



YUKON

GRADE
8-9

CROSS-CURRICULAR UNIT

CLIMATE CHANGE

Science | English Language Arts

Yukon First Nations Curriculum Working Group

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Yukon
Education



DEVELOPMENT

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COVER PHOTO: Government of Yukon / R Postma

A pdf of this unit can be found at <http://lss.yukonschools.ca/planning-tools.html>



CLIMATE

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PART 1: INTRODUCTION

INTRODUCTION

This unit was developed by a Yukon teacher, in collaboration with the Yukon First Nations Curriculum Working Group. It is meant as a starting place to help teachers incorporate big ideas, learning standards, core competencies, and integration of Yukon First Nations (YFN) ways of knowing and doing into the redesigned Grades 8 and 9 curriculum for Science and English Language Arts.

Although the Western worldview permeates and dominates current information and education systems, there is a growing awareness of the richness of knowledge that exists within Indigenous perspectives and experiences. By integrating YFN ways of knowing and doing, this unit acknowledges the value of traditional and oral knowledge.

The unit can and should be used in conjunction with locally developed resources. Bringing YFN ways of knowing and doing into the classroom means connecting and collaborating with the local First Nations community, as there is much knowledge that is locally held. This process will result in a richer curriculum for all students.

Every YFN has people who are willing and able to visit schools and to share their knowledge and wisdom. As teachers look to connect with their local First Nations community, a good place to start is with the liaison workers in the school who can help teachers with initial contacts and to understand local protocols. There is also a helpful handbook published each year by the First Nations Programs and Partnerships Unit, *Yukon First Nations Resources for Teachers*.

The unit includes a number of suggestions for developing local inquiry based, experiential activities, and provides a variety of learning activities and resources. The activities are intended to be flexible in their use and teachers are encouraged to adapt them to their own lesson planning.



Additional support for this unit can be found in recordings of Elders and Knowledge Keepers of the Yukon First Nations Curriculum Working Group, which can be accessed at <http://lss.yukonschools.ca/planning-tools.html>

This unit is intended in part to address the Calls to Action of the Truth and Reconciliation Commission, particularly the call to “integrate Indigenous knowledge and teaching methods into classrooms” (clause 62) and “build student capacity for intercultural understanding, empathy and mutual respect” (clause 63).



RATIONALE: WHY CLIMATE CHANGE?

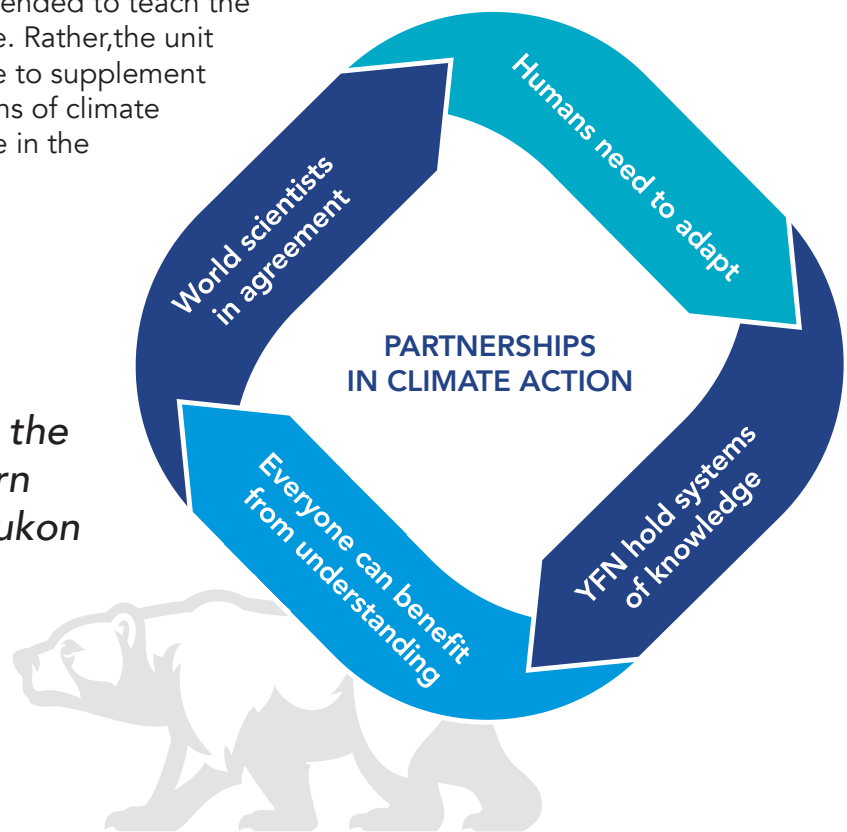
With discussions of climate change appearing regularly in the news, it is a topic that has caught almost everyone's attention, including scientists, politicians, Indigenous governments, educators, and the general public. The earth's climate has always changed over time, but since the Industrial Revolution the impact of humans has had a major impact on this change. Global climate change is one of the world's most serious issues. It is having the greatest effects in northern polar regions, including Yukon and dealing with it will be a major concern for Yukon students in their future lives.

Yukon First Nations have a deep traditional ecological knowledge (TEK) of northern ecosystems through countless generations of seasonal food gathering and accommodating and responding to environmental change in their traditional territories. Oral histories, recollections of Elders, and words in Yukon First Nations languages all reflect responses to such changes. Recently Yukon First Nations people have noticed signs of greater environmental change and challenges to their resilience than they have faced in the past.

This unit will help students understand climate change by investigating local changes, using traditional knowledge and current events as some of their sources. Students will inquire into the necessary skills for adapting to and reducing climate changes, taking lessons from Yukon First Nations who have faced vast environmental and social changes with the strength, resiliency, and persistence needed for survival.

The resources in this unit are not intended to teach the scientific facts about climate change. Rather, the unit is intended to be used as a resource to supplement the understanding of the implications of climate change, and what needs to be done in the future to reduce its impacts.

Global climate change is one of the world's most serious issues. It is having the greatest effects in northern polar regions, including Yukon and dealing with it will be a major concern for Yukon students in their future lives.



CONNECTIONS TO YUKON FIRST NATIONS WAYS OF KNOWING AND DOING

Yukon First Nations people have always experienced, and learned to respond to, environmental change. The oral histories passed down for countless generations speak of the responses to such change, especially since the coming of Europeans.

The diverse First Nations in Yukon lived closely with the land, through seasonal food gathering and careful observations of the health of the plant and animal species and weather patterns. Central to this relationship has been respect and reverence for the generosity of the land and repercussions of unsustainable harvesting practices.

There are eight First Nations language groups in Yukon. Embedded in these languages and oral histories is the knowledge of unique technologies and systems for living successfully on the land. Since the time of contact, Yukon First Nations have experienced significant impacts on aspects of the transmission of this traditional knowledge, changes in land-based practices, changing economies, and imposed political structures.

In recent times there have been significant improvements in culture and language revitalization, reclaiming of Indigenous rights, and recognition of the legacy of residential schools through the Truth and Reconciliation Commission report. Yukon First Nations retain strong and persistent relationships to the land.

The First Nations of Yukon continue to closely observe and monitor seasonal changes, climate, and abundance of various plant and animal species. These plants and animals continue to be an important food source for Yukon First Nations.

Recently the seasonal indicators upon which TEK depends have become less predictable and reliable. Climate variability and impacts of environmental changes have caused considerable concern for Yukon First Nations. There have been increased observations of environmental change which is concerning to Yukon First Nations who rely on their resilient relationship with the land. These observations and perspectives are important to include in discussions and considerations of global climate change.



CURRICULAR CONNECTIONS

SCIENCE 8	SCIENCE 9
<p>Big Idea</p> <ul style="list-style-type: none"> Life processes are performed at the cellular level <p>Curricular Competencies</p> <ul style="list-style-type: none"> Apply Yukon First Nations perspectives and knowledge, other ways of knowing, and local knowledge as sources of information Express and reflect on a variety of experiences and perspectives of place <p>Content</p> <ul style="list-style-type: none"> Characteristics of life 	<p>Big Idea</p> <ul style="list-style-type: none"> The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them <p>Curricular Competencies</p> <ul style="list-style-type: none"> Make observations aimed at identifying their own questions, including increasingly complex ones, about the natural world Apply Yukon First Nations perspectives and knowledge, other ways of knowing, and local knowledge as sources of information <p>Content</p> <ul style="list-style-type: none"> Yukon First Nations knowledge of interconnectedness and sustainability

ENGLISH LANGUAGE ARTS 8 & 9

Learning about climate change can be coordinated with the Grades 8 and 9 English Language Arts curriculum. In particular, traditional narratives and texts that embed Traditional Ecological Knowledge can be used to meet the relevant curricular competencies.

ELA 8 and 9 Big Ideas

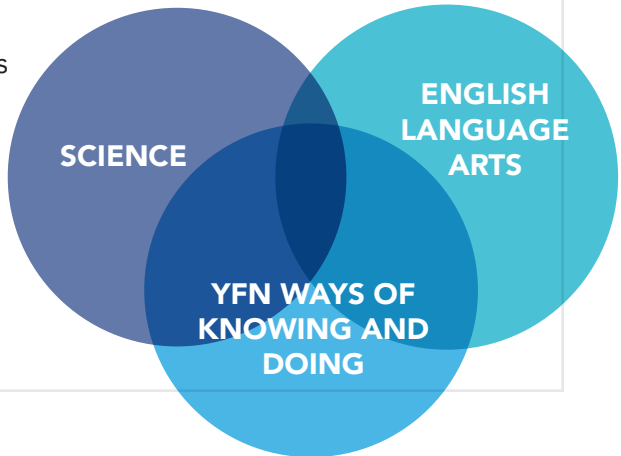
- Exploring stories and other texts helps us understand ourselves and make connections to others and to the world.
- Questioning what we hear, read, and view contributes to our ability to be educated and engaged citizens.

ELA 8 Curricular Competencies

- Recognize and appreciate the role of story, narrative, and oral tradition in expressing Yukon First Nations perspectives, values, beliefs, and points of view
- Develop an awareness of the protocols and ownership associated with Yukon First Nations texts.

ELA 9 Curricular Competencies

- Access information and ideas for diverse purposes and from a variety of sources and evaluate their relevance, accuracy, and reliability.
- Recognize and appreciate the role of story, narrative, and oral tradition in expressing Yukon First Nations perspectives, values, beliefs, and points of view
- Use and experiment with oral storytelling processes



CORE COMPETENCIES

This unit connects to many facets of each of the three core competencies; examples are listed below, although teachers may choose other facets depending on students' needs.



Communication

- Connect and engage with others (to share and develop ideas)
- Acquire, interpret, and present information



Thinking

- Critical Thinking
 - Analyze and critique
 - Question and investigate



Personal and Social

- Positive Personal and Cultural Identity
 - Contributing to community and caring for the environment
 - Building relationships

LEARNING GOALS & SUGGESTED INQUIRY QUESTIONS



These learning goals and suggested inquiry questions are a combination of Big Ideas, Learning Standards (Curricular Competencies and Content), Core Competencies, and Yukon First Nations ways of knowing and doing. They are provided as possibilities; teachers may choose to use some or all for assessment, or create their own.

Learning Goals

1. Apply Yukon First Nations knowledge of interconnectedness and sustainability as it relates to climate change.
2. Understand climate change and the effects on Yukon First Nations sense of place.
3. Explain how Yukon First Nations traditional knowledge can help to identify changes in the environment due to climate change.

4. Use Yukon First Nations traditional knowledge about the characteristics of life of plants and animals in their territories.
5. Discuss local Yukon First Nations traditional knowledge of changes in local ecosystems due to climate change.
6. Apply Yukon First Nations perspectives and knowledge and local knowledge as sources of information about climate change.
7. Express and reflect on a variety of experiences and perspectives of place.
8. Make observations aimed at identifying their own questions about climate change, including increasingly complex ones.
9. Recognize and appreciate the role of story, narrative, and oral tradition in expressing Yukon First Nations perspectives and points of view about climate change in Yukon.
10. Develop an awareness of the protocols and ownership associated with Yukon First Nations oral traditions.
11. Access climate change information and ideas from a variety of sources and evaluate their relevance, accuracy, and reliability.
12. Engage in learning about climate change through a Yukon First Nations oral storytelling process.

Inquiry Questions

1. What signs have Yukon First Nations people observed that provide evidence of the effects of climate change?
2. How can we apply Yukon First Nations understandings of sustainability to reduce the effects of climate change?
3. What evidence is there of environmental changes, such as climate change, contained in Yukon First Nations traditional narrative and stories?
4. What impacts could climate change have on Yukon First Nations sense of place in the future?
5. How can Traditional Ecological Knowledge help scientists study climate change?
6. How can we apply Yukon First Nations understandings of sustainability to reduce the effects of climate change?
7. How is Yukon First Nations knowledge about the characteristics of life of plants and animals used to help scientists understand the effects of climate change?
8. In what ways have Yukon First Nations observations shown changes in the interconnectedness of different spheres due to climate change, such as water and land, fish and water?
9. How have Yukon First Nations observations about changes in local ecosystems helped scientists monitor the changes brought about by climate change?

PRIOR KNOWLEDGE

Know, Do, Understand

Before engaging in this unit, students will need to know/do/understand the following:

- What is climate change? How has the Earth's climate has been changing over time? • **KNOW**
- What is Traditional Ecological Knowledge? • **KNOW**
- How to give and receive feedback from peers, teachers, and Elders • **DO**
(Guidance with this can be found on page 23 of the Appendix, *Working with Elders: A Checklist*)

ENDURING UNDERSTANDINGS

Yukon First Nations hold a wealth of knowledge about ways to adapt to the changes in the natural world, including changes brought about by climate change.

In the past, people could rely on their traditional knowledge to predict natural indicators, such as where and when they could harvest resources, but now these indicators are much less predictable.

ESSENTIAL QUESTIONS

- How can Traditional Ecological Knowledge help scientists study climate change?
- What can we learn from Yukon First Nations peoples to help us live sustainably in the face of climate change?

PLANNING TO TEACH THE UNIT

This unit has three parts. The first section gives an introduction to climate change; the second section focuses on how climate change affects the salmon resource; and the third section gives suggestions for an inquiry into resiliency and climate change.

Outline

Part One: Earth and climate change over time

1. Climate change as a current event story: engaging learners
2. How is the Earth's climate changing?
3. Oral histories of climate change over time

Part Two: Respect for the Land and Water – Salmon and Climate Change

1. Salmon in Hay River?
2. Salmon in Yukon communities
3. Evidence of climate change
4. Impacts on salmon habitat
5. Water quality

Part Three: Resiliency During Change

1. Problem-based learning: a look at the local effects of climate
2. Lessons in resiliency: first climatologists



PART 2: LEARNING ACTIVITIES

LEARNING 1

Earth and Climate Change Over Time



Question for Inquiry:

What is the evidence of climate change from geologic time and how has human behaviour contributed to these changes?

Suggested Resources

- Video *Through Arctic Eyes* by the Arctic Athabaskan Council, PBS Learning Media bit.ly/2cSLeGB
- Blackline Master 1: Climate change in the news – National Chief Bellegarde
- Local Yukon First Nations resources and information
- Video *Climate Change 101* with Bill Nye the Science Guy, Youtube video. bit.ly/1Za2D3f
- Blackline Master 2: Yukon First Nations oral history of climate change – interview with Elder Chuck Hume
- Blackline Master 3: Evidence of climate change over time from Yukon First Nations oral histories

L1. Activity 1

Climate change as a current event story: engaging learners

Climate change is a widely discussed topic and most students will have some awareness about it. Assess what students already know about climate change, and investigate the latest issues in the news.

- Generate a class-wide brainstorm on what students have already heard or read about climate change. Discuss their most important concerns.
- Changes to the earth's climate are felt throughout Yukon.
 - Ask students if they have heard of family or community members who have noticed unusual changes in the environment that may be caused by climate change.
- Show the video *Through Arctic Eyes* (3 minutes). In pairs, provide students with current news articles on climate change from various viewpoints – local, regional, national and international. Be sure to include articles that include Yukon First Nations perspectives. See page 24 of the Appendix for a 2015 news release from National Chief Perry Bellegarde (Assembly of First Nations).
 - Ask students to highlight two or three concerns from the articles that can be added to the class brainstorm. This provides students with an inquiry mindset and questions to begin the unit of study.

L1. Activity 2

How is the Earth's climate changing?

Depending on the prior knowledge and experience of your students, teach or review some of the key concepts of climate change.

- A** To assist with this teaching, show a video, such as *Climate Change 101* with Bill Nye the Science Guy bit.ly/1Za2D3f
- B** Use these questions for discussion:
- What is the difference between global warming and climate change?
 - What are fossil fuels and how do they contribute to climate change?
 - Is climate change something that will happen far in the future or are we seeing it now? Explain your reasoning.
 - Name some examples of changes in climate or extreme weather. What are some recent extreme weather events that have happened around the world?
- C** Here are some key terms for students to understand:
- Global warming: the heating up of the Earth caused primarily by the burning of fossil fuels (oil, coal and natural gas), which releases heat-trapping carbon dioxide into the atmosphere.
 - Climate change: the altering of climate patterns (e.g. more precipitation, more intense storms, floods or droughts) on Earth caused by the burning of fossil fuels.
 - Carbon dioxide (CO₂): a heat-trapping molecule, and the principal greenhouse gas of concern to climate scientists. A growing concentration of CO₂ from burning fossil fuels is warming the Earth.
 - 2°C: the amount of global warming above pre-industrial levels (200 years ago) which could lead to catastrophic outcomes for human populations (and countless other animal and plant species). The Earth has already warmed by 0.8°C above pre-industrial levels.

L1. Activity 3

Oral histories of climate change over time

For countless generations, Yukon First Nations have passed down oral histories that tell of changes to the climate, water levels, and landscape. This history has been upheld in the Supreme Court as reliable and accurate, and is supported by geological and archeological evidence.

Invite an Elder or Knowledge Keeper to share their oral histories, and/or locate oral histories for your community that are permitted for sharing, and/or use Blackline Master 2, Yukon First Nations oral history, which contains a written account of oral histories of climate change as told by Yukon First Nations Elder Chuck Hume.

Teachers may want to use the Blackline Master, Evidence of climate change from Yukon First Nations oral histories, as a template for students to record their learning.

LEARNING 2

Respect for the Land And Water: Salmon and Climate Change



Question for Inquiry:

How has salmon, a critical species for most Yukon First Nations, been impacted by climate change?

Suggested Resources

- Blackline Master: Salmon in Hay River?
- Local Yukon First Nations resources and information
- Strangers in a Strange Land, Canadian Wildlife Federation
cwf-fcf.org/en/resources/for-educators/lesson-plans/strangers-in-a-strange-land.html
- River of Salmon Peoples, Theytus Books, 2015

L2. Activity 1

Salmon in Hay River?

Introduce this section with the recent headline story about a man who caught a chum salmon in Hay River, NWT: *"Salmon in Hay River? Local Fisherman's Catch Shocks Residents."* (Blackline Master 4).

- Discuss why the community would be so shocked. Ensure students understand it is a Pacific salmon far out of its normal range.
- Locate Hay River on a map. How far away from home was the fish? (Assuming it was a BC coastal fish, though it was probably an Alaskan fish.) What route did it probably take to get there?
- Ask students to predict how the Pacific salmon might have ended up in Great Slave Lake.
- Read the news article about the discovery aloud, or make copies for students to read. Ask students to write two facts and two questions about climate change prompted by this article.
- Discuss with students why they think more and more salmon are heading for the Arctic Ocean rather than the Pacific Ocean.

L2. Activity 2

Salmon in Local Communities

Explore with the class the importance of salmon to the First Nation in your own community and in most of Yukon.

- A** Ask students to brainstorm their ideas about why salmon are important. Make a class list and ask students to rank the ideas from most important to least important.
- B** Engage students in one or more activities that expand on the importance of salmon. Some possible activities are:
- Invite an Elder or knowledgeable community member to the class to speak about the cultural and economic importance of salmon. This could also be tied in with Learning 3 (page 18) by asking if they have noticed changes to salmon in recent years.
 - If possible, visit a local stream or river during spawning time, and/or a salmon hatchery, and/or a fish ladder, and/or a fish wheel.
 - Read a traditional salmon story local to your community.
 - View a video about the importance of salmon. See suggestions in Additional Resources listed at the end of the unit (page 21).
 - Research the topic using published and online materials
- C** Ask students to review their lists and priorities. Would they change anything?
- D** Ask students to discuss what impact there would be if large populations of salmon headed for the Arctic (assuming climate change continues to create accessible ecosystems for salmon there).

Why are salmon important?

What impacts would there be if large populations of salmon headed for the Arctic?



L2. Activity 3

Evidence of Climate Change

Ask students to investigate the question “What can the Elders and other community members tell us about climate change in the local ecosystem?”

- A** Introduce or review the term Traditional Ecological Knowledge (TEK). Give some examples, and ask students if they know of any examples from people in their community.
- B** Explore historical knowledge learned from the study of traditional narratives that may have been recorded by people in your community. If none are available you may want to use some from another Yukon community.
- C** Ask Elders and other knowledgeable community members to share their observations about the local environment that may be caused by climate change.
 - You may want to have one or a small group of speakers come to the classroom, or meet at a community center with the students.
 - You may want to have students work in groups to interview an Elder or other community member, and report back to the whole class.
 - Work with students to develop questions to ask the speakers or interviewees. To see good sample questions, see the activity *Strangers in a Strange Land* on the Canadian Wildlife Federation website.
cwf-fcf.org/en/resources/for-educators/lesson-plans/strangers-in-a-strange-land.html

Although the book *River of Salmon Peoples* is a BC publication, it includes many useful discussions and memories about salmon and the Fraser River, and how the salmon resource has changed over time. Some examples are:

- page 62, Nle'kepmxcin
- pages 66-67, Dakelh and Tsilhqot'in
- page 105, Nle'kepmxcin

L2. Activity 4

Impacts on Salmon Habitat

- Discuss salmon's unique habitat, both fresh and salt water.
- Ask students to reflect on how climate change impacts the salmon's habitat, such as water temperature, water quantity, and food sources such as aquatic invertebrates.
- Create an understanding of how climate change might impact aquatic invertebrates and salmon.

L2. Activity 5

Water Quality

Have students investigate the quality of a local fresh water source by conducting a field study or lab activity.

- A** A possible activity is for students to collect live macro invertebrates from a river or stream, then classify and count them.
 - The resulting data can be used in the same way scientists use it, to get an indication of the quality of the water.
 - A good resource for this activity can be found at:
www.yukonenvirothon.com/water-quality-aquatic-invertbrate.html
- B** Extend this further by developing questions around the quality of water that you were able to sample. Investigate how the quality of the water might be impacted by climate change.
- C** If you are able to retrieve or access other data about the changes in the particular river or stream you are sampling, comparative studies can be established.
- D** Pose questions, for example:
 - What is the source of water for this river or stream you are sampling?
 - Is this river or stream salmon-bearing, or other fish-bearing?
 - How might the water quality impact salmon?

LEARNING 3

Resiliency During Change



Questions for Inquiry:

How does Traditional Ecological Knowledge in your community corroborate the evidence of climate change?

What are some strategies, based upon Indigenous Knowledge for living sustainably in local environments and being resilient during episodes of climate change, which would benefit Yukon?

Suggested Resources

- Local Yukon First Nations resources and information
- *BC Climate Action Toolkit* www.toolkit.bc.ca
- *Climate Justice in BC* www.teachclimatejustice.ca
- Blackline Master 5, Sample questions for opening discussions with Yukon First Nations Elders and Knowledge Keepers

L3. Activity 1

Problem-based Learning: A Look at the Local Effects of Climate Change

Explore options for students to become involved in action based community projects. This can help them to identify the local impacts of climate change and roles they can play to support their community response. Suggested resources include:

- *BC Climate Action Toolkit*
- *Climate Justice in BC*, eight modules of valuable local action ideas

Suggested Assessment:

- Products of learning: Create a slide show, blog, online video, poster, or report

L3. Activity 2

Lessons in Resiliency: First Climatologists

Students can explore historical knowledge learned from the study of oral histories or by interviews with Elders and Knowledge Keepers (TEK). They can discover ways in which Indigenous knowledge can be appropriately recognized and incorporated into strategies for adapting to and reversing climate change. It is powerful learning when students meet with

Elders, Knowledge Keepers, and community members from the traditional territory upon which they live. A sample of interview questions that could be used to start conversations with Yukon First Nations Elders can be found on page 28 of the Appendix.

View *People of a Feather*, a documentary film about survival in a changing Canadian Arctic.

Questions for Inquiry:

- What key understandings have Yukon First Nations passed down through their oral histories and narratives about adapting to the changing nature of the land and seasons?
- What causes these changes and how are they dealt with for the well-being of the community and future?
- What are Yukon First Nations noticing about the current changes to weather, climate and availability of species in their territory? How are the tools of contemporary science supporting these observations?
- What are strategies all Yukon citizens can benefit from that have been passed down by the Yukon First Nations?

ADDITIONAL RESOURCES

A Green Industrial Revolution: Climate Justice, Green Jobs and Sustainable Production in Canada. Lee, Marc and Amanda Card. A report on the industrial and employment strategies needed to transition to a sustainable economy and create a new generation of well-paying green jobs.
www.policyalternatives.ca/publications/reports/green-industrial-revolution

Alaska Native Perspectives on Earth and Climate. Good climate change videos from an Alaskan First Nations perspective. www.pbslearningmedia.org/collection/eau/#.WRM81bwrKqA

Climate Insights 101. Pacific Institute for Climate Solutions. Great resource for various teachings of perspectives of climate change. pics.uvic.ca/education

Education Learning Resource: Climate Change. Sierra Club of BC.
sierraclub.bc.ca/wp-content/uploads/2015/08/climate-change-learning-resource.pdf

Indigenous and Traditional Peoples and Climate Change. Macchi, Mirjam. 2008.
A global report on the response of Indigenous people around the world to climate change.
cmsdata.iucn.org/downloads/indigenous_peoples_climate_change.pdf

"It's so different today": Climate change and Indigenous Lifeways in British Columbia, Canada. Turner, Nancy J. and Helen Clifton. *Global Environmental Change* 19 (2) (2009). An academic article on Indigenous perspectives on climate change.

Salmon Migration Obstacle Course. Telus World of Science. In this game, students will act out the salmon life cycle from fry to spawners. They have to survive in the wild!
www.scienceworld.ca/resources/activities/salmon-migration-obstacle-course

PART 3: EVALUATION

REFLECTIONS

Create opportunities for students to reflect on the outcomes and process of the unit. Reflections are important for assessing Core Competencies. Students could use the “I can” statements that are part of the Core Competencies or write their own. A sample for student self-assessment of the core competencies can be found on page 29 of the Appendix.

EXTENSIONS

Consider ways to extend this unit to provide students with opportunities to explore deeper skills within these subject areas, or to increase cross-curricular connections with other subject areas.

ASSESSMENT AND EVALUATION

The learning activities in this unit lend themselves to several different assessment strategies, to provide both formative assessment (assessment for learning) and summative assessment (assessment of learning).

Assessment requires the gathering of evidence of student’s learning experience and evaluation means that teachers determine what students have learned from their experiences in the unit. The Department of Education’s *Communicating Student Learning Resource and Professional Development Tool* includes a YFN Assessment Framework. Using a YFN methodology for assessment and evaluation to assess students’ learning includes: observation; practice; and mastery. See page 30 in the Appendix, *Learning Experiences Rubric: Yukon First Nations Assessment and Evaluation Model* (Johnson, 2017).

Assessment and communication practices must integrate Yukon First Nations ways of knowing and doing.

To embrace YFN ways of knowing and doing, the formative assessment process for assessing core competencies must include:

- anecdotal comments;
- self-assessment;
- personal learning goals;
- student conferencing.

For this unit, assessment tools that could be used include:

CONVERSATIONS	OBSERVATIONS	PRODUCTS
Student-teacher conferences	Anecdotal observations	Portfolios
Journals	Group skills	Media production
Portfolio conferencing	Engagement in learning activities	Journals – Self-reflections of learning
Self-assessments	Student-to-student dialogue	Videos
	Student-led conferences	Collage
		Maps
		Artistic mediums

Here are some suggestions for assessing the Essential Questions of the unit.

- 1 How can Traditional Ecological Knowledge help scientists study climate change?**

 - Have students develop a mind map that illustrates types of TEK that can assist scientists. Students should consider both baseline data and observed changes.
 - As students progress through the unit, ask them to note in their journals special types of TEK that may be of use to scientists.

- 2 What can we learn from Yukon First Nations peoples to help us live sustainably in the face of climate change?**

 - Ask students to discuss the question, How can we look at climate change as Yukon First Nations do – with an understanding that everything in the universe is connected?
 - Hold a class discussion and assess how students contribute to the discussion.
 - Ask students to write a journal response to the question.
 - Ask students to create a poster or other visual representation that advocates a relationship to the Earth that is similar to that held by Yukon First Nation peoples.

APPENDIX

Working with Elders

PAGE 23: Working with Elders: A Checklist

Blackline Masters

PAGE 24: Climate change in the news – National Chief Bellegarde

PAGE 25: Yukon First Nations oral history of climate change – Interview with Elder Chuck Hume – March 2017

PAGE 26: Evidence of climate change over time from Yukon First Nations oral histories

PAGE 27: Salmon in Hay River? Local fisherman’s catch shocks residents

PAGE 28: Sample questions for opening discussions with Yukon First Nations Elders and Knowledge Keepers

Assessment Tools

PAGE 29: Sample: Student Self-Assessment of the Core Competencies

PAGE 30: Learning Experiences Rubric: Yukon First Nations Assessment and Evaluation Model

Working with Elders: A Checklist

Elders are highly revered and respected people; they are community mentors who provide invaluable support and guidance. In Yukon First Nation cultures, Elders play an essential role in the education of children. They pass on traditional teachings and values through their stories and are considered community role models. It is important to make effective use of local expertise whenever local cultural knowledge is being addressed in the curriculum.

When an Elder, or anybody else, speaks to your students, it is important to follow community protocol. In most communities it would be appropriate to respect Elders and knowledgeable people in the following ways:

- Contact your Community Education Liason Coordinator, Education Support Worker or Education Outreach Coordinator for support and additional knowledge on community protocols;
- Contact the Elder you wish to invite to your classroom in person;
- Allow the Elder some time to think about the offer, do not expect an answer immediately;
- If the Elder agrees, arrange a time to meet in person to explain what the topic is, and work with the Elder to find out what they want to teach and develop the plan together;
- Help your students generate questions pertaining to the topic ahead of time for the Elder;
- Call the Elder the day before to confirm;
- Arrange for a helper;
- Make sure there is transportation for the Elder;
- Open up the environment so the Elder can move freely;
- Put desks and chairs in a circle with the Elder in a comfortable chair;
- Help the Elder to sit comfortably;
- Offer tea and refreshments;
- Help your students greet the Elder respectfully and if possible in his or her language;
- Wait for the Elder to speak;
- Arrange for the honorarium to be ready when the Elder or other community members come to work with your students (honoraria are available through Cultural Inclusion funds);
- Consider ways to present all traditional stories, songs and dances in the most dynamic way possible;
- Meet the Elder in an environment outside the classroom, such as cultural camps, local cultural centres, the local community hall or homes;
- Present the Elder with a gift as a thank you. For example a card made by the students, food items or a small handmade gift.



Climate Change in the News – National Chief Bellegarde



Canadian Chief: Aboriginal Rights First Step in Fighting Climate Change

*By Marc Montgomery
Friday, December 4, 2015*

Chief Bellegarde (Assembly of First Nations) was invited as part of Canada's official delegate to the conference and sat alongside Prime Minister Justin Trudeau, the Minister of Environment and Climate Change, and the Foreign Affairs Minister represented Canada at the opening plenary for the COP 21.

When Canada's Prime Minister spoke he mentioned the importance of traditional knowledge of Aboriginal peoples to be included in the effort to deal with climate change.

In an AFN press release, National Chief Bellegarde stated: "It is notable that the Prime Minister recognizes us as Indigenous peoples with all the rights articulated in the United Nations Declaration on the Rights of Indigenous Peoples, and that he understands that Indigenous peoples and our traditional knowledge are essential in finding solutions to combat climate change. We are the first to feel its effects and our voices and recommendations must inform the path forward. We fully expect that the final treaty negotiated here will reflect that."

Source: bit.ly/2cSMPf

Yukon First Nations Oral History of Climate Change – Interview with Elder Chuck Hume – March 2017



ELDER PROFILE

Elder Chuck Hume is a distinguished member of the Champagne and Aishihik First Nations. Chuck was born in the bush, and he grew up in Klukshu in the Dalton Post area. He worked with and wrangled horses for many years, and is an experienced trapper. Chuck was a lineman and is now a retired Park Warden.

What signs have Yukon First Nations people observed that provided evidence of climate change?

The environment is changing; I remember back in the 1970's it used to get to 70 below. When the temperature drops that low, the first week you don't see anyone, and then second week you see everybody but you don't know who they are because they are all bundled up so much. You never used to have rain in winter, but now you do.

What's happening now is you talk to people from NWT to Old Crow. They don't know where the moose are coming from. All the flats are covered with moose where they never used to be. At one time there were caribou all over this area. Moose go up north because they are cold weather animals. We have witnessed polar bears wandering down in Engineer Creek (>500km inland from the Arctic Ocean). We have seen pelicans in Ft. McPherson, which is a long way from the ocean. Muskox have been sighted near Old Crow. Near the community of Old Crow water levels have been dropping – Elders and people are having trouble reading water the way they used to. There are many northern lakes drying up and also many lakes draining into other lakes. It is also getting hard to read the weather in the way we used to do it. There are many changes that people are starting to notice.

With the change in climate now, the impact that it's having on ice and glaciers and permafrost is noticeable. Nobody knows how much volcanic acid-rock drainage is coming from those melting glaciers. What is running into the lakes now? You look at permafrost melt; you see it as told by Elders. It melts and formed are big pools of black water. What's melting from permafrost is seeds and larvae that is being re-introduced into our system. We are losing trout, suckers, white fish, and grayling. All these things are getting impacted. Some of these lakes (like Kloo Lake and Pine Lake) were once heavily fished, now they are not being fished. Is it the permafrost melt that's killing off the fish? You can smell the difference too, almost like a skunky smell.

What evidence is there of environmental changes, such as climate change, contained in Yukon First Nations traditional narrative and stories?

When I look at the whole system I remember the stories passed down from my grandparents. They used to tell me the old traditional stories. When they used to live on the east side of the Alsek River, the river backed up due to the advance of the glacier across the river and created a huge glacier lake. The river eventually broke through the glacier when it started to recede and released this huge water flow, which is why you see those dunes along the river. Everyone's village downstream got washed away. Alsek Glacier created that lake every 300 years when the climate changed and the glacier grew. When you look at whole glacier systems – retreating glaciers are leaving dust which is affecting plant growth and lowering sheep populations now. Our Elders told us that our climate is always in a state of change.

Another story that I was told was about the terrible times our people had during the year of no summer. It was really cold and really dry. This country dried up and everything blew away. There were huge forest fires, which forced the animals to move north. The last animal that left this country was the grizzly bear. Our people really suffered and some of them were sent south in case the climate did not improve in the future (it did).

Evidence of Climate Change Over Time From Yukon First Nations Oral Histories

Title of the Oral History / Narrative: _____

To whom does the story belong? (i.e. Yukon First Nation, Family, Community) _____

Who re-told this narrative? _____

Describe the key events that happened in the narrative. (i.e. flood, rise in water level, migration, famine)

What caused the event? _____

What were the consequences? _____

How were people affected? _____

Salmon in Hay River? Local Fisherman's Catch Shocks Residents

A Hay River, N.W.T., fisherman's recent catch has left community members "shocked," and a biologist suggesting that climate change may be affecting the migration patterns of fish in the North.

While net fishing at the mouth of the Hay River Saturday night, Lorne Poitras caught a 10 kg chum salmon — a species that's not native to the N.W.T., much less the area.

The catch came as a surprise to Poitras, a self-described "traditional hunter and trapper" who was stocking up on fish for the winter months.

"I was pulling in my net," he said, "and I was taking my fish out like I normally do. I thought I caught a trout at first.

"And as it got closer, I'm realizing: 'Well, that's not a trout!' And then I looked, and I thought: 'That's a salmon!'"

Poitras said that he had heard of salmon being caught in Hay River before, but that "it's something that doesn't happen often, that's for sure.

"I was talking with some elders on the Hay River Reserve," he said, "and they said about 40 years ago, someone caught a salmon in the Hay River." Lorne Poitras



caught this salmon in his net at the mouth of the Hay River Saturday night — an unusual catch that had locals 'shocked,' he said.

Poitras shared a photo of his unusual catch on Facebook, which "shocked" community members, he said.

"They were about as surprised as I was," he said with a laugh. "It's an access issue, and also an opportunity issue"

However, a PhD candidate at the University of Manitoba says that salmon numbers in the N.W.T. are increasing, likely due to the effects of climate change.

"They are certainly rare, but they're definitely not unheard of," said Karen Dunmall, who's studying the salmon population in the territory. "This isn't the first salmon harvested in Hay River... there are some records of salmon in Hay River in the past."

Dunmall said that despite year-to-year fluctuations, the number of salmon in the N.W.T. are generally increasing, saying that "it's an access issue, and also an opportunity issue.

"There's a couple of things that may be going on," she said. "There is a possibility of increased access of salmon to the Mackenzie River system, or, possibly, there are spawning populations of salmon in the Mackenzie River, and changes may be occurring that allow increased populations to survive." Salmon enter the N.W.T.'s watershed system from the Arctic Ocean, says Dunmall, and the increased access could be due to warming temperatures, which lead to earlier melts each spring.

"You go back to the climate change issue," she said. "The salmon may be indicating changes that are occurring – broader changes across the Arctic."

Dunmall, who is working with the Department of Fisheries and Oceans, said that so far, her research has only documented increased access for salmon in the territory, but said that it's possible salmon may be in the territory "looking for new areas to spawn in.

"They need areas in the Arctic that don't freeze," she said. "They're not common, and they're associated with groundwater springs."

The Department of Fisheries and Oceans offers a reward for salmon caught in the Mackenzie River system, but it won't be going to Poitras, who says that he ate half of his unusual catch, "and the other half is smoking right now.

"It was very good," he said, laughing. "Me and the family really enjoyed it."

Source: CBC website

Sample Questions for Opening Discussions with Yukon First Nations Elders and Knowledge Keepers

Interconnectedness of Yukon First Nations and their environment

- What signs have Yukon First Nations people observed that provide evidence of the effects of climate change?

Yukon First Nations knowledge of sustainable practices

- How can we apply Yukon First Nations understandings of sustainability to reduce the effects of climate change?

Climate change and the effects on Yukon First Nations sense of place

- What evidence is there of environmental changes, such as climate change, contained in Yukon First Nations traditional narrative and stories?
- What impacts could climate change have on Yukon First Nations sense of place in the future?

Yukon First Nations traditional knowledge can help to identify changes in the environment due to climate change

- How can Traditional Ecological Knowledge help scientists study climate change?
- How can we apply Yukon First Nations understandings of sustainability to reduce the effects of climate change?

Yukon First Nations traditional knowledge about the characteristics of life of plants and animals in their territories







- How is Yukon First Nations knowledge about the characteristics of life of plants and animals used to help scientists understand the effects of climate change?

Local Yukon First Nations traditional knowledge of changes in local ecosystems due to climate change

- In what ways have Yukon First Nations observations shown changes in the interconnectedness of different spheres due to climate change, such as water and land, fish and water?
- How have Yukon First Nations observations about changes in local ecosystems helped scientists monitor the changes brought about by climate change?

Student Self-Assessment of the Core Competencies

These profiles contain descriptions of student progress at different stages. The profiles include the facets and they are interrelated and embedded within the profile descriptions, which are written from a student's point of view, reflecting student ownership and responsibility for demonstrating the competencies. The profiles describe how students move from novice to more complex, sophisticated, and independent stages of development.

	1	2	3	4	5	6	7	8
Communication 	With support I can be part of a group.	In familiar situations, with direct support, I communicate with peers and adults.	In familiar situations, with some support or guidance, I communicate with peers and adults.	I communicate with peers and adults with growing confidence, using forms and strategies I have practiced.	I communicate clearly, in an organized way, using a variety of forms appropriately.	I communicate confidently in organized forms that show attention to my audience and purpose.	I communicate effectively in well-constructed forms that are effective in terms of my audience and purpose.	I am intentional and strategic; I am able to engage and accomplish my purpose with an increasing range of audiences, including those I do not know.
Creative Thinking 	I get ideas when I play.	I can get new ideas or build on or combine other people's ideas to create new things within the constraints of a form, a problem, or materials	I can get new ideas in areas in which I have an interest and build my skills to make them work	I can get new ideas or reinterpret others' ideas in ways that have an impact on my peers.	I can develop a body of creative work over time in an area of interest or passion			
Critical Thinking 	I can explore.	I can use evidence to make simple judgments	I can ask questions and consider options; I can use my observations, experience, and imagination to draw conclusions and make judgments.	I can gather and combine new evidence with what I already know to develop reasoned plans	I can evaluate and use well-chosen evidence to develop interpretations, identify alternatives, perspectives, and make implications; and make judgments. I can examine and adjust my thinking.	I can examine evidence from various perspectives to analyze and make well-supported judgments and interpretations about complex issues.		
Positive Personal and Cultural Identity 	I am aware of myself as different from others.	I am aware of different aspects of myself. I can identify people, places, and things that are important to me	I can describe different aspects of my identity. I am proud in who I am	I understand that my identity is influenced by many aspects of my life. I am aware that my values shape my choices, and contribute to making me a unique individual.	I can identify how my life experiences have contributed to who I am. I recognize the continuous and evolving nature of my identity			
Personal Awareness and Responsibility 	With support, I can show a sense of accomplishment and joy, and express some wants, needs, and preferences.	In a safe, supportive environment, I can share my ideas and accomplishments, and accept responsibility for my actions.	I can recognize my strengths and use strategies to focus, manage stress, and accomplish my goals.	I can recognize my value and advocate for my rights. I take responsibility for my choices, my actions, and my achievements	I can identify my strengths and limits, find internal motivation, and act on opportunities for self-growth. I take responsibility for making ethical decisions.			
Social Responsibility 	I am aware that other people can be different from I am.	In familiar and structured settings, I can interact with others and the environment respectfully.	I can interact with others and the environment respectfully and thoughtfully.	I can take purposeful action to support others and the environment.	I can initiate positive, sustainable change for others and the environment			

Learning Experiences Rubric: Yukon First Nation Assessment and Evaluation Model *(ALYCE JOHNSON, 2017)*

Observations, Conversations, Products	Observe	Practice	Mastery
Working with Elders	Is aware of Elders or others while they are teaching and is respectful	Follows Elders' instructions carefully and respectfully	Highly regards Elders' teachings and adheres to traditional protocols
Listening skills	Maintains contact with Elder, practitioner, teacher	Is respectful and wants to learn by doing and listening	Listens attentively without asking questions or interrupting
Observational skills	Participation in learning activity requires watching	Remains close or near the Elder to acquire knowledge and skills	Is attentive at all times and doing-by-observing
Storytelling skills	Is able to reiterate parts of stories or knowledge shared	Can reiterate storytelling without prompts	Able to reiterate stories and knowledge with great detail and from memory
Note-taking and documentation skills	Writes minimal information for demonstrating learning	Organizational skills are good and demonstrates learning	Highly organized, detailed and neat, and transfers of learning is evident
Writing skills	Must be encouraged to write with detail or descriptions	Good writing skills, and may require additional information or organizational skills	Transfers all learning activities into self-reflections or journals and essays
Organizational skills	Materials or resources are not organized into binder or e-files; written essays or note-taking is minimal or disorganized	Organizes materials or resources and information to store knowledge or products (ie. photographs)	Cognizant of the need for organizing materials or products and written materials to represent and demonstrate learning

TEACHER NOTE: Highlight the strengths of each student to determine learning levels

Illustrations, drawings	Details in art require additional learning experiences	Able to transfer from one medium to another with guidance and assistance; Continued practice is essential and student is willing to redo the work	Able to transfer from one medium to another with confidence (ie. hard copy to painting or other medium); Very detailed and meticulous; Assists other students
Works diligently and independently	Requires focus on learning activities and needs encouragement to participate	Focuses on the learning activities and usually works independently	Is confident in his/her abilities to work independently; Helps other students with their work without teacher prompts

TEACHER NOTE: Highlight the strengths of each student to determine learning levels

