Discussing with students how the precision of some of these words is linked with Indigenous knowledge of the land.
- Incorporating terms into a game/activity/lab assignment to make language learning fun.

Source: https://www.ece.gov.nt.ca/sites/ece/files/resources/our_languages_curriculum_2020_low_res.pdf

TRADITIONAL WORDS					
English	<u>Tsaat'ine</u> <u>tthadeh/</u> <u>Dene</u> (Beaver or xe'ghont'e)	<u>Sahtúot'ine/</u> <u>Dene (Slavey</u> <u>or Kaguntu)</u>	<u>Nēhiyawēwin/</u> <u>Cree</u>	<u>Dinjii Zhu'</u> <u>Ginjik/</u> <u>Gwich'in</u>	<u>Inuvialuktun/</u> <u>Inuvialuit</u>
Fishing place, fishing spot	Da'etse'ahi k'e	Da'etse'ahi k'e	nôciki- nose- wewinohk	Łuk katr'idi'ii k'it	Iqalukmi
Fish nets	ługe mih'	Łue mila	ahyapiyak	Chihvyah	Kubyaq

Ice Fishing	E'ten k'e da etse'ah	Te k'e tue ka'atsetii	mikk- wamihk ka kwâsk- wepicikehk	Łuu t'eh Łuk katr'idi'inh	No Trans- lation Available
Catch and release	Ługe tsichu uh tsebitsi	Łue mbe't- sande' ih ndat- sedetsi'	Pastew Sîpîsis	Łah zhit yuulâi' ts'àt yinadiinjik	No Trans- lation Available
Areas where the fish spawn	Ługe atii k'e	Łue ndeyehi k'e	kinosewak ka amit- wawtaw	Dik'in' nyàa'il dehk'it	Nutaaq Iqaluk

These are some traditional words related to sustainability of freshwater ecosystems and fish. As you complete the lesson, encourage students to think about other words they would like to know the traditional word for. Who can they speak to to learn these traditional words?

Keywords: ecotourism

Themes: Indigenous knowledge; sustainability

Student Handout: Sport Fishing in the Mackenzie River Basin

WHAT IS SPORT FISHING?

Sport fishing is the practice of fishing for pleasure or for competitions. Some people travel across the world in search of a big beautiful fish - or for the adventure of fishing. People visit the **Mackenzie River Basin** to catch pike, trout, and char, and to enjoy a landscape uncrowded with humans. There are many fishing lodges and tours that profit off of sport fishing. These help the economic development of the local communities.

However, this human activity can damage the fish populations and harm the people who rely on the fish as a source of food, such as the local Indigenous communities. Increasing numbers of highways, back roads, and boat launches allow sport fishers to visit traditional fishing areas of local Indigenous communities. These places become crowded, and it becomes harder for Indigenous people to fish for their food. It is very difficult to limit the number of people travelling, boating, or fishing along the highway and backroads. Without limits, overfishing leads to drastic decreases in fish populations. The fish that the Indigenous peoples rely on as a source of food are being threatened.

SPORT FISHING IN THE PEACE RIVER AREA

Below are some excerpts from reports that talk about the concern of overfishing caused by sport fishing in the Peace River area. This area is part of the Mackenzie River Basin.

The highway that runs along the Peace River is one of the areas that is of concern for the Indigenous peoples in the area.

With Highway 29 running the entire length of the Peace between Hudson Hope and Fort St. John, and several boat launches, traditional fishers believe that sport fishing has caused a decline in the number of fish. For instance, after an entire afternoon using two different fishing nets of up to 100 feet each, only two fish were caught at the Eagle Island Fish Camp. (Treaty 8 Association of BC area, p. 64-65, 2016-2017 Report)

Backcountry roads are also a major concern for the Indigenous people.

In tributary rivers like the Moberly, Halfway, Pine, Sukunka, Murray, Burnt, Wolverine, it is common knowledge among local fishers that fish populations are in rapid decline. Most fishers believe it [decline in fish population] is due to overfishing because backcountry roads had created open access to once remote fishing spots. (Treaty 8 Association of BC area, p. 65, 2016-2017 Report)

NOTE: This handout was generated through research from the research project, Tracking Change: Local and Traditional Knowledge in Watershed Governance (<http://www.trackingchange.ca/>).

Assignment: People's Perspectives on Sustainability in the Mckenzie River Basin

In the following excerpts, Indigenous people from various communities in the Mackenzie River Basin share their deep knowledge of the land, including how they care for it. This knowledge has been developed through long-term experience and observations living, harvesting, and travelling over the land, throughout people's entire lives and also across generations. Such deep knowledge of the land and water is sometimes referred to as "Indigenous knowledge" or "local and traditional knowledge."

ASSIGNMENT

While these people do not use the word "sustainability," they are expressing values and describing practices that express their vision of sustainability. Read carefully through the following quotes. Underline key words that help you understand sustainability from these people's perspectives. Take note of anything that is inhibiting sustainable practices for these people.



Fish harvesting in K'atl'odeeche First Nation - A Sustainable Practice!

Photo Credit: K'atl'odeeche First Nation provided by Patrick Riley

PERSPECTIVES ON SUSTAINABILITY (QUOTES)

"Well-being of Akaitcho people is based almost entirely on the cultural and spiritual connection to the land and water. From healthy eating, to physical activity, to keeping the mind sharp; all these are honed from the skills that Dene people have on the land. Healthy food comes from hunted game, gathered fruits and medicines, and fish from the lakes and rivers." (Akaitcho Territorial Government Report, 2017)

PERSPECTIVES ON SUSTAINABILITY (QUOTES) CON'T

"We are very lucky in this area because... we can rely on fish, or whales, or caribou, or moose, or muskrats...The Inuvialuit are very resilient people and were able to survive relying on the land and everything that it provides. "

Richard Binder, Inuvik, NT (FJMC 2016-17 Report)

"Fish are so important to us. We need to protect and take care of them. That is why we still have our ancestors' cabins – because of the fish. We need to protect the fish." Madelaine Champlain (2016-17 WRRB Report)

"Today as in the past, people in Wahti rely on fish as an important source of healthy food. Store-bought options are very expensive and often less nutritious. It is well known that for a healthy diet it is essential to include country foods, such as fish. And with caribou less available, fish becomes an even more important food resource..." 2016-17 (WRRB Report)

"The Dene Tha' elders feel that they have lost considerable control over the management of their traditional lands and waters and that it affects their ability to properly protect the land and carry out their traditional activities– and this is a source of deep frustration." (2017-18 KFN Report)



Déljé Fish Harvest in the Sahtu Region - Sustainable!

Photo Credit: Chelsea Martin

Assignment: Ecotourism Consultant

Ecotourism is increasingly promoted in the Mackenzie River basin as a means of boosting local economies while maintaining sustainable practices. **Ecotourism** is tourism directed toward exotic, often threatened, natural environments, intended to support conservation efforts and observe wildlife.

ASSIGNMENT

Imagine your community is considering a new ecotourism initiative. You are being consulted as an ecotourism expert and are expected to make a recommendation to your community. Draw on everything you have learned in class, and conduct additional research as necessary, in order to carry out one of the following:

OPTION 1: Create and outline an ecotourism business that would be a sustainable option for your community. The outline should include the name of your business, a brief description of the business including some of your business goals and objectives, a short summary of your products/services your business provides (i.e. the target audience/participants, the types of activities provided, etc.), and how the business will meet your sustainability objectives. [For an example of what this might look like, read the Business Plan Executive Summary web page: <https://www.thebalancesmb.com/business-plan-executive-summary-example-2948007>. This gives you a general idea of how to go about creating this Business Plan outline.]

OPTION 2: Choose a proposed ecotourism business (real or imagined) and write an opinion piece for a community newspaper, outlining how this mode of ecotourism is not in fact sustainable and should not be carried out in your community. Make sure you are responding to a specific form of ecotourism (i.e. sport fishing, river tour, cultural tour, etc.) so that you can address the specific impacts of the business.

REQUIREMENTS

- Include a clear, specific, and detailed definition of sustainability (environmental, social, economic, cultural, etc.)
- Discuss the various natural resources, weather conditions, staff/human resources, cultural sharing, or other factors the ecotourism activities rely on
- Provide evidence from class handouts, activities, and the interview you conducted
- Reference current local ecotourism and/or sport fishing activities in your local region

It is important that your work is clear and comprehensive, engages key concepts and issues, and is relevant to your local context. After all, you want your ideas to have an impact!