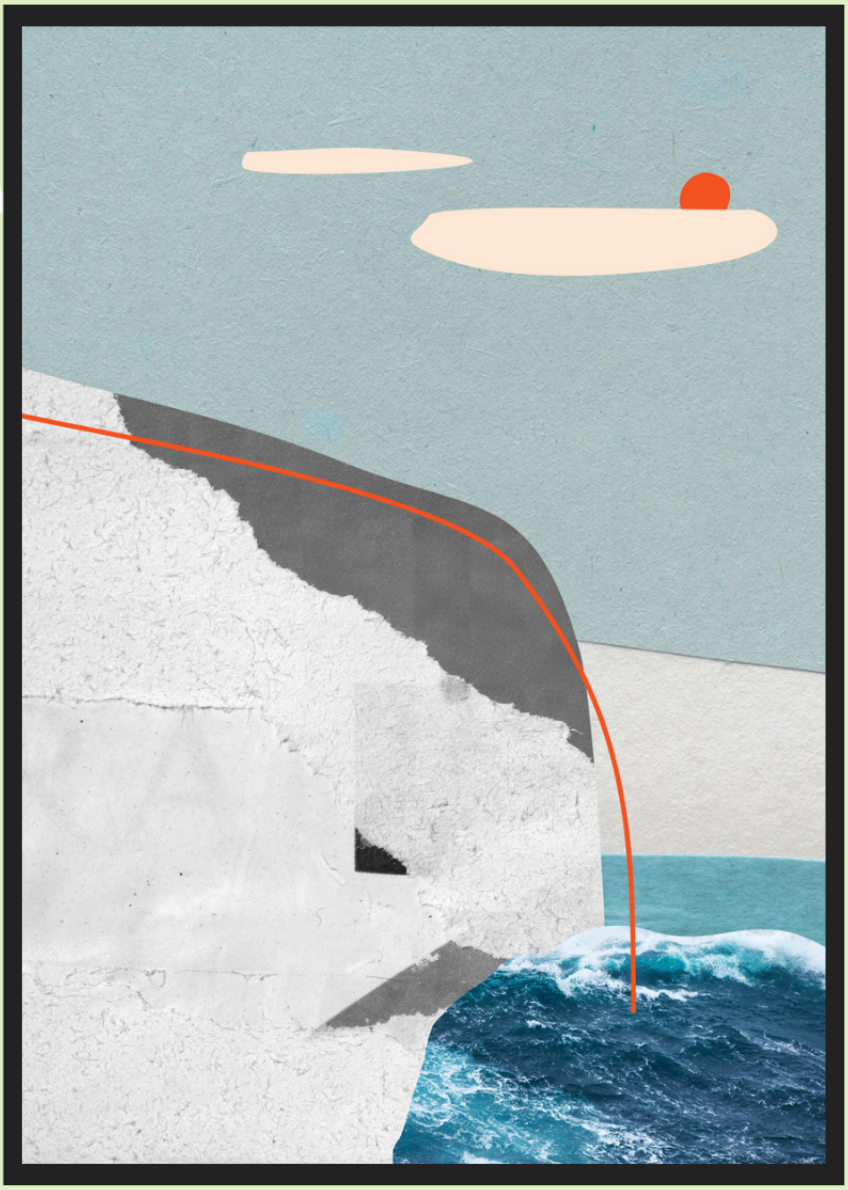
CHAPTER 1:

What is climate change? Why care?

A Project of Learning for a Sustainable Future

Contributors Judy Halpern and Lynn Bristoll



Art by Karla Curcinski for ArtistsForClimate.org

A project of

Learning for a Sustainable Future

LSF

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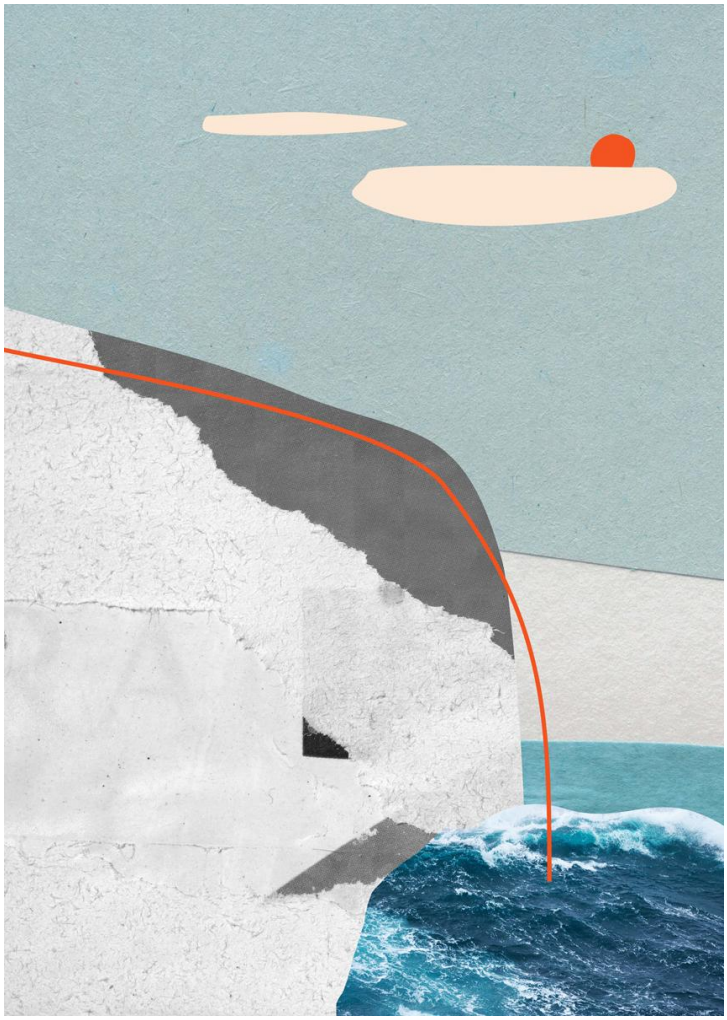
Chapter 1. What is Climate Change and Why Care?

In this initial inquiry, students will explore and learn about the differences between weather and climate and understand the basic scientific principles of climate change through books, videos and interpretations of an infographic. You may find there are more activities than a class can complete. Several activities have been included so that every kind of learner can find ideas, questions, and activities that inspire learning that leads to action.

Climate change is a wicked problem that is increasingly affecting human health, species distribution, and the ability of the earth's ecosystems to sustain our physical, economic, social, and environmental needs. The reports from the Intergovernmental Panel on Climate Change (IPCC) and other leading scientific organizations have become increasingly urgent. Alongside this urgency, media reporting consistently uses a doomsday framing, which can leave viewers with a sense of anxiety or paralysis.

In this inquiry, we suggest that educators begin by talking with children about the weather and climate. This will help them understand the more difficult concept of climate change. We also suggest framing learning pathways broadly by connecting to actions that students identify as personally relevant and important to them.



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Before you begin: Background Information for Educators

Canada's climate is changing at an accelerated rate: since 1948 Canada's annual average land temperature has increased by 1.5°C—roughly double the global average level of warming (Natural Resources Canada). "It has been clear for decades that the Earth's climate is changing, and the role of human influence on the climate system is undisputed," said Masson-Delmotte. Yet the new report also reflects major advances in the science of attribution – understanding the role of climate change in intensifying specific weather and climate events such as extreme heat waves and heavy rainfall events" (Climate change widespread, rapid, and intensifying – IPCC, 2021)

It is true that there are many natural forces that play a role in determining the Earth's climate: the Earth's orbit around the sun, changing ocean currents, very large volcanic eruptions and the Earth's tilt, and there is a great deal of evidence that the world has warmed and cooled in decades before humans existed. However climate changes have never occurred at a pace as

rapid or as drastic as we have seen since pre-industrial time, and these changes cannot be explained by any natural phenomena (Prairie Climate Centre). These changes are a cause for concern but, more importantly, they are also a call to action to mitigate current and future effects and adapt to the changes that are already happening and/or likely to happen in the near future. “Adaptation builds resilience and reduces risk related to current and future climate change impacts. It involves adjusting plans, policies and actions, and can be reactive (i.e., occurring in response to climate change impacts) or anticipatory (i.e., occurring before impacts of climate change are observed).” (NRCAN, p. 19)

Climate vs. Weather

The difference between weather and climate is that whereas weather describes an event occurring at a particular time and place - a storm moving in over a city for example - climate describes the typical weather that a location experiences based on the study of weather conditions over long periods of time. An often heard expression is that 'climate is what you expect, and weather is what you get'. (Let's Talk Energy - Climate vs. Weather: A collaborative project with the Royal Canadian Geographical Society (RCGS) and Ingenium)

To better understand the difference between climate and weather, watch this video by National Geographic that features Neil Degrasse Tyson.

Greenhouse Effect

“A greenhouse is used to create a warmer growing environment for plants that would otherwise not survive in the colder conditions outdoors. In a greenhouse, energy from the sun passes through the glass as rays of light. This energy is absorbed by the plants, soil and other objects in the greenhouse. Much of this absorbed energy is converted to heat, which warms the greenhouse. The glass helps keep the greenhouse warm, by preventing the warmed air from escaping.” (Ingenium, 2022)

Climate Change Impacts

Some of the many impacts of climate change include: biodiversity, ecosystems, species loss and extinction. If the global community is able to limit the increase in temperature to 1.5 degrees, the impacts on terrestrial, freshwater and coastal ecosystems are expected to be lower. According to the Council of Canadian Academies’ expert panel on climate change risks and adaptation potential, Canada faces substantial risk with a likelihood of significant losses, damages, or disruptions in Canada over a 20 year timeframe in the following areas: agriculture and food; coastal communities; ecosystems; fisheries; forestry; geopolitical dynamics; governance and capacity; human health and wellness; Indigenous ways of life; northern communities; physical infrastructure; and water.

Climate Change Knowledge & Understanding

Overall, Canadians are quite certain that climate change is happening. According to a recent survey conducted by Dr. Ellen Field and Learning for a Sustainable Future, 85% of all Canadians believe that climate change is happening. However, the population is less certain that humans are the primary cause of the warming climate; only 43% of respondents think that

climate change is caused mostly by human activity. When this understanding is contrasted with the widespread scientific consensus that climate change is human caused, the urgent need for more comprehensive education on the subject is made clear.

Another finding from the report, *Canada, Climate Change and Education: Opportunities for Public and Formal Education*, found that 46% of students ages 12-18 are categorized as "aware," meaning they understand that human-caused climate change is happening, but they do not believe that human efforts to stop it will be effective. This is an opportunity for schools to help students understand that there are strategies and solutions to address climate change if all sectors take action today.

General Introduction to the inquiries in this chapter:

This chapter offers 3 different structured and scaffolded inquiries to support *What is Climate Change and Why Care?* Numerous strategies are included in each of the inquiries.

These explorations can be completed in their entirety as stated, however, because we know inquiry is an organic and fluid process based on student input, educators may wish to take parts of each of the 3 ideas presented and even adapt, modify or replace what's suggested to create their own inquiry with their class. It is therefore suggested that teachers review the whole chapter first in order to determine and plan what works best with their particular group of learners.

The following 3 inquiries are connected to curricular concepts as shown in this chart. These curricular concepts are applicable across Canada.

Curricular connections	**Concepts**
Science	Sustainability Stewardship Ecosystems Interdependence Changes Cycles Climate Conservation Action Innovation
Language	Critical literacy Media forms Reading

	Text features Text forms Inference Retelling Restating Communication
Social Studies	Physical features Human-environmental interactions
Physical Education and Health and Wellness	Enjoyment Motivation Participation Outdoor education
The Arts	Composition Interpretation Symbolism
Math	Data literacy

Tool: Journaling
Encourage students to record their thinking and learning throughout the learning process. The main reason for developing a journal is for students to then be able to look back and track their growth and progression with their connection to climate change. Students scaffold their thinking throughout their learning journey. The entries can be a combination of personal reflections and assigned reflections. This can be done as illustrations, concept maps or written reflections.

Inquiry 1: Understanding Weather vs. Climate

Students will explore climate change concepts based on a non-fiction text and explore how climate is different from weather.

Resources:

- ***What is Climate Change?*** by Gail Herman, chapter 1 sound bite
- Other possible stories from this list: Climate Action Books for Kids

Inquiry 2: Introducing Climate Change

Students will use visual literacy skills to interpret an infographic that explains climate change concepts.

Resources:

- **Infographic - from Ingenium's Let's Talk Energy**

Inquiry 3: Understanding Climate Change

Students will watch videos to obtain solid background information on climate change concepts including the carbon footprint of the food we eat.

Resources:

- Ideas adapted from ***A Walking Curriculum*** by Gillian Judson
- Access to the Internet

Chapter 1: What Is Climate Change & Why Care?
Inquiry 1: Understanding Weather vs. Climate

- **Provocations** – *Book*
- **Question Generation** – *Q Chart*
- **Knowledge Building**– *Thinking Routines*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *climate change science*
- **Consolidation –** *journal*
- **Assessment –** *RAFT strategy*
- **Take Action**

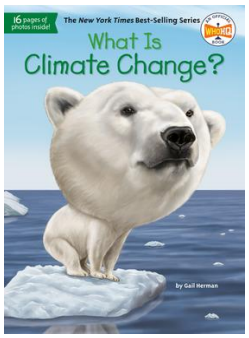
A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Book:
The book identified here is one suggested title to introduce the concept and spark discussion on climate change, but there are numerous picture books and other literature that can be used for the same purpose. This link from Lakehead University's library offers a succinct collection of relevant titles that could be found in other school or public libraries.

Alternatively, Learning for a Sustainable Future (LSF), has a site called Resources for Rethinking (R4R.ca) that allows the user to do various searches. By clicking on their Children's Literature link and identifying the grade and the theme of "Climate Change" in the drop down boxes, another set of suggested titles will appear that could be helpful.

The following is the publisher's synopsis of the book *What is Climate Change* by Gail Herman.



What is Climate Change? By Gail Herman
The earth is definitely getting warmer. There's no argument about that, but who or what is the cause? And why has climate change become a political issue? Are humans at fault? Is this just a natural development? While the vast majority of scientists who study the environment agree that humans play a large part in climate change, there is a counterargument. Author Gail Herman presents both sides of the debate in this fact-based, fair-minded, and well-researched book that looks at the subject from many perspectives, including scientific, social, and political.

Example Activity

- Read the introductory chapter aloud. This introduction uses an example of how the polar bear's life has changed since 2016 due to the effects of climate change.

- Follow this by listening to the first 2:06 minutes of "What is Climate Change"? (this corresponds to ***Chapter 1: Things are Heating Up*** in the story and then continues to explain what is happening as a result of rising temperatures).
- The rest of the sound bite (from 2:05 - the end) explains the impacts of this phenomenon around the world. You might want to have students listen to the entire clip. In this case, have a large world map available to point out the various regions mentioned (e.g., Arctic Ocean, Alaska, Lake Chad in Africa, etc.). As well, compare the imperial measurements mentioned (i.e., 2 and 8 inches) to their metric conversions, which students can visualize using a ruler.

As you read through the book, discuss how people, animals and plants are feeling and affected by these changes.

Possible Discussion Questions:

- What is your favourite weather? Why?
- What would happen if it never stopped raining? Or if it didn't rain at all?
- Who or what is the cause of climate change?
- Why has climate change become a political issue?
- Is this just a natural development?
- Are humans at fault?
- Help younger students with question starters (Who, what, where, when, why and how).
- Look at the chapter titles in the book, and think about what questions you would ask before reading the chapter.
- Does climate change affect humans and animals?
- How do the decisions made by the government impact people's lives in relation to climate change?

Extension Activity Suggestions:

- Get Outside: Challenge students to find examples of climate change actions from in and around the school yard that they can photograph. For example, solar panels on a building, wind mills, trees providing shade, green spaces replacing asphalt for cooling, or different ideas for greening school grounds. Visit Evergreen for more information and ideas: **School Ground Greening Projects**

- Explore the activity from ***Green Teacher*** magazine called Weathering Climate Confusion to clarify the difference between climate and weather while alerting students to levels of public confusion about the two terms.

B. Question Generation

Questioning Grid

	Is / Are	Did / Do	Can	Would / Should	Will	Might / Could
What						
Where						
When						
Who						
Why						
How						

Factual

Predictive

Analytical

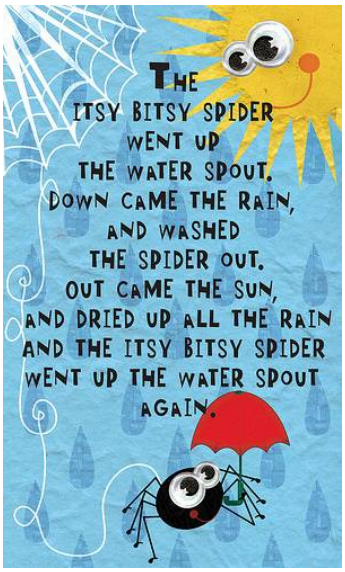
Application
Synthesis

At this point in the inquiry, we want to harness students' curiosity and build off the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Use a **Q Chart** to assist in developing questions. This question creation chart provides an example of this in practice. Learn more here.

Example Activity: Have students generate as many questions as they can in a given period of time (4-5 minutes) based on what they heard/read in the book, ***What is Climate Change?*** by Gail Herman. Write each question on a separate sticky note. Help students to understand the types of questions they have asked by having them place their sticky note in the correct quadrant.

Here is a sample of how to classify your questions using a simple, familiar text.



It may be helpful to colour code the chart as in this image below. Those in the pink quadrant (factual), or remembering and understanding, are the lowest order of questions. These answers can usually be found "right there" in the text. ***Who climbed up the water spout?***
Those in the yellow quadrant (analytical), or applying and analyzing, are those answers that can also be found in the text but students need to "think and search" the text and make inferences to find answers. ***How many times did the spider climb the spout?***
Those in the blue quadrant (predictive), involve understanding and applying, requiring students to dig deeper into the text to try to interpret what the author is saying. ***Why do you think the spider decided to climb back up the spout?***
Those in the green quadrant (evaluating), are highest order thinking questions; students need to look beyond the text and evaluate and analyze what the author is saying. ***Have you ever tried and failed at something the first time, and yet had the courage to come back and try again?*** (myalwayslearning)

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Have students continue their thinking through the **Think, See, Wonder** routine**.**

Example Activity : Have students look at the cover of the book and/or any of the illustrations within the book or images from any other of the picture books found in **this list**. Based on what they see and what they think from their previous knowledge, have them brainstorm ideas for “what they wonder” about weather and climate.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what students are already well informed about, and a general direction that students want to pursue.

Work with students to fill out the “Know” and “Want” columns of a **KWL (Know-Want-Learned) Chart** in relation to the questions generated.

Use responses to inform and guide the learning process. Students can provide insight into which concepts need clarity, what they are already well informed about, and a general direction that many students want to pursue.

Sample KWL Chart:

TOPIC:		
K – What I Already **Know**	**W** – What I **Want** to Know	**L** – What I **Learned**

E. Pursuing Learning

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Example Activity:

Climate Change 101 is a learning module that was created for Learning for a Sustainable Future by Let's Talk Science.This learning module is suitable for grades 3-4 students to complete as a class or grade 5-6 students to complete individually or with a partner. It is made up of three lessons on the science of climate change. Lesson 1: What are the indicators of climate change, Lesson 2: What is the greenhouse effect?, and Lesson 3: How can we tackle this problem?

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Example Activities:

Journal reflection prompts:
This is why I care about climate change...

- Thinking about my questions, this is why I think the question is important and what I currently know…
- Reflect how you would explain (text or drawing) any of the following to a classmate, family member, or neighbour: climate vs. weather, how the greenhouse effect works, the effects of climate change especially in our community (or province/territory or nation).

15 Meaningful and Hands-On Climate Change Activities for Kids From We Are Teachers students can choose to try any of the 15 science-based activities to reinforce their understanding of weather vs. climate change. These 15 activities are all linked to questions, instructions, and explanations, from credible websites and organizations. Students can choose activities or teachers can assign ones for consolidation.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests that can be used after consolidation or at any point in the lesson to check for understanding.

Using the RAFT (Role, Audience, Format and Topic) strategy helps students understand their role and how to effectively communicate their ideas clearly to their chosen audience.

Example Assessment: You are school artists and you are invited to explain to the school community the difference between **weather and climate.** You have been given space on a graffiti wall where you can share your ideas and opinions about the difference between

weather and climate. Be ready to present it to the school community.

Take Action:

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Note, the suggestions are consistent in each chapter.

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety.

Ask the students what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:

- Educate your community about the risks posed by climate change
- Create posters that represent some of the local risks to your community
- Organize an assembly to present information in an engaging manner
- Perform a school-wide waste audit, and make a plan for a less wasteful path forward (one example is offered through EcoSchools at School Waste Audit)
- Take a personal or class pledge to make lifestyle changes:
    - Reduce meat intake
    - Reduce use of single-use plastics
    - Eco-friendly options in place of single-use items (e.g., plastic water bottles, paper coffee cups, etc.)
    - Walk or bike to school
    - Use both sides of paper
    - Turn off the lights when leaving a room
    - Unplug things when not in use
- Plant trees

Action Project Examples:

Watch this video titled **'Change the World' in 5 minutes.** It is about an elementary class who has decided that they would spend the first 5 minutes of school each day of the week implementing sustainable change to the world. It's more of a movement that gives the youth the power to make a difference.

Visit **Young Voices for the Planet** for a myriad of ideas!
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“OUTDOOR ED PROJECT: OUTDOOR LEARNING IS WHERE IT’S AT!”-Father Fenelon Catholic School- Pickering, ON (2017) K-8

- The students decided how to create different learning areas in the outdoors. As small groups committed to designing and implementing ideas, student teams worked to create the areas for climate change learning in their schoolyard. They believe that it is vital for students to be a part of the learning outdoors and create a strong connection to their learning environment. Students from Kindergarten to Grade 8 were involved in ensuring that the project continues to be part of their learning at school. See their project here.

Chapter 1: What is Climate Change & Why Care?
Inquiry 2: Introducing Climate Change

- **Provocations** – *Infographic*
- **Question Generation** – *What Makes You Say That, Umbrella Questions*
- **Knowledge Building**– *Umbrella Questions*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *Claim Support Question, Facts or Fiction*
- **Consolidation –** *Circles of Action, Headlines*
- **Assessment –** *3-2-1 Strategy*
- **Take Action**

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Infographics

"Infographics allow students to share information in a creative way," as Sandy Cangelosi claims in her online article, 4 Effective Uses of Infographics in the Elementary Classroom.

- Share the "What is Climate Change?" infographic from Ingenium's Let's Talk Energy resource with your students. Explore the visuals before deconstructing the text. In the main image we see a polar bear, perched atop of an iceberg, which becomes the smoke from a smokestack from a factory in a big city next to a flaming tree. There is a lot happening in this imagery.
- Have students discuss what messages the image is trying to convey.
- Begin to deconstruct the text by size. The largest text tells us what the infographic is about. As the text gets smaller, the information gets more detailed. Depending on the grade level of your students you can decide how much information they will be able to interpret.

Possible Discussion Questions:

- An infographic tells a story about data. What is the main point of the story that this infographic is telling?
- What is the first thing you notice when you look at this infographic?
- What picture or piece of information is standing out in your mind after viewing this infographic? Why does that "speak" to you the most?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

What Makes You Say That? Is a strategy that promotes evidential reasoning (evidence-based reasoning.)

Example Activity:

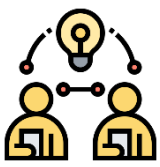
- How do some of the smaller images help to tell the story?
- How does the size of the font help you understand the story this infographic is telling?
- What [vocabulary] words are directly associated with climate change? Create a word wall to ensure that all students understand these important terms.
- Have you read about or heard about an area affected by one of the effects of climate change mentioned in the image? Where was this and what happened?

With your class, develop **Umbrella Questions,** focused questions on climate change that are of interest to the students. It may take several drafts to develop umbrella questions that meet both student and teacher expectations.

In the example below, the quotes are from the infographic and the questions are possible questions that stem from the quote. These questions can be used as is or students can be encouraged to generate questions based on the quotes.

Example Activity:

- "Climate change affects biodiversity"
    - What is biodiversity?
    - How does climate change affect plants and animals?
- "Climate change is due to natural factors and human factors"
    - What natural factors contribute to climate change?
    - What human factors contribute to climate change?
        - What can we, as humans, do to stop climate change?
- "Greenhouse gas emissions are the main cause of climate change"
    - What are greenhouse gases and what causes their increase in our atmosphere?
    - Are there any alternatives to energy that don't produce greenhouse gases?
- "Adaptation and mitigation are strategies for responding to climate change"
    - What does adaptation mean? What are adaptation strategies that respond to climate change?
    - What does mitigation mean? What are some mitigation strategies that respond to climate change?



C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Another strategy used in this infographic to “tell a story” is the use of colour. Each colour—yellow, blue, grey and green—helps focus attention on different issues surrounding climate change. Place 4 pieces of coloured construction paper on the board or on a piece of chart paper and have students work in pairs or small groups to generate questions for each colour on sticky notes (same colour if possible).

From these sticky note questions, work as a class to develop **Umbrella Questions** focused on the “big ideas” of climate change. These questions will help ground the inquiry.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what students are already well informed about, and a general direction that students want to pursue.

Example Activity:
If you used the **KWL Chart** in the book provocation from Inquiry 1, students could return to their KWL chart and make revisions based on their new learnings.

Work with students to fill out the “Know” and “Want” columns of a **KWL (Know-Want-Learned) Chart** in relation to the **umbrella questions**.

Sample KWL Chart:

TOPIC:		
K – What I Already **Know**	**W** – What I **Want** to Know	**L** – What I **Learned**

E. Pursuing Learning

At this stage, students may begin research to pursue their umbrella questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Have students make a claim using the **Claim Support Question** strategy.

Example Activity:

1. Make a claim (a statement that is an explanation or interpretation) from what you see on the infographic.
2. Identify support (things you see, feel or know) for your claim.
3. Ask a question related to your claim. What isn't explained that you can explore further?

Alternatively you can have students use the **Facts or Fiction** routine to think more critically about the truth in something presented to them.

Example Activity:

1. What information do you think this infographic is trying to tell you?
2. Who would decide that this information is important to know and learn?
3. What information do you think needs proof to be believed?
4. Are there any facts on this infographic that we could question and need more information to understand or believe?
5. What parts of this infographic do you think are true? What makes you think that?
6. Are there any parts of this infographic that you think may not be true? What makes you think that?

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Have students work in small groups in a **Circle of Action** to discuss and brainstorm potential responsible and reasonable action.

Example Activity:

Knowing what we have learned about climate change so far, what can I do to contribute to reducing the effects of climate change…

1. In my inner circle (of friends, family, the people I know)?
2. In my community (my school, my neighbourhood)?
3. In the world (beyond my immediate environment)?

Ask students to create a **headline** based on the material presented so far.

Example Activity:

1. Write a headline that captures the most important aspect of this topic/issue.
2. How does your headline differ from what you would have said before we explored this topic?
3. How has your headline grabbed the readers' attention?

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests that can be used after consolidation or at any point in the lesson to check for understanding.

Use the **3-2-1 Strategy** to have students summarize their learning by identifying 3 things they have learned, 2 things they would like to learn more about and 1 question they still have.

Example Activity:

1. Three - After the lesson, have each student record three things he or she learned from the lesson.
2. Two - Next, have students record two things that they found interesting and that they'd like to learn more about.
3. One - Then, have students record one question they still have about the material
4. Review - Finally, the most important step is to review the students' responses. You can use this information to help develop future lessons and determine if some of the material needs to be taught again.

Take Action

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Chapter 1: What is Climate Change & Why Care?
Inquiry 3: Understanding Climate Change

- **Provocations** – *Videos*
- **Question Generation** – *Creative Question Starts*
- **Knowledge Building**– *Stop and Jot, Think, Pair, Share*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *Sensory Walk*
- **Consolidation –** *Tweet it Out*
- **Assessment –** *Plus, Minus, Interesting*
- **Take Action**

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Videos

Choose any or all of the 5 suggested videos to view, discuss and spark inquiry. These videos give solid background information on the concept of climate change, including the difference between weather and climate and the carbon footprint of food that we eat.

Jot down the questions that students generate after the video(s).

Video 1: What's the Difference Between Weather and Climate? [Climate Kids] - 2:01 minutes

This video explains the difference between weather and climate and how change can impact our world.

Video 2: Climate Change: The environment for kids [Smile and Learn] - 4:59 minutes

This video helps children to learn what climate change is, what can we do to stop it and take better care of our planet.

Video 3: Climate Change for Kids | A fun engaging introduction to climate change for kids [Learn Bright] - 11:34 minutes

This video explains climate change, we encourage teachers to watch the video and identify the teachable moments or sections for your age group.

Video 4: Climate Change 101 with Bill Nye [National Geographic]- 4:09 minutes

Climate change is a real and serious issue. In this video Bill Nye, the Science Guy,

explains what causes climate change, how it affects our planet, why we need to act promptly to mitigate its effects, and how each of us can contribute to a solution.

Bill Nye says that the most important thing to take away from this video is that 'climate change is real and it's happening.' This is a simple statement supported by a lot of evidence, but it is something that is not agreed upon by everyone; why could this still be the case? How might it be slowing progress?

Video 5: **The Carbon Footprint of a Sandwich** [NPR's Skunk Bear] - 3:05 minutes

Follow the path of a BLT sandwich, from field to plate.

The connection in this video between human activity and the carbon dioxide produced is not the most obvious one. Are you surprised at the impact of a slice of bread or a piece of bacon? Why or why not? Are there certain foods that you think would emit less greenhouse gases in production? How can you find out?

Possible Discussion Questions:

- What did you hear that surprised you?
- Did you learn anything new?
- Do you have any questions about climate change?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Using the following Creative Question Starts, have your students work in pairs or small groups to come up with as many questions regarding the information presented in the videos starting with: "Why…?", "What if…?", "What is the purpose of…?", "How would it be different…?", "What if we knew…?", and "What would change if…?"

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Intended for students to think about what they're learning, use the **Stop and Jot** strategy to have students record their thoughts while pausing at various times in the lesson.

Or

Use the **Think, Pair, Share** strategy to build confidence, encourage greater participation and share what they're learning.

Example Activity:
After watching several or all 5 videos suggested above (or after viewing other relevant videos having to do with climate change), have students **Stop and Jot** down things they have learned on sticky notes. Only one piece of paper should be used for each thought. Alternatively, this could be done during and/or after each video as well. Once sufficient time has been provided, students should share their points with a peer using the **Think, Pair, Share** protocol.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what students are already well informed about, and a general direction that students want to pursue.

Work with students to fill out the "Know" and "Want" columns of a **KWL (Know-Want-Learned) Chart** in relation to the **Stop and Jot** activity.

Sample KWL Chart:

TOPIC:		
K – What I Already **Know**	**W** – What I **Want** to Know	**L** – What I **Learned**

E. Pursuing Learning

At this stage, students may begin research to pursue their various questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Try a **sensory walk** to have students explore new or different sensory experiences.

Example Activity: (this can be done during all seasons and weather!)

To make students aware of their environment using their senses, have them notice the weather on that particular day. If it is windy, can they feel the wind on their body parts? What direction is the wind coming from? Have them notice where the sun is and if they feel the heat. Have them notice the shape of the clouds. Are they moving? Do the shapes of the clouds remind you of anything? In the winter, if it is snowing, go outside and look at snowflakes closely. Look at your snowflakes and compare them with a friend, are they the same?

For other ideas on focused sensory walks, explore ***A Walking Curriculum*** by Gillian Judson. "Walking activities are designed to:

- **engage** the body, emotions, and imagination in ways that can increase familiarity with the local and natural contexts of school and learning;
- **increase** attention to detail, particularity and their connection with place;
- **connect** place-based learning activities with cross-curricular goals"

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Have students synthesize their understanding by **"Tweeting" It Out!**.

Example Activity:
In its inception, Twitter would only post tweets of 140 characters or less. More recently in 2021 they have doubled the limit to 280, although studies have found fewer words (70-100) to be most effective (What's the Ideal Length of a Tweet?).With all of the information students have gained from the videos they've watched, have students summarize their learning in a "tweet" abiding by Twitter's word count. They may wish to include hashtags as well to demonstrate their social media skills but also their understanding of the content as they know it to date.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Students are instructed to write down the positives, negatives and interesting features of a topic, question or situation using the **Plus, Minus, Interesting** strategy.

Example Activity:

Once students have watched any or all of the videos, have them work in pairs to identify the ideas presented in the videos that fit into each column. For example:

PLUS	MINUS	INTERESTING
List all of the positive ideas that were presented in the video(s).	List all of the negative ideas or problems that arise from the ideas presented in the video(s).	List all of the interesting ideas, neither positive or negative, that arise from the ideas presented in the video(s).

Take Action:

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Note, the suggestions are consistent in each chapter.

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety.

Ask the students what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:

- Educate your community about the risks posed by climate change
- Create posters that represent some of the local risks to your community
- Organize an assembly to present information in an engaging manner
- Perform a school-wide waste audit, and make a plan for a less wasteful path forward (one example is offered through EcoSchools at School Waste Audit
- Take a personal or class pledge to make lifestyle changes:
    - ○ Reduce meat intake
    - ○ Reduce use of single-use plastics
    - ○ Use eco-Friendly and/or reusable cups
    - ○ Walk or bike to school
    - ○ Use both sides of paper
    - ○ Turn off the lights when leaving a room
    - ○ Unplug things when not in use
- Plant trees

Action Project Examples:

Watch this video titled **'Change the World' in 5 minutes.** It is about an elementary class who has decided that they would spend the first 5 minutes of school each day of the week implementing sustainable change to the world. It's more of a movement that gives the youth the power to make a difference.

Visit **Young Voices for the Planet** for a myriad of ideas!
The mission of ***Young Voices for the Planet*** (YVFP) is to limit and mitigate the magnitude and impacts of climate change by empowering youth, through uplifting and inspiring success stories, to take an essential role in informing themselves, their peers and their communities—becoming leaders and changing laws, changing minds and changing the world.

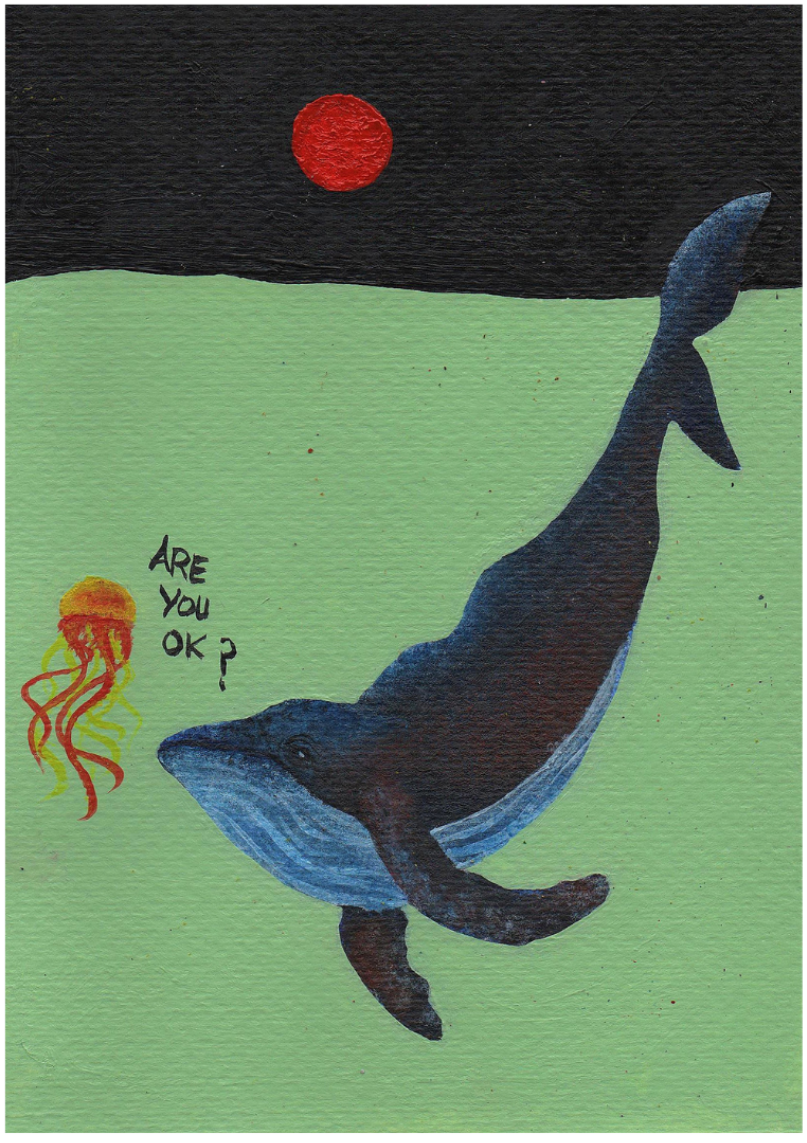
"OUTDOOR ED PROJECT: OUTDOOR LEARNING IS WHERE IT'S AT!"-Father Fenelon Catholic School- Pickering, ON (2017) K-8

- The students decided how to create different learning areas in the outdoors. As small groups committed to designing and implementing ideas, student teams worked to create the areas for climate change learning in their schoolyard. They believe that it is vital for students to be a part of the learning outdoors and create a strong connection to their learning environment. Students from Kindergarten to Grade 8 were involved in ensuring that the project continues to be part of their learning at school. See their project here.

CHAPTER 2:
How does climate change affect our world?

A Project of Learning for a Sustainable Future

Contributors Judy Halpern and Lynn Bristoll



Art by Belen Gonzalez for ArtistsForClimate.org

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Chapter 2. How Does Climate Change Affect Our World?

This inquiry delves deeper into the multifaceted environmental effects of climate change. We encourage students to harness their curiosity about the local environment by examining changes to systems and through systems thinking, specifically ecosystems, biodiversity and habitat loss, or by connecting with a community expert and exploring restorative practices. We have included a multitude of external resources and guiding questions to help support and extend student research and action.

Photo by Belén González (Matitafore)

Before you Begin: Background Information for Educators

Regions across Canada are already experiencing the effects of climate change. Many ecosystems are changing rapidly, and animals' habitats are changing at a faster rate than they can adapt. The Living Planet Report shows an average decline of 60% in animal populations between 1970 and 2014. In order to conceptualize some of the major environmental effects that can be attributed to climate change and trends that could emerge in coming years, the effects have been broken down into the following sub-categories: changes in temperature and precipitation, changes to the cryosphere (portions of Earth's surface where water is in solid form, including ice caps, glaciers, sea ice, snow cover, etc.), changes to freshwater resources, changes to ocean climate, and biodiversity changes.

Changes in Temperature and Precipitation:

- In Canada, temperatures have increased by 1.5 degrees above pre-industrial levels. Canada's position in the far northern hemisphere means that we are experiencing the effects of climate change at a higher rate than many other regions in the world.
- Warmer air has the potential to absorb more surface water, resulting in both droughts and more intense precipitation events. Overall trends indicate that Canada has become wetter in the past decade, with increased rainfall and decreased snowfall across many regions of southern Canada.
- Temperature and weather extremes are expected (very hot and very cold as well as very wet and very dry) leading to a higher risk of associated environmental hazards such as floods and droughts.
- Overall temperature warming is enhanced in the northern latitudes of the country.

Changes to the Cryosphere (parts of the earth's surface characterised by the presence of frozen water)

- Permafrost temperatures in Northern Canada have been fairly consistently rising 0.2 degrees per decade over the past 20-30 years.
    - Globally between 2007 and 2016, there has been an average increase of 0.29°C ± 0.12°C in permafrost temperatures. (IPCC, 2019)
    - The effects of melting permafrost include release of harmful greenhouse gases previously trapped within the ice and reduction of structural support in regions previously covered by permafrost.
- Glaciers have been melting at an accelerated rate since the beginning of the 20th century—glaciers lost 11% and 25% of their surface area in Alberta and British Columbia, respectively, between 1985 and 2005 Columbia, respectively, between 1985 and 2005 (*Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation;* Chapter 2, 2014).

Changes to Freshwater Resources

- Changes to freshwater resources across Canada are difficult to categorize as a whole, nationally, due to the extreme regional variation that exists.
- Canadian data shows that water quality has remained stable in the vast majority of monitoring stations across the country (81%) between 2002 and 2016, improved in 10% of locations, and decreased in 9%.
- However, the levels of PBDEs (Polybrominated diphenyl ethers, persistent organic pollutants) remain above prescribed guidelines in the following locations: The Great Lakes, Pacific Coastal, and St. Lawrence.
- Excessive nutrients in both the Winnipeg River Basin and The Great Lakes area have caused detrimental algae blooms in these locations.
- Water levels across the Great Lakes (the largest surface freshwater system on Earth) broke seasonal or all-time record highs in both 2019 and 2020. These changes in water level are a wake up call that these types of extreme conditions are not a worry for the

future, but happening now. “Adaptation planning must manage uncertainty, rather than try to avoid it” (Kwakkel et al., 2016) (NRCAN National Issues Report, Chapter 4)

- “Combined changes in precipitation phase (e.g., rain or snow), earlier snowmelt, ice cover retreat and decreasing glacier mass affect Canadian river flows and lake levels. Future trends identified in Canada’s Changing Climate Report (Bush and Lemmen, 2019) and other studies, include: less water availability in southern basins, particularly in summer; increased frequency and intensity of water-related extremes; reduced water quality and more harmful algae blooms.” (NRCAN National Issues Report p. 196-197)

Changes in the Ocean Climate

- Trends in the Pacific, Atlantic and Arctic oceans indicate long-term warming of approximately 0.1 percent per decade, in both surface temperatures and bottom waters.
- Ocean temperature, acidity, and oxygen levels are affected by increasing atmospheric carbon dioxide levels.
    - Since the 1980’s the ocean has absorbed between 20-30% of total anthropogenic carbon dioxide emissions.
- The rate of ocean warming has more than doubled since 1993 (IPCC).
- Ocean levels are rising at a concerningly fast rate (in part due to the melting ice caps), which is increasing the risks of flooding and potential contamination of freshwater and groundwater, among other issues.
    - In Canada, a country surrounded by three different ocean bodies, the changes to ocean levels, temperature and composition are of paramount importance.
- “NASA measures sea level around the globe using satellites. The Jason-3 satellite uses radio waves and other instruments to measure the height of the ocean's surface – also known as sea level. It does this for the entire Earth every 10 days, studying how global sea level is changing over time.”
    - For resources explaining the effects of climate change on the oceans to young children visit NASA’s Climate Kids.

Biodiversity Changes in Canada:

- Increases in the frequency and intensity of droughts, forest fires, and insect outbreaks in combination with direct human impacts like deforestation, pollution and overharvesting are resulting in habitat loss and threatening the survival of many species (Canada and a Changing Climate).
- Changes to season lengths and times (such as earlier springs) are changing the growth and reproduction patterns of many plant species, which directly affects animals that rely on them for food and habitat.
- Physical changes in the landscape (e.g., higher water levels or human barriers such as roads, farms, and dams) can prevent animals from accessing food or breeding/rearing areas and can result in habitat loss.
- “The capacity of ecosystems and individual species to adapt to climate change through range shifts, however, is not without limits. Organisms are limited in the range of environments to which they can adapt.” (NRCnap. 284)

- “Since biodiversity is critical to ecosystem resilience and functioning, it is important to consider ecosystem services within the context of broader life support systems when investigating climate change impacts, ecosystem responses, climate change adaptation and greenhouse gas (GHG) emissions reduction (Biodiversity Adaptation Working Group, 2018).” (NRCan p. 278)

General Introduction to the Inquiries in this Chapter:

This chapter offers 3 different structured and scaffolded inquiries to support *How Climate Change Affects Our World, Our Community, and Our Natural World?* Each of the 3 inquiries begin with a provocation followed by the other steps of our inquiry model which includes many active learning strategies and activity/resource examples (see the table of contents in each inquiry for details).

These explorations can be completed in their entirety as stated, however, because we know inquiry is an organic and fluid process based on student input, educators may wish to take parts of each of the 3 ideas presented and even adapt, modify or replace what’s suggested to create their own inquiry with their class. It is therefore suggested that teachers review the whole chapter first in order to determine and plan what works best with their particular group of learners.

The following 3 inquiries are connected to curricular concepts as shown in this chart. These curricular concepts are applicable across Canada.

Curricular Connections	**Concepts**
Science	Stewardship Ecosystems Biodiversity Sustainability Protection Habitats Change Survival Action Conservation
Language	Critical literacy Text features Text forms Interencing Retelling Visual literacy Media forms Persuasion Point of view

Social Studies	Perspectives Interrelationships Cause Significance Human-environmental interaction Physical features Rights Justice
Physical Education and Health and Wellness	Fulfillment Contribution Connection Relationships
The Arts	Composition Symbolism Interpretation
Math	Data literacy

Prior to Provocations: Journaling
Encourage students to record their thinking and learning throughout the learning process. The main reason for developing a journal is for students to then be able to look back and track their growth and progression with their connection to climate change. Students scaffold their thinking throughout their learning journey. The entries can be a combination of personal reflections and assigned reflections. This can be done as illustrations, concept maps or written reflections.

Inquiry 1: How Does Climate Change Affect My World? Understanding Systems Thinking

Students will be introduced to systems and systems thinking by exploring how climate change affects their own world.

Resources:

- **Habits of a Systems Thinker** cards

Inquiry 2: How Does Climate Change Affect Our Community? What Systems are at Work in a Neighbourhood?

Students will explore their local community, through a neighbourhood walk, noting the systems at work that make it function. Students will note human impacts on the local community and explore the consequences of short-term and long-term actions.

Resources:

- Permission to go on a neighbourhood walk
- **Habits of a Systems Thinker** cards

Inquiry 3: How Does Climate Change Affect Our Natural World? How is Biodiversity Affected by Climate Change Using a Systems Thinking Approach?

Students will explore the systems at work in a local natural habitat and as an "adventure scientist" collect data to provide evidence on the health of the habitat and biodiversity within it.

Resources:

- **Poster** from Ingenium's Let's Talk Energy
- Access to a local natural habitat

Chapter 2: How Does Climate Change Affect Our World
Inquiry 1: Understanding Systems Thinking

- ***Provocations*** *–Artefact*
- ***Question Generation*** *– Creative Question Starts, Compare and Contrast*
- ***Knowledge Building*** *– Video*
- ***Determining Understanding*** *– Habits of a Systems Thinker*
- ***Pursuing learning*** *– Think Feel Care*
- ***Consolidation*** *– I Used to Think, Now I Think*
- **Assessment** *– Invent and reflect, One Minute Sentence*
- ***Take Action***

This inquiry is focused on understanding systems thinking. “To think about systems means we pay attention to interrelationships, patterns, and dynamics as well as to the parts.” (Linda Booth Sweeney, Agency By Design, Project Zero at Harvard Graduate School of Education

Prior to Provocations: Journaling
Encourage students to record their thinking and learning throughout the learning process. The main reason for developing a journal is for students to then be able to look back and track their growth and progression with their connection to climate change. Students scaffold their thinking throughout their learning journey. The entries can be a combination of personal reflections and assigned reflections. This can be done as illustrations, concept maps or written reflections.

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Artefact
The opportunity to handle actual **artefacts** is a unique experience. Students will inevitably be curious about the artefacts and this will naturally lead to good discussion.

Example Activity:
Bring a homemade or purchased terrarium (or a picture of a **terrarium**) to class. A terrarium is a self-sustaining plant **ecosystem** with living plants inside. It is usually made of a sealed, transparent container which contains all of the necessary parts that make up the ecosystem.

Explore all of the parts that make up the terrarium ecosystem. Consider what a plant ecosystem needs to survive (food, water and sunlight) and how all the elements (plants, soil, rocks, the container) all contribute to keeping the system working as an **ecosystem**. The plants and the soil in the terrarium release water vapour, essentially recycling water. The vapour is then collected onto the walls of the vessel and trickles down to the soil. The rocks in the bottom help to keep the soil from saturating so the water is absorbed as needed.

All of the parts of the terrarium contribute to its success, even the container. Students make connections to the idea that if something consists of many parts and functions as a **system**, the parts influence one another. If one part isn't working properly, or if a part of a system is missing, broken, worn out, mismatched or misconnected, it affects the entire system.

Explore another example of a **system**, and see if students can identify the parts that make that **system** work. For example, using a bicycle, have students brainstorm all of the parts of a bike that make it work. Ask students to make simple connections from the parts to the whole: e.g., How do the wheels connect to the pedals? How do the pedals connect to the gears? How do the gears connect to the brakes?

Now explore some other systems and how the parts contribute to the functioning of the whole system; for example:

- Systems in my kitchen
- A bicycle as a system
- Planets in a solar system

- Computer and its components
- Human body system (e.g., digestive, circulatory, etc.)

This video by Linda Booth Sweeney makes a great introduction to **systems thinking:** **What Are Systems?**

Possible Discussion Questions:

- Choose one system that we encounter in our everyday lives and list as many of its parts as you can. What would happen if one of the parts was missing or malfunctioned?
- Think about your schoolyard as an ecosystem, list all of the parts. What would happen if one of the parts was paved to make a new parking lot?
- Can you think of a system we have discussed in class in the past and reflect on its components (e.g., water cycle, human body, solar system)

B. Question Generation

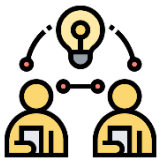
At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Use **Creative Question Starts** to provoke student thinking and further their inquiry.

Example Activity:
Using these question starters, have students come up with a list of questions regarding a living system:

- What if...?
- What is the purpose of...?
- How would it be different if...?
- Suppose that...?
- What if we knew...?
- What would change if...?

Have students write their questions on sticky notes, one question per note. Compare and contrast these questions with those generated for another system you explored in the provocation. Sort the questions into duplicate ones, those that can be answered with some simple research and those that may lead to a deeper inquiry.



C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

The **Mangrove Ecosystem Video** **by PBS's Plum Landing** explores how the parts of the ecosystem contribute to the success as a whole.

Example Activity:
Watch the video, then analyze the behaviours of the system:

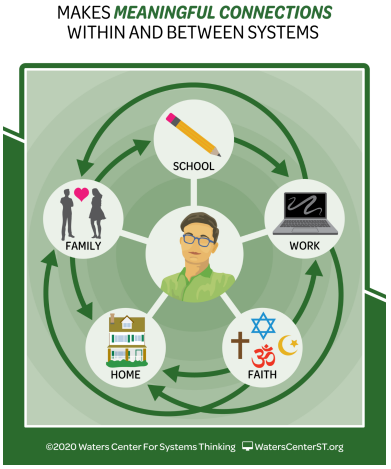
1. Identify the key parts of the mangrove as a system
2. Examine the interconnections between the parts
3. Explore how the behaviour of each part affects the behaviour of the other parts
4. Identify how the interactions of all of the parts, working together, produce the overall behaviour of the entire system.

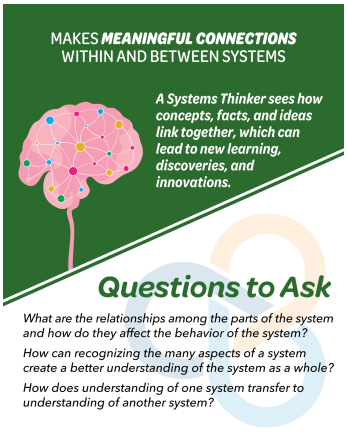
D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

After viewing the Mangrove Ecosystem video(s) and participating in the provocation activities, explore this strategy to determine next steps.

From **Habits of a Systems Thinker** learning cards, address the concepts on this card to help students make some meaningful connections between systems that they have explored:





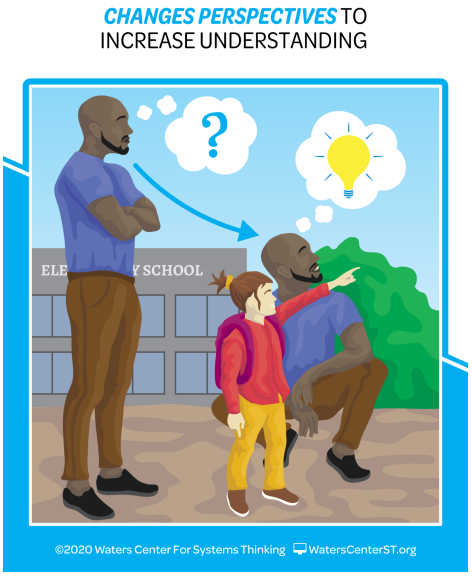
Example Activity:
Consider the systems that make our school function. Explore the parts (office runs the administration, classrooms, library, gym, schoolyards, parking lots, playgrounds, etc.) and identify other parts that contribute to making our school function. Allow students to express how these parts make the school function as a system and how this affects each students' role at home, with their friends and as a learner.

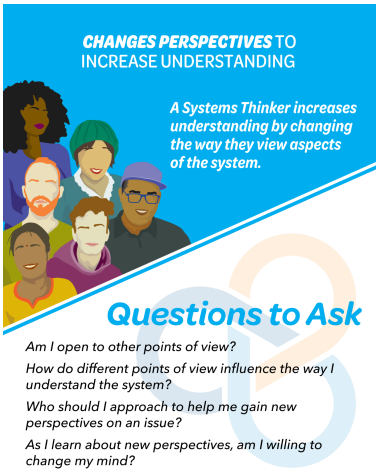
E. Pursuing Learning

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of systems thinking. The activities listed below will enrich the understanding of climate change.

The **Think Feel Care** routine helps learners understand that people who participate in a system think, feel, and care differently about things based on their positions in the system.

Example Activity:
A system thinker changes perspectives to increase understanding. Use the **Habits of A Systems Thinker** card shown here, and the questions posed on the card to respond to Greta Thunberg and George Monbiot's **short film** highlighting the need to protect and restore nature in response to the climate crisis.





Example Activity:
Have students role-play different people in the school community that help the school function as a working system. Explore situations where decision making is necessary from different points of view. For example:

- *It is raining outside and recess is approaching. Students have proper clothing and like to play in the rain.* Make a decision on indoor recess from:
    - the principal's point of view
    - a teacher's point of view
    - the custodian's point of view
    - the students' point of view
- *The friendly class snake escaped from its tank. Students love the snake and know that it won't harm anyone who is kind to it. Some students are terrified and may try to harm it if found.* Make a decision on what to do from:
    - the principal's point of view
    - a teacher's point of view

- the custodian's point of view
- the students' point of view

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

After students have had an opportunity to do some research on everyday systems, a valuable consolidation tool is **I used to think...now I think**.

Example Activity:
Using this strategy have students work individually or in small groups and respond to any or all of these statements:

- "I used to think that my sometimes silly actions, as a student in the school, didn't matter; now I think…"
- "I used to think that not exercising my body regularly would just make me lazy; now I think…"
- "I used to think our school worked because adults made all of the decisions; now I think…"

These are just a few examples. Have students come up with other statements that demonstrate their understanding of the importance of all parts of a system needing to work together to make it function properly.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests that can be used after consolidation or at any point in the lesson to check for understanding.

Reflection:
Explain how the bicycle is a system that helps the world. It reduces carbon footprint and it is a healthy system.

Have fun with some **Rube Goldberg** machines! Invite students to invent a simple Rube Goldberg system that solves a problem in the natural world. Have students reflect on how their invention can help the world.

Here are some Rube Goldberg Lesson Ideas.

To form a concise summary, use the **One Minute Sentence** strategy.

Example Activity:

1. **List:** During a lesson, have students make a list of the most important ideas of the lesson. They can do this individually or with a partner.
2. **Compose:** Students review the important ideas they've recorded so far, then use what they've reviewed to compose one sentence to summarize the entire lesson individually.
3. **Mash Up:** Students can also get together with a partner and compare sentences, take the main points from each other and co-create one richer sentence that demonstrates their learning and understanding in this inquiry.

(Adapted from The Teacher Toolkit: One Minute Sentence)

Take Action:

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Note, the suggestions are consistent in each chapter.

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety.

Choose any or all of the 4 suggested videos to view, discuss and to spark an inquiry:

- **Save Tomorrow** [Young Voices for the Planet] 7:21 minutes
  Inspired by the other Young Voices for the Planet films, three 9-year-old girls realize that they might be able to make a difference, too. These youth in Lexington, MA team up together to change a town law (with unanimous support!) to allow solar panels on public buildings. They then turn their passion towards protecting the local forest habitat.

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    Students explore what it means to be Nature Positive and design a creative image of a tree, uploading it to a virtual forest as a demonstration of their commitment to being Nature Positive and wanting others to be too.

Possible Discussion Questions:

- What is your favourite place to be outdoors?
- How are young people making their voices heard?
- How can a "nature positive" attitude help local habitats and biodiversity?
- Why is it important that all people have access to the outdoors?

- What are some outdoor spaces/places that all people and communities should have access to?
- Do all people have access to the outdoors?
- What is your favourite place outdoors?

Ideas for Taking Action:

- Plant trees
- Habitat restoration
- Collect data as citizen scientist such as local bird counts, schoolyard tree and plant surveys or participate in a **local bioblitz**
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Action Project Examples

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Chapter 2: How Does Climate Change Affect Our World

Inquiry 2: What Systems are at Work in a Neighbourhood?

- ***Provocation*** *–Neighbourhood Walk, I Wonder Wall*
- ***Question Generation*** *– Concept Mapping,*
- ***Knowledge Building*** *– Parts, Perspectives, Me*
- ***Determining Understanding*** *– Back and Forth, Habits of a Systems Thinker Scenarios*
- ***Pursuing learning*** *– Habitat Exploration*
- ***Consolidation*** *– Triangle, Square, Circle*
- **Assessment** *– 30 Second-one minute sound bite*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Neighbourhood Walk

Take your class outside on a neighbourhood walk to observe the local environment. This could include both the natural and built environment. You could ask your students to look for anything from flora and fauna to evidence of adaptations to climate change.

On this walk challenge students to find three to five **"I wonders"** about how climate change is affecting or may affect the environment in your local area. Compile all of the "I wonders" into a list for students to refer back to when developing **umbrella questions**. For example, "I wonder how bees are being affected by climate change."

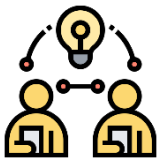
Biodiversity or species at risk modification:
Before leaving for your walk, encourage students to bring a device along to allow them to photograph their "wonderings". (Students may be able to download the free app, iNaturalist. The app allows them to take photos of plants, animals or insects for identification and will suggest probable species. Data uploaded into iNaturalist is shared with scientists to help conduct research and monitor invasive species). If students do not have the app (or data on their device), simply take photos of interest to explore further upon returning to the classroom.

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation that has captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline a pathway for question generation depending on the provocation(s) that your class engaged with.

Consider the neighbourhood to be another system and explore questions using **concept mapping** that can connect the different parts.

Example Activity:
Create your own concept map using the essential question, **"What are the systems in our neighbourhood?"** See Systems Thinking in the Elementary Classroom for some ideas.



C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Using the **Parts, Perspectives, Me** routine, encourage students to examine, in detail, a part of the system.

Example Activity:
Following the neighbourhood walk have students choose an object/subject of interest they discovered on their walk. In pairs or small groups have students explore the following ideas in order to build knowledge and explore alternative perspectives.

Possible Discussion Questions:

- What are the various parts or components of the object or subject of choice?
- Explore this object or subject from a different perspective such as one of the parts or components that you identified above. How do these parts or components contribute to the function of the whole?
- What personal connections can you make to this object or subject? Try also taking the perspective of the specific component or part that you identified.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

After experiencing some of the provocations and participating in the Parts, Perspective and Me activity, explore this strategy to determine next steps and levels of understanding.

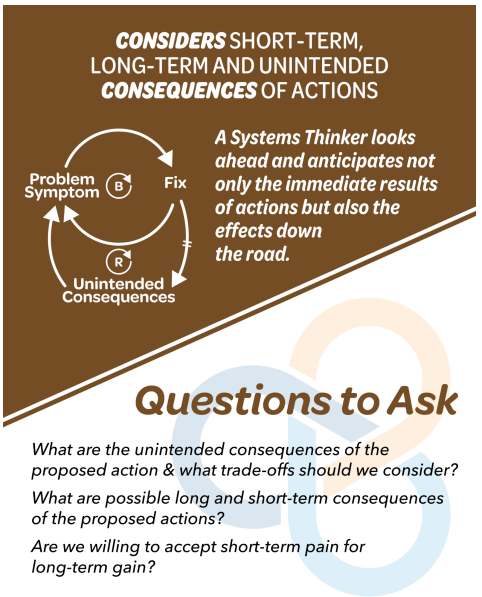
The **Back and Forth** technique allows students to explain a concept or idea and share thoughts with a partner.

Example Activity 1:

In pairs, student A explains a problem or an issue they observed on their walk (such as vandalism in the woodlot) and perhaps a potential solution to the problem. Student B writes down what they think they understood the problem to be and the potential solution and then shares what they wrote with student A. Students reverse roles and check each other's work for clarity and accuracy.

Example Activity 2:
Using the **Habits of A Systems Thinker** cards, consider "short-term, long-term, and unintended consequences of actions".

Exploring our own community through a systems thinking lens creates opportunities for us to examine our actions and the consequences of them. Allow students time to discuss these scenarios using the **Back and Forth** strategy, until they come up with a collaborative possible solution to address the scenario. Students can then present their solutions to the class for feedback.



Scenario 1:
Problem: too many cars on our roads contributing to air quality problems as they sit idling in traffic
Short-term consequence: build more roads so that cars continue to move freely, less idling
Long-term consequence: people more apt to use their cars to get around because traffic is moving more freely
Unintended consequence: more people driving, more carbon dioxide released into the air contributing to air pollution

Scenario 2:
Problem: coyotes killing and eating chickens on local farms
Short-term consequence: extend hunting season and quotas on coyotes to reduce the population
Long-term consequence: less coyotes means increase in some animal populations such as rabbits and deer; increased population of rabbits and deer means more grazing on available plants and trees, particularly in the winter months
Unintended consequences: rabbits and deer starving as their food source is limited

E. Pursuing Learning: Impacts on the Environment

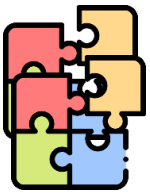
At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Students become explorers through **Habitat Exploration**.

Example Activity:
"Are you ready to go on a habitat exploration? If you took a trip around your neighbourhood, you would see an incredible variety of habitats, everything from parks to ponds. In this activity, students will be explorers who travel around their communities to observe various land and water habitats. Students will collect, record, organize, and compare data about the variety of habitats and take note (using field notes and by taking pictures) of the cleanliness of the habitat and take a survey of the biodiversity, both plants and animals, that make it their home."
(Adapted from zspace.com)

Possible Discussion Questions:

- What is the biggest environmental impact in our area? Do you see any evidence of climate change in your study area?
- From your field work, determine which species are most common in your area? Did you find any evidence that other species may also use this study area?
- Do you see any risks for any species in your study area?
- How are we, as humans, connected to any of the species you found?
- What are the best restoration actions (best ways to improve these areas) that will encourage biodiversity and maintain healthy habitats?



F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Determine three important issues identified on the neighbourhood walk using the **Triangle, Square, Circle** routine.

Example Activity:
Based on the activities that followed the neighbourhood walk, have the class, together as a group, (or in small groups for older children), use a triangle shape to determine 3 important issues, problems or discoveries they made, one for each point Use a square shape to explore things that "squared" with them or that they agree with. Finally, use a circle shape to identify what is still "circling" in their minds or questions that they still have regarding how climate change affects our local habitats.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

As an assessment tool, I have students try the **30 Second - 1 Minute Sound Bite** strategy.

Example Activity:
Have students work in pairs or small groups to create a short and succinct PSA about the need to care for a specific local habitat or a species at risk within a local habitat.

Take Action:

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Note, the suggestions are consistent in each chapter.

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety.

Choose any or all of the 4 suggested videos to view, discuss and to spark an inquiry.

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Possible Discussion Questions:
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    - In this activity, students talk to members of their community about some of the environmental and climate change they have noticed since they were young.

Chapter 2: How Does Climate Change Affect Our World

Inquiry 3: How is Biodiversity Affected by Climate Change Using a Systems Thinking Approach?

- ***Provocation*** *–Poster*
- ***Question Generation*** *– Umbrella Questions*
- ***Knowledge Building*** *– Four Corners*
- ***Determining Understanding*** *– Doodling/Sketching*
- ***Pursuing learning*** *– Adventure Scientists*
- ***Consolidation*** *–Card Sort*
- **Assessment** *– Headlines*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Poster

A good digital **poster** presents information clearly, but doesn't draw on data, as an infographic does.

Example Activity:

Share the following poster from Ingenium's Let's Talk Energy resource with your students. Explore the visuals before deconstructing the text. Notice the use of colours - grey, green, brown, and blue. Explore the different features of this poster, including the text, font, images and backgrounds and have students relay the "story" and information that this poster conveys. What questions emerge from this exercise?

Climate Change and Biodiversity

Biodiversity is about **living things** and their relationships with each other

This includes **species**, **ecosystems** and the **ecological processes** of which they are a part

The **earlier arrival** of spring changes the **life cycles** of many plants that provide food and habitat for other species

Many species won't be able to **adapt** quickly enough to changes in their **environment**

Habitat fragmentation

happens when natural landscapes are broken up by development such as river dams and highways, which can interrupt migration routes

Phenological mismatches

happen when the life cycles of dependent species change and no longer match up

E.g., migratory species arrive at a site after their prey has passed

Northern ecosystems are vulnerable to habitat loss and could see an influx of new species and diseases from the south

More CO_2 in the atmosphere and higher temperatures could lead to **longer growing seasons** for forests

Climate change can cause **Range contraction** when already limited habitats change and shrink further

Habitat destruction

In **prairie ecosystems**, more droughts will likely harm the growth of natural grasslands

Climate change can lead to competition for resources among species, as well as bigger and more frequent **infestation outbreaks**

Wolf + Coyote

Hybridization

is the mixing of different but similar species, and can drive rare species to extinction or increase adaptability

Extreme storms and **rising sea levels** can cause coastal squeeze

Climate change causes harmful algae growth in **marine ecosystems**, which are also at risk of pollution, commercial fishing and wetland drainage

Preservation through adaptation

Protect - nature reserves and marine sanctuaries
Connect - wildlife crossings, bridges and corridors
Restore - selective fishing, animal breeding programs

For the whole Canada in a Changing Climate report, visit **Adaptation.NRCan.gc.ca**

Ingenium | Let's Talk Energy | Canadian Geographic | Canada

Possible Discussion Questions:

- What is the main point of this poster?
- There are many different font types on this poster. Why do you think these different fonts are used?
- What new vocabulary is being introduced and how does the poster help us learn these new words?
- Which plant and animals in your neighbourhood/community could be further affected by climate change?
- How does the poster make you feel?
- How does the information make you feel?
- What actions do you want to take from the information you have learned from the poster?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Begin by creating **Umbrella Questions** to help ground the inquiry.

In the example below, the quotes are from the infographic and the questions are possible ones that stem from the quote. These questions can be used as stated or students can be encouraged to create and ask questions based on the quotes.

Example Activity:

- How is a habitat an example of a system?
- What are some of the problems, caused by climate change, that affect the biodiversity of a habitat?
    - How do each of these problems affect the biodiversity of a habitat?
- "Climate change affects biodiversity"
    - What is biodiversity?
    - How does climate change affect plants and animals?
- "Preservation through Adaptation"
    - What does adaptation mean?
    - What are some of the ways that adaptation can be used to preserve biodiversity?

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Use the **Four Corners** technique to promote listening, verbal communication, critical thinking, and decision-making.

Example Activity:
Generate a [controversial] statement related to the information presented in the poster or from the questions generated in the **Umbrella Questions** strategy. Place 4 choices around the room spaced in such a way that a group of students can come together for a conversation. The choices can be statements such as “strongly agree”, “agree”, “disagree” and “strongly disagree”, or other statements where students need to choose and be able to describe their feelings towards or understandings of.

Examples:

- “The mixing of different but similar species, such as wolf and coyote, will drive the species to become extinct.”
- “Warmer weather is better for birds and animals that depend on plants to survive.”
- “New roads and highways are good for nature as they keep traffic moving, causing less idling time for cars and trucks.”
- Or others...

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

After determining your umbrella questions and participating in the four corners activity, explore this strategy to determine next steps.

Doodling/sketching is a strategy for group mapping of what information is known to date. Watch this video for tips on how and why to use drawings as “powerful effects on learning”.

Example Activity:
Give each group of 3-4 students a piece of blank chart paper and some markers. Ask them to plan and sketch, together as a group, using pictures and some words, their understanding of some of the concepts introduced through the poster. The point is not the quality of the drawings but the students’ abilities to demonstrate knowledge linguistically, visually and kinesthetically.

E. Pursuing Learning: Impacts on the Environment

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Become an **"Adventure Scientist"** who helps active science research by collecting data in the field. Scientists and adventurers, of all ages, spend time in the field collecting valuable data used to make decisions and solve real world problems. Check out their website at the above link.

In partnership with National Geographic Education and Adventure Scientist, students can participate in a schoolyard biodiversity adventure called Ring of Darhad: Mongolia Wolverine Expedition. Below is the link to the specific lesson on schoolyard biodiversity data collection.

Example Activity 1:
Lesson Overview: Become an adventure scientist by exploring the biodiversity of your schoolyard. Use a field journal to plan and prepare for your adventure, collect data in the field, and draw conclusions from your findings. The link takes you to the lesson, including background information, learning objectives and detailed instructions including a reproducible field journal and data collection tables.

Example Activity 2:
Jobs in a biotic community. Students survey a specific habitat, looking for organisms that inhabit that habitat and look for evidence of these organisms doing their "job". **Here is a link** to the lesson from Ecoliteracy.ca

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Using the **Card Sort** strategy, teachers can check for students' understanding.

Example Activity:
Create vocabulary/concept cards, using index cards or blank card stock paper. Students, working in groups of 3, are given a stack of cards with new vocabulary, concepts and ideas on them. Have students sort cards into groups that connect with each other and have students explain their connections. For example: biodiversity - living things - ecosystems - species, these cards can all be connected with an explanation as to how they are connected.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

The **Headlines** routine ensures students summarize what they know and understand in a concise manner.

Example Activity:
Have students write headlines that capture the most important aspect of this topic/issue in this inquiry. Ask, “How does your headline differ from what you would have said yesterday?”

Take Action:

These ideas for action can be utilized at any point in the learning process, whether it’s now or after completing more guided inquiries. Note, the suggestions are consistent in each chapter.

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CHAPTER 3:
How does addressing climate change make us healthier?

A Project of Learning for a Sustainable Future

Contributors Judy Halpern and Lynn Bristoll

Art by Ely Astorga for ArtistsForClimate.org

A project of

Learning for a Sustainable Future

LSF

Supported by Natural Resources Canada's Building Regional Adaptation Capacity and Expertise (BRACE) Program

Ressources naturelles Canada | Natural Resources Canada

Canada

Chapter 3. How Does Addressing Climate Change Make Us Healthier?

This inquiry explores sensitive material. It explores the connection between climate change and many facets of human health. We have included resources, activities, and information to inform educators of the serious and widespread effects that climate impacts have on physical and mental health across Canada. This inquiry also invites students to reflect and consider their own health in the face of these serious climate changes. We explore how many of the actions to reduce greenhouse gas emissions also have the co-benefit of improving our health.

Through open-ended discussion probes, thoughtful provocations, and several hands-on activities, this inquiry provides multiple directions for educators to take as human health and climate change are explored side by side.

Art by Ely Astorga for ArtistsForClimate.org

Before you Begin: Background Information for Educators

In order to help you have conversations with your students about how they are feeling about the existential threats of climate change, we recommend several additional resources to consult. Before feeling ready to create a safe space where students can explore issues of climate change, you should feel supported and informed with the help of expert voices on the subject. Here is a list of both theory and practices from some of the leading voices in this field:

Theory

- Jennifer Atkinson - Facing It (Climate grief podcast)
- Sophy Banks - Transition Town: What is 'Inner Transition' (video)
- Dr. Avivit Cherrington - Global Education (Episode 17): How Children Experience Hope (podcast)
- Leslie Davenport - Emotional Resiliency in the Era of Climate Change
- Bob Doppelt - Transformational Resilience
- Katie Hayes - 5 Ways Communities are Coping with Climate Anxiety (article)
- Rob Hopkins with Lise Van Susteren - Pre-Traumatic Stress Disorder & The Imagination (podcast/article)
- Renee Lertzman - How to turn climate anxiety into action (TedTalk)
- Panu Pikhala - Climate Anxiety
- Sarah Jaquette Ray - Teaching Climate Change. (video)
- Espen Stoknes - How to transform apocalypse fatigue into action on global warming (video)

Practices

- Jennifer Atkinson - Emotional Impact of Climate Change (video)
- Climate Therapy Alliance - Emotional Resilience Toolkit for Climate Work
- Leslie Davenport - Climate Psychologist on using guided imagery (radio interview/article)
- Panu Pikhala - Spectrum of ecological emotions activity (activity)
- David Selby and Fumiyo Kagawa - Unleashing Blessed Unrest - Climate Change Despair and Empowerment (article)
- Dr. Lise Van Susteren's Resources: Climate for Health
- Anuradha Rao - One Colour People of Colour Protecting our Planet (book)
- Harriet Rohmer - Heroes of the Environment True Stories of people who are helping to protect our environment (book)
- Professor Fikile Nxumalo (research)

The climate is changing at a rapid rate, and this change continues to have implications for human health in a profound way. It is important to consider human health as more than simply the absence of disease; human health is a multidimensional framework that encompasses mental, physical and emotional well-being as equal contributors. Climate change has both direct and indirect implications for mental health and psychosocial well-being. Overall, recent studies have found that Canadians are increasingly experiencing mental health conditions and

symptoms related to the effects of climate change. As well, in terms of the impacts on physical health, “Climate change is already impacting health in a myriad of ways, including by leading to death and illness from increasingly frequent extreme weather events, such as heatwaves, storms and floods, the disruption of food systems, increases in zoonoses and food-, water- and vector-borne diseases, and mental health issues” (WHO, 2021). In order to properly address the urgency of climate change in Canadian classrooms within a health and well-being framework, it is important to understand the impact of climate change on all facets of human health.

Educating students about the health-related effects of climate change is critical due to the close link between comprehending and acting on climate change. Psychological Research and Climate Change showed that people are better able and more motivated to act on climate change solutions when they can relate information and solutions to their own health and well-being or local environment.

There are many additional factors that can affect an individual’s or region’s susceptibility to the negative physical effects of climate change including: geographic location, the presence of pre-existing illness or disability, and inequalities (socioeconomic, demographic, education level, economic status and age).

Physical Health

The Public Health Agency of Canada has classified physical health risks as a result of climate change into five categories: temperature-related morbidity and mortality, weather-related natural hazards, air quality, water- and food-borne contamination, and health effects of exposure to ultraviolet rays. Some health effects can be directly linked to concrete climate events like natural disasters (droughts, floods, storms), but other changes are more gradual. (Health Canada)

Temperature-related morbidity and mortality: periods of higher than normal heat and the numbers of days per year above 35 degrees Celsius are multiplying and, on this trajectory, will continue to do so throughout the next century, causing:

- respiratory and cardiovascular illnesses
- increased occupational health risks

Weather-related natural hazards: climate change is increasing both the severity and frequency of natural hazards throughout Canada which can cause:

- damaged public health infrastructure
- injuries and illnesses
- social and mental stress
- increased occupational health hazards
- population displacement

Air quality issues: cars, planes and industrial facilities are causing air pollution and it is being intensified by warmer temperatures, causing:

- increased exposure to outdoor and indoor air pollutants and allergens

- respiratory diseases
- cancer, heart attacks, strokes
- other cardiovascular diseases.

Water-borne contamination and food safety: climate change causes increased precipitation, storm surges, and water temperatures which can contribute to flooding and runoff that can spread sewage, chemicals, diseases, bacteria, and toxic algae. Climate change can also put food safety at risk due to changing environmental and social conditions that increase the likelihood of contamination.

Health effects due to exposure of ultraviolet rays: Increased UV exposure poses a high risk and has the potential to cause:

- skin damage and increased risk of skin cancer
- cataracts
- disturbed immune function

Mental Health

Mental health is influenced in many ways by climate change, both directly and indirectly, and it can have both acute and chronic impacts on human health. Chronic mental health impacts can be less obvious than in physical illness, but no less important. Individuals may experience fear and feelings of helplessness that can manifest into serious mental health conditions such as post-traumatic stress disorder, anxiety, depression, grief, substance abuse disorders, and others.

Acute mental health consequences often occur as a reaction to a natural disaster which has caused damage to infrastructure, food systems, medical services, transportation, home and belongings, or loved ones. Natural disasters can cause or exacerbate stress, and the psychological effects can be profound and long-lasting.

Chronic mental health consequences can occur as a result of gradual climate changes. Feelings of powerlessness, despair, and constant worry about the future of the planet, one's own health, and that of future generations have been termed "eco-anxiety."

According to Mental Health and Our Changing Climate, both acute and chronic mental health effects can include:

- Anxiety
- Depression
- Post-traumatic stress disorder
- Compounded stress
- Loss of personal and occupational identity
- Feelings of fatalism and helplessness
- Trauma and shock

Click here for an in-depth look at the specific impacts of climate change on mental health.

It is crucial to be informed about and cognizant of students' mental health when addressing climate change in the classroom. There are clear risks associated with catastrophizing the problem and leaving students feeling helpless or solutionless. However, when the emphasis is placed on taking action against climate change, the impacts on mental health can be positive rather than negative. Encouraging students to make lifestyle choices that benefit the environment or taking collective action can curtail some of the negative effects of climate change. According to the American Psychological Association, "climate solutions not only improve the quality of air and food but also enhance our cognitive abilities and strengthen our mental health."

Learn more about the relationship between Mental Health and Climate Change by reading Mental Health and Our Changing Climate

Health of Canadians in a Changing Climate

This chapter offers 3 different structured and scaffolded inquiries to support ideas associated with "How Does Addressing Climate Change Make Us Healthier?" Each of the 3 inquiries begin with a provocation followed by numerous strategies and examples.

These steps can be completed in their entirety as stated. However, as inquiry is an organic and fluid process based on student input, educators may wish to adapt, modify or replace the suggested steps to create their own inquiry with their class. We therefore suggest that teachers review the whole chapter first in order to create a plan that will work best with their particular group of learners.

The following 3 inquiries are connected to curricular concepts as shown in this chart. These curricular concepts are applicable across Canada.

Curricular Connections	**Concepts**
Science	Living things Ecosystem Protection Habitats Sustainability Survival Changes Environment
Language	Critical literacy Communication Retelling
Physical Education and Health	Motor skills Locomotor Cooperation Relationships

	Choice Self-awareness
The Arts	Creativity Innovation Interpretation Colour Space

Inquiry 1: Impacts on Health - Campaign for Vitamin N (*"N" for nature)*

"Vitamin N (for "nature") is a concept coined by Richard Louv, author of the book of the same name. This book and concept is a complete prescription for connecting with the power and joy of the natural world right now, with: activities, informational websites, an abundance of down-to-earth advice, and dozens of thought-provoking essays." (*"Vitamin N* (for "nature"), Richard Louv, 2016).

Resources:

- Access to the Internet
- Art supplies for poster making activity

Inquiry 2: Impacts on Health - Sustainable Health, Well-being and Zero Hunger

"Well-being is a feeling of satisfaction with life, a state characterized by health, happiness, and prosperity. Good health concerns the care of the human body and everything that can be done to protect it from sickness and intoxication and enable access to care" (UNESCO, 2021).

- SDG Resources for Educators: Good Health and Well-Being
- SDG3: Health & Well-being [Barcelona Institute for Global Health, ISGlobal]

"**Hunger** is an alarm signal sent by the body when the stomach is empty and the blood sugar level decreases. Malnutrition occurs when the body adapts to the prolonged absence of food, losing weight and functioning more slowly." (UNESCO, 2021).

- Primary: SDG 2: Zero Hunger [MAPFRE]
- Junior: SDG 2: Zero Hunger [MAPFRE]

Resources:

- Access to the internet
- Poster of the Sustainable Development Goals
- Large gym or outdoor field for active game

Inquiry 3: Impacts on Health - Prescription for a Water-healthy Community

“The 2030 Agenda for Sustainable Development provides a global blueprint for dignity, peace and prosperity for people and the planet, now and in the future. A few years into the Agenda, we see how civil society, private sector, and governments are translating this shared vision into national development plans and strategies” (United Nations, 2020)

Resources:

- Access to the internet
- Cardstock paper and colouring implements for each child to make a pair of Global Glasses (The Worlds Largest Lesson, 2020).

Chapter 3: How Does Addressing Climate Change Make Us Healthier?
Inquiry 1: Impacts on Health - Campaign for Vitamin N

- ***Provocations*** – *Image Impressions*
- ***Question Generation*** – *See Think Wonder*
- ***Knowledge Building*** – *Knowledge Building Circle*
- ***Determining Understanding*** – *Posters*
- ***Pursuing Learning*** – *Surveys, Sit Spots*
- ***Consolidation*** – *Campaign Poster*
- **Assessment** – *Choice Board*
- ***Take Action***

"Vitamin N (for "nature") is a concept coined by Richard Louv, author of the book of the same name. This book and concept is a complete prescription for connecting with the power and joy of the natural world right now, with activities, informational websites, an abundance of down-to-earth advice, and dozens of thought-provoking essays" (Vitamin N, Richard Louv, 2016).

A. Provocations

To hook student interest, choose one or more of the provocation ideas to initiate student thinking.

Image Impressions

Pollution exists in many forms. There is air pollution, water pollution, terrestrial (land - litter, plastic) pollution, noise pollution, and light pollution to name a few. Search for images that depict the harmful treatment of nature. Below are some [creative commons] examples (Click the photo to access the source url).

(© id-iom, 2011 retrieved from: https://www.flickr.com/photos/id-iom/5842280154/)

Print off the images (or find your own to print), stick each one on a piece of chart paper, and mount them around the classroom so that students have space to walk around, think about what they see, and respond. This activity is best done in silence with students looking at the pictures as they would in a **Gallery Walk,** viewing the images, and writing their reaction to the image or interpretation of what they think the image is saying directly onto the chart paper surrounding the image. They can use words or drawing to demonstrate their feelings towards the images. Allow enough time for students to look and respond thoughtfully.

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Once the gallery walk is complete allow students time to read or discuss the reactions written on the papers.

During the **See, Think, Wonder** routines students share their thinking.

Example Activities
Option 1:
Working in pairs, each group of students receives a **See, Think, Wonder worksheet.** Ask each pair to choose a particular image to respond to. Once students have a chance to discuss with a partner what they 'think' and what they 'see' when looking at the image, students work together to come up with a list of questions that they 'wonder' about when looking at the image. These wonderings can then be collated and the class can choose questions to drive the inquiry on understanding Vitamin N.

Option 2:
Have each student make a "picture frame" by cutting out a frame shape from a heavy stock boxboard (old cereal box) or use popsicle sticks glued into a picture frame shape. Take students on a simple walk in the schoolyard to capture nature's beauty. When students find something in nature that they think is beautiful, have students lay their frames over the object or scene. They can share their captures using another **Gallery Walk** or they can use a device to photograph their capture to bring back into the classroom.

Generate questions on the captures that students find. Here is a resource to help:
Activities for Teaching Children to Ask and Answer Questions

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge-building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process. Engaging in a class **Knowledge Building Circle** (ideally outside if possible) is a good opportunity to delve deeper into the topic of human health and encourage participation from many students in the classroom. Find your way into a circle where everyone can see one another and if this is your first knowledge-building circle, make sure that everyone understands their role in the circle. You could pose some guiding questions to the group and mediate the conversation as required. It is a good idea to take notes throughout the discussion or otherwise record the experience to refer to when gauging students' growth in understanding.

Example Activity:
What is vitamin N? According to Richard Louv, author of many books including **Last Child in the Woods** and **Vitamin N** there are 10 reasons why children and adults need Vitamin N.

1. **The more high-tech our lives become, the more nature we need.**
2. Humans are hard-wired to love and need exposure to the natural world.
3. We suffer when we withdraw from nature.
4. **Nature brings our senses alive.**
5. Individuals and businesses can become nature smart.
6. **Nature heals.**
7. Nature can reduce depression and can improve psychological well-being.
8. **Nature builds community bonds.**
9. **Nature bonds family and friends.**
10. The future is at stake.

Looking at this list of 10 reasons why adults and children need a healthy dose of Vitamin N, choose up to 5 reasons (bolded ones are our suggestions to focus on with students in grades 3-6) to be at the centre of your knowledge building.

Using a **Knowledge Building Circle**, explore these statements to allow students to express their understanding and build their knowledge around the importance of nature for health and well-being. Students may find that they want to share stories about their experiences in nature and how those experiences impacted them.

Possible knowledge-building circle questions:

- How do you feel when you are outside?
- What is your favourite place to be? Why?
- When is your favourite time to be outside?
- Do you feel different when you are inside?

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Students choose one of the statements from Richard Louv's list of 10 reasons why adults and children need Vitamin N and create a poster to support that reason. The poster should be focused on a good slogan and clearly show, through text and drawings, the message you want to convey. Examples of slogans:

- Put Down the Screen and Go Outside
- Screen Time vs Green Time
- Go Wild - Spend Time in Nature
- Love Your Mother (Nature)
- Nature Each Day Keeps the Doctor Away

- Just Do It! Get Outside!
- Give a Hoot, Don't Pollute
- Do Your Share for Cleaner Air

Here are two examples of posters to promote an "anti-idling" campaign. Ask students to consider how the message is being conveyed. There is little text, but drawings and symbols also send the message. Have students make rough drawings of their posters and incorporate these techniques to make their message understood.

This site shares the Advantages of Posters in Education and suggests 6 attributes that a quality poster should contain. This could help in developing the success criteria with the students.

Possible Discussion Questions:

- What does idling mean? Why is this a problem?
- What do you think each symbol on the posters means?
- Why is there a dollar sign on the poster?
- How does the use of capital letters and/or colour help make the point?

E. Pursuing Learning: Impacts on Health

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Students will continue their exploration of health and climate change. If there is interest, the activities listed below offer deliberate, focused opportunities for students to pursue learning about physical and mental health-related impacts and responses to climate change.
Example Activity: Create a **Survey** so that students can investigate what knowledge the public (their community) has about the impacts on health due to climate change. Students can survey through:

- Observations (e.g., during school drop off and pick up times, have students tally the number of cars and buses that idle while waiting for students, observe how peers

deal with their garbage, recyclable and compostable items during lunch and snack times)

- Interviews (e.g., students create questionnaires and interview members of the school community, their parents and friends).
    - They can ask questions about simple environmental actions that promote good health, how people use nature or feel about being in nature
    - Or they can ask people about their knowledge of environmental problems (such as air pollution, light pollution, use of plastics, etc.) that contribute to climate change.

The results of these surveys can then be used to help direct students' campaigns promoting the importance of Vitamin N and good behaviours that promote positive environmental actions.

Mental Health Break:
To get their own healthy dose of Vitamin N (particularly if students are feeling overwhelmed), spend time outside in a natural space. Learn how to do **Sit Spots** outside as a coping, relaxation strategy as well as a learning activity. Start with one minute and increase the time every day or week. At school, travel outside as a class with their Sit Upon, a mat or bag to sit on that will keep them dry. Try to find a place that your class can revisit on a regular basis, perhaps every week or every month. Encourage students to sit a minimum of two metres apart and invite them to quietly observe what is around them, do some breathing exercises or just to relax and enjoy their surroundings.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Using all of the information from the inquiry up to this point, students create a campaign to promote the importance of Vitamin N. A campaign is an "organized course of action to achieve a goal" (Oxford Language Dictionary, 2022). The goal is to spend more time in nature to increase our exposure to Vitamin N.

A campaign has more than just a poster to promote your ideas, it also needs a plan. Students will choose an action that gets people outside more often.

Click here to see some examples of a successful campaign from the company Stihl's "Get Real" Campaign.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

The **Choice Board Strategy** incorporates the principles of Universal Design Learning (UDL) by encouraging multiple means of expression. Students choose a mode from the choice board (see sample below) to present their understanding of their learning.

Choice Board Strategy Example guiding questions:

- How does addressing climate change also help improve our health?
- What climate solutions are also healthy lifestyle choices?
- Why is being in nature important for the health of living things?
- What can we do to help our environment?
- What is a healthy lifestyle?
- Does everyone have the accessibility and opportunity to have a healthy lifestyle?
- What factors may influence a healthy lifestyle?

Sample Choice Board

Create a Bumper Sticker	Tell an Oral Story	Make an Announcement
Draw a Picture	**FREE CHOICE**	Think like a plant
Make Music (any materials)	Sing a Song	Use Recycled Materials to Make a Model

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety.

Ask the students what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place. Use the choice board activities the students chose to share information with other classes or the community.

While the future is uncertain, there are many examples of positive actions happening all around the world, and too often these stories do not get media coverage (check out The Happy Broadcast to get some good news for a change!).

Finding actions that students can get involved in is paramount and in the subsequent thematic inquiries, there are many examples of school projects and activities. As we collectively oscillate between optimism and outrage, stories of the past can also be important for active hope pathways.

Ideas for Taking Action:

- A ready-made vehicle idling campaign (NRCAN, 2015)
- Create their own anti-idling or idle-free posters for their community. Catalogue of Potential Idling Reduction Campaigns (NRCAN, 2015)
- Educate the school through different announcements sharing "waste and water facts". Post the garbage collection graph on the wall outside the classroom. Do a second schoolyard garbage audit a month later. Put the second graph on the wall. Celebrate successes.
- How to Help the Earth By The Lorax by Tish Rabe, illustrated by Christopher Moroney and Jan Gerardi
    - Please note: LSF supports the removal of other Dr. Suess materials that have been discontinued because of anti-Black and anti-Asian racism.

Create some announcements to share with the school.

- **Play the Freerice game from UN World Food Programme**
    - Global hunger is one of the most pressing social issues, but it's also the most solvable. **Freerice** is a free online educational trivia game where people of all ages can do their part—simply by playing. Every right answer on Freerice triggers a real financial donation to the UN World Food Programme (WFP) from sponsors worth about 10 grains of rice.
    - The game has five difficulty levels and over 20 categories of questions to choose from, such as English vocabulary, Languages, Science, Humanities, World Landmarks, and a new category called "Coronavirus: Know the Facts."
    - Use your time and knowledge to help provide food for people in need. The game is available online at freerice.com or as a free app in the android or iOS app stores.
- UN Climate Action Superhero: Become a "Veggie Vindicator"
    - "Educate everyone on why to eat - and appreciate - eating more veggies".

        - Collect non-perishable food for your local Foodbank at different times of year.
        - Host a local food festival showcasing local and nutritious foods that come within a certain distance from your community
        - Start a Meatless Monday campaign at your school challenging students to eat more plants

- Become a Water Wizard! A water wizard "keeps dangerous plastics from getting into the ocean and makes sure you don't let water go to waste".
    - Create a Campaign for World Water Day (March 22) or World Water Week (the week of March 22).

- 14 Ways You Can Help the Earth…Starting Now (CBC).

- Plan and Promote Participation in The Great Gulp (raising awareness about drinking water and single-use plastic bottles).

- Join the Changemaker Classroom and commit to a Changemaker Project where 1 global goal is selected and a local action project is implemented.

- Select one of the UN Goals and one or more of the suggestions on the "World's to do" list to act on.

- Create, advertise and promote your own "day" related to one of the SDG goals such as World Toilet Day that brought attention to sustainable water sanitation and climate change.

    - Students can choose to download the "SDG in Action" app onto their phones at https://sdgsinaction.com/ to learn more about any of the 17 goals, find out what can be done and then create or join an action team.

- Create a plant-based cookbook, collecting recipes from families in your school. Sell the cookbook as a fundraiser and donate the money to a local Foodbank.

Action Project Examples

How could you use these great examples to come up with action projects with your students?

- Feeding Our Community - Ruth Betts Community School - Flin Flon, MB (2019)
    - Students at RBCS built a community garden to increase the availability of affordable fresh produce. Students acquired the knowledge to build, grow, and harvest their own fresh fruit and vegetables and how to utilize them in daily meals and snacks. The garden contains a plant medicine wheel, ceremonial plants, and a three sisters garden, incorporating traditional knowledge. See their project here.
- VegFest - E.L. Crossley Secondary School, Pelham, ON (2016)

    - E.A.R.T.H. club members at E.L. Crossley hoped to inform their fellow students about the positive impacts a plant-based diet can have on the future of our planet. Students organized a week of veggie-friendly events with the support of various local community partners. The week's events included a vegan cooking class with a local natural chef, a screening of the documentary Cowspiracy, a smoothie day, vegan salad bar extravaganza, cafeteria games, and a vendor day. VegFest received an overwhelmingly positive response and high levels of student participation each day. See their project here.
- Connect with Nearby Nature - Ecoschools Canada
    - "Nature" is often understood as a place far away from human involvement. However, humans exist within natural systems all the time, even in urban environments! The **Connect with Nearby Nature** action incorporates outdoor, environmental learning to foster relationship-building between people and place, including all the more-than-human others who also call that place home. Students will get to know their ecological neighbours by practicing inquiry, observation, identification, research, and communication skills to build their own nature-connections and knowledge, and share learnings with their communities. Specifically, this action involves the creation of **field guides**, **maps**, or **outdoor signage**. See resources and details here.

- Daily Actions to Make a Difference
    - This resource offers a page of ideas for each of the 17 UN Sustainable Goals. Students can get inspired by the suggestions offered and select some they can follow to make a difference in the world.
      170 Daily Actions to Transform the World

Chapter 3: How Does Addressing Climate Change Make Us Healthier?
Inquiry 2: Impacts on Health - Sustainable Well-Being and Food Security

- ***Provocations*** – *Videos, game*
- ***Question Generation*** – *See Think Wonder*
- ***Knowledge Building*** – *Book, "Getting Critical": Digging Deeper*
- ***Determining Understanding*** – *Stop and Think*
- ***Pursuing Learning*** – *Research*
- ***Consolidation*** – *Guided Reading, Drama*
- **Assessment** – *I Used to Think… Now I Think*
- ***Take Action***

"**Well-being** is a feeling of satisfaction with life, a state characterized by health, happiness, and prosperity. **Good health** concerns the care of the human body and everything that can be done to protect it from sickness and intoxication and enable access to care" (UNESCO, 2021).

- SDG Resources for Educators: Good Health and Well-Being
- SDG3: Health & Well-being [Barcelona Institute for Global Health, ISGlobal]

"**Hunger** is an alarm signal sent by the body when the stomach is empty and the blood sugar level decreases. Malnutrition occurs when the body adapts to the prolonged absence of food, losing weight and functioning more slowly." (UNESCO, 2021).

- Primary: SDG 2: Zero Hunger [MAPFRE]
- Junior: SDG 2: Zero Hunger [MAPFRE]

A. Provocation

To hook student interest, these videos introduce the UN's Sustainable Development Goals (SDGs) and help students focus on goal #2 Zero Hunger and goal #3 Good Health and Well-being. Watch all of these videos before playing the game called **The Food Security Budget Game**.

Videos

Malala Introducing the World Largest Lesson (6:19 minutes)
The World's Largest Lesson Introduced by Malala Yousafzai. This introductory video explains the global goals in terms that young children can understand.

SDG3: Health & Well-being (2:23 minutes, suitable for grades 5 and up)
The Sustainable Development Agenda including SDG 3 is about ensuring healthy living, fostering well-being for all people at all ages and promoting indicators to monitor progress. This can only be achieved through local action.

Good Health and Well-Being Goals (3:01 minutes, suitable for grades 4 and up)
This simple show explains the good health and well-being goals in a nutshell.

Understand Goal 3: Good Health and Well-Being (1:56 minutes, suitable for grades 4 and under)
An introduction to goal 3 for primary students.

Every Plate Tells a Story (2:05 minutes)
From healthy eating to reducing wastage, eliminating plastic packaging, sourcing closer to home and checking on the practices of food producers, children will roll up their sleeves and dig into Goals 2, 3, 13, 14, and 15 (The Worlds Largest Lesson, Every Plate Tells a Story, 2020).

Game: Food Security Budget Game
Review the definitions provided within the link with students. There are several "think and answer" questions on page 4 that you might choose to share with your class and can be modified based on the province or territory where the students live. Decide whether you would like students to work individually or in a group and hand them a "Food Security Budget Activity" worksheet from page 7. The directions are provided on page 5 so that the class can play one or more games.

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

The **See Think Wonder** routine encourages students to make careful observations and make thoughtful interpretations. It helps to stimulate curiosity and set the stage for inquiry.

Example Activity 1:
After watching the video **Every Plate Tells a Story** have students dive into their lunchboxes to analyze their food choices. Use the See, Think, Wonder strategy to explore where (in the world) their food has come from and how it got to their lunchbox! How many questions can they generate about each item?

and/or

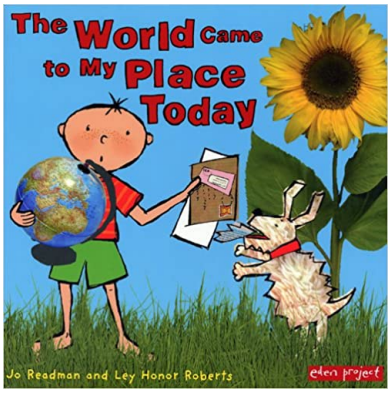
Example Activity 2:
After watching the video **Every Plate Tells a Story**, have students participate in a group 'lunchbox' analysis. Using a simple cardboard box, create a "lunchbox" using pictures from grocery store flyers for each group of 4-5 students. Instruct students to cut out up to 10 pictures of their favourite foods, filling their "lunchbox" with images. Once filled, students work together to sort the food into groups (criteria to be determined by the teacher and grade level of the students). Suggestions for sorting criteria: using Canada's Food Guide (available in 31 languages including 10 of Canada's Indigenous languages), where the food originates, seasonal availability, or processed or not processed to name a few. From these images, have students generate questions they could ask their local grocery stores about sourcing

local foods. For example: when purchasing fruit that is in season in Canada, such as apples in the fall, why do grocery stores still carry apples from Mexico?

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Book: ***The World Came to My Place Today*** by Jo Redman, illustrated by Ley Honor Roberts



The world really does come to visit George when his grandpa arrives, with a globe, to look after him and his sister for the day. Grandpa explains how everything from the cereal they eat for breakfast and the chocolate bars they love, to the rubber in their bicycle tyres and wood in their toys, come from plants all over the world.

The slideshare version can be downloaded from **a Scribd company**.

Example Activity:
This storybook explores where our food comes from and how it gets to our plates. After sharing the story, using the **Change for Children**'s resource called **The Wonderful World of Food**, dig into global food facts and then use the "Getting Critical" exercise to investigate food security, scarcity and fair trade issues.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Ask students to cut out pictures of food that would make up one of their typical meals and

put them together on a plate. Using the poster that they will already be familiar with from the Question Generation section, **Every Plate Tells a Story** (appendix B in World's Largest Lesson's resource), have students "STOP AND THINK" and make connections to the other global goals by asking themselves the questions:

- Who grew or helped produce my foods?
- How far did my food travel to get to me?
- What was my food packaged in?
- Am I making healthy choices?
- How much food am I wasting?
- What can I do differently and who can I tell?
- What is the ecological footprint of the food I eat?

From these images and with the knowledge they've gained through this inquiry so far, have students try to create a balanced meal that has the smallest ecological footprint using the GreenEatz Food Carbon Footprint Chart.

E. Pursuing Learning

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

This is an opportunity to make some local connections to grocery stores that could lead to action. Investigate the "Ugly Food" or "Misfits" movement. This is a movement towards embracing food that doesn't look perfect but is perfectly good to eat.

"In Canada we waste nearly as much food as we eat. Approximately 30 percent of that food is fresh fruits and vegetables—25 million pounds—rejected before it reaches the distributors, stores and our plates. The desire for "perfect", unblemished produce means perfectly edible food gets tossed simply because it's not pretty enough. Consumers rarely even see curvy carrots, bulbous potatoes, or twisted zucchini because of supermarket restrictions based on strict inspection regulations governed by the Canadian Food Inspection Agency (CIFA)" (Holly Brooke, "Fight Food Waste, Eat Ugly Vegetables," Eat Magazine, 2015).

Connect with your local grocery stores to see how they deal with "ugly food" and food waste. Here are some other resources to the movement:

- Canada is Warming up to Ugly Vegetables (Vice, 2016)
- Ugly Food Works - and you can get it for 30% less (Global Citizen, 2016)
- Meet the Misfits - Ugly Food (Radical Health, 2018)
- The Imperfect Garden by Melissa Assaly

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Guided Reading of the graphic story **The Rise of the Plate PioneerZ** written by Joe Reiter with support of the World's Largest Lesson and UNICEF. As a class or in small groups, read the story and complete the activity sections at the back of the comic. Have students, working in small groups, take part in a drama activity where they act out the dialogue in the graphic story. Students can improvise additional dialogue to enhance the story.

After reading and/or the drama activity, facilitate a classroom discussion on a definition of a Plate Pioneer to check understanding. This activity comes from the **Plate PioneerZ** resource.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

The **I Used to Think… Now I Think…** routine helps students to reflect on their thinking.

Example Activity:
Using some of the following sentence starters, have students complete the **I Used to Think… Now I Think**

- Unemployed people are food insecure
- Food securities affect only senior citizens
- People who are food insecure are bad at cooking
- People who are food insecure budget poorly and make unhealthy food choices
- Healthy food is cheaper than junk food
- There is nothing I can do to help food security issues in my community

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety.

Ask the students what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place. Use the choice board activities the students chose to share information with other classes or the community.

While the future is uncertain, there are many examples of positive actions happening all around the world, and too often these stories do not get media coverage (check out The Happy Broadcast to get some good news for a change!).

Finding actions that students can get involved in is paramount and in the subsequent thematic inquiries there are many examples of school projects and activities. As we collectively oscillate between optimism and outrage, stories of the past can also be important for active hope pathways.

Ideas for Taking Action:

A ready-made vehicle idling campaign (*NRCAN, 2015)*

Create their own anti-idling or idle free posters for their community.
Catalogue of Potential Idling Reduction Campaigns *(NRCAN, 2015)*

Educate the school through different announcements sharing “waste and water facts”. Post the garbage collection graph on the wall outside the classroom. Do a second schoolyard garbage audit a month later. Put the second graph on the wall. Celebrate successes.

How to Help the Earth By The Lorax - Read Aloud

Create some announcements to share with the school.

- **Play the Freerice game from UN World Food Programme (WFP)**
    - Global hunger is one of the most pressing social issues, but it’s also the most solvable. **Freerice** is a free online educational trivia game where people of all ages can do their part—simply by playing. Every right answer on Freerice triggers a real financial donation to the UN World Food Programme (WFP) from sponsors worth about 10 grains of rice.
    - The game has five difficulty levels and over 20 categories of questions to choose from, such as English vocabulary, Languages, Science, Humanities, World Landmarks, and a new category called “Coronavirus: Know the Facts.”
    - Use your time and knowledge to help provide food for people in need. The game is available online at freerice.com or as a free app in the android or iOS app stores.
- UN Climate Action Superhero: Become a “Veggie Vindicator”
- “Educate everyone on why to eat - and appreciate - eating more veggies”.
- Collect non-perishable food for your local Foodbank at different times of year.
- Host a local food festival showcasing local and nutritious foods that come within a certain distance from your community

- Start a Meatless Monday campaign at your school challenging students to eat more plant
- Become a Water Wizard! A water wizard “keeps dangerous plastics from getting into the ocean and makes sure you don’t let water go to waste” (UN, 2020).
- Create a Campaign for World Water Day (March 22) or World Water Week (the week of March 22) (Ecoschools, 2017).
- 14 Ways You Can Help the Earth…Starting Now (CBC).
- Plan and Promote Participation in The Great Gulp (raising awareness about drinking water and single-use plastic bottles) (Ecoschools, 2021).
- Join the Changemaker Classroom and commit to a Changemaker Project where 1 global goal is selected and a local action project is implemented (The Changemaker Classroom).
- The Worlds To Do List: Select one of the UN Goals and one or more of the suggestions on the “to do” list to act on.
- Create, advertise and promote your own “day” related to one of the SDG goals such as World Toilet Day that brought attention to sustainable water sanitation and climate change (UN, 2020).
- Students can choose to download the “SDG in Action” app onto their phones to learn more about any of the 17 goals, find out what can be done and then create or join an action team.-based foods
- Create a plant-based cookbook, collecting recipes from families in your school. Sell the cookbook as a fundraiser and donate the money to a local Foodbank.

Action Project Examples

How could you use these great examples to come up with action projects with your students?

- Feeding Our Community - Ruth Betts Community School - Flin Flon, MB (2019)
    - Students at RBCS built a community garden to increase the availability of affordable fresh produce. Students acquired the knowledge to build, grow, and harvest their own fresh fruit and vegetables and how to utilize them in daily meals and snacks. The garden contains a plant medicine wheel, ceremonial plants, and a three sisters garden, incorporating traditional knowledge. See their project here.
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    - E.A.R.T.H. club members at E.L. Crossley hoped to inform their fellow students about the positive impacts a plant-based diet can have on the future of our planet. Students organized a week of veggie-friendly events with the

support of various local community partners. The week's events included a vegan cooking class with a local natural chef, a screening of the documentary Cowspiracy, a smoothie day, vegan salad bar extravaganza, cafeteria games, and a vendor day. VegFest received an overwhelmingly positive response and high levels of student participation each day. See their project here.

- Connect with Nearby Nature - Ecoschools Canada
    - "Nature" is often understood as a place far away from human involvement. However, humans exist within natural systems all the time, even in urban environments! The **Connect with Nearby Nature** action incorporates outdoor, environmental learning to foster relationship-building between people and place, including all the more-than-human others who also call that place home. Students will get to know their ecological neighbours by practicing inquiry, observation, identification, research, and communication skills to build their own nature-connections and knowledge, and share learnings with their communities. Specifically, this action involves the creation of **field guides**, **maps**, or **outdoor signage**. See resources and details here.

- Daily Actions to Make a Difference
    - This resource offers a page of ideas for each of the 17 UN Sustainable Goals. Students can get inspired by the suggestions offered and select some they can follow to make a difference in the world.
      170 Daily Actions to Transform the World

Chapter 3: How Does Addressing Climate Change Make Us Healthier?

Inquiry 3: Impacts on Health: Prescription for a Water-Healthy Community

- ***Provocations*** – Video*, 2 Stray, 1 Stay*
- ***Question Generation*** – *D*iscussion questions
- ***Knowledge Building*** – Jigsaw
- ***Determining Understanding*** – Read Aloud
- ***Pursuing Learning*** – Home Water Audit
- ***Consolidation*** – Graphic Story
- **Assessment** – Poster Making
- ***Take Action***

"The 2030 Agenda for Sustainable Development provides a global blueprint for dignity, peace and prosperity for people and the planet, now and in the future. A few years into the Agenda, we see how civil society, private sector, and governments are translating this shared vision into national development plans and strategies." (UN: Why the SDG's Matter)

A. Provocation

Videos

As a whole class, watch either the first video here Clean Water & Sanitation (Primary), United Nations SDG6 Explained! geared more for grades 3 and 4, or the next one suitable more for grades 5 and 6, Clean Water & Sanitation (Secondary) in order to get students thinking about water and how it's used everywhere to sustain life and remain healthy. This is also a great introduction to the UN's Sustainable Development Goal #6 of the same name. If you'd like to show more than one video to promote thinking on water another video is United Nations SDG6 Explained!, and SDG Goal 6 Explained: Clean Water & Sanitation

Next, working in groups of 3, have students discuss their thoughts about the importance of water and then record the uses of water on a sheet of chart paper. The chart paper should be divided in half with one side showing personal water use and the other side displaying uses of water outside of their homes, within their community and beyond. Students can look through any print resources available on the topic as well as explore the internet to add to their work.

Have students assign each member of the group a number 1, 2 and 3. Gauge student progress to determine how long to provide for the class to record their thoughts and what they have quickly found through briefly researching. When they have had sufficient time to record, conduct the **2 Stray 1 Stay** strategy.

B. Question Generation

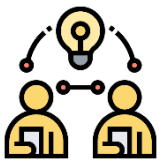
At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Example Activity:
To keep students engaged in knowing and thinking more about water, share the 10 slides from Nasa Kids 10 Interesting Things About Water as well as the video Water: Looking After Our Planet.

Students should independently record questions they have that they will ask their peers in preparation for the next step. Assign students into 2 large groups and have them share and respond to student-generated questions using the "**Harkness Discussion Method**".

The teacher begins with an example to demonstrate the strategy. Below are some suggested questions. They may be useful to have handy throughout the inquiry to guide students in their understanding of water importance and its risks, based on the information gained through the provocation and conversation to date.

- How does water keep you healthy?
- At home, where do you get your water from? How is it cleaned before you drink it?
- At school, where does the water come from? Is it cleaned differently than at home?
- What would you do if there was a drought in your community or something that happened to the source that supplies water to your house?
- How do we take water for granted?
- How do you show respect for water?
- Do you think we will always have water available for human use? Why or why not?
- Can you think of places where we might be able to recycle water?
- Have you experienced any issues with clean water in your community? Have you heard of water problems elsewhere in Canada? In the world?



C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Divide the class into groups of 5 and use the **Jigsaw** method to explore the various water resources.

Example Activity:
The following offers 5 links to water information. Each jigsaw group (or expert group) should be assigned one of the links in order to review the information, discuss what they have found out and summarize in their mind or on paper the focus. After a determined amount of time, the members of the expert group will disperse and report the key details of what they learned together to their home group.

1. A Glass of Dino Pee

2. Single-Use Plastics: The Problem with Plastic Pollution, The Water Project: Bottle Water is Wasteful
3. Fun Ways to Teach Kids to Save Water
4. How to Filter Water: DIY Science Experiments for Kids
5. Goal 6 Infographic, The Great Gulp: Water Issues & Facts (page 4 only)

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Read the story ***The Water Walker*** by Joanne Robertson to the class or have them watch and listen to the read aloud on the link below:

Choose from the following stories or read them all to explore how access to clean water addresses other of the UN's Sustainable Development Goals. Have students explore which goals, beyond #6 Clean Water and Sanitation, link to water issues, in particular goal #5 Gender Equality and goal #10 Reduced Inequalities. This may also be a time and place to discuss Boil Water Advisories in many Indigenous communities in Canada and the important people fighting for justice like Autumn Peltier. Here are two videos of Autumn's story, one when she began her advocacy work (https://www.youtube.com/watch?v=zg60sr38oic&t=83s) and the other where her work has taken her as a water activist (https://www.youtube.com/watch?v=A33XRMLBbOc&t=5s)

- **We Are Water Protectors** by Carole Lindstrom, illustrated by Michaela Goade
- **Nibi's Water Song** by Sunshine Tenasco, illustrated by Chief Lady Bird
- **Walking for Water** by Susan Hughes, illustrated by Nicole Miles
- **One Well** by Rochelle Strauss (watch the trailer) (download the teacher's guide)

E. Pursuing Learning

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Have students read the information found on pages 3 & 4 in the following link and complete a home water audit by completing the Water Wise Student Worksheet on page 6.
Water in the World: Water Sources & Conservation Once students complete their audits have a discussion about their findings. There are guiding questions provided in the link as well. An option is to play Water Conservation Pictionary as well, found on page 8 as a fun activity to reinforce the concept.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Explore the graphic story called **Chakra the Invisible Girl: Global Goals and Sanitation** created by Stan Lee, Sharad Davarajan and Gotham Chopra, written by Ashwin Pande. This resource helps to connect the Global Goals to their targets and to each other and then focuses on water. After reading the comic, have students help Chakra and Mighty Girl match the goals to their target (pages 7-10) and complete any of the other 4 activities that follow at the end (pages 15-18). Since students won't be able to electronically answer the questions you might want to print the pages for their use.

Cautionary Note: If you use Chakra's Trash Challenge the answers may differ from the ones indicated in the booklet as recycling programs and how to sort materials varies from community to community. Chakra's Save Water Challenge suggests taking a bath instead of a lengthy shower, however this would be a great discussion point because what you'd want to encourage are quick showers where you can turn the tap on and off while cleansing.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Create a **poster** to promote the importance of one of the SDGs in your own community, with goal #6 linked to water and sanitation. The World's Largest Lesson has a set of comic posters to accompany each of the 17 goals. Download sample posters here for inspiration!

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CHAPTER 4:

Is it hard to be green?

A Project of Learning for a Sustainable Future

Contributors Judy Halpern and Lynn Bristoll

Art by Burcu Köleli for
ArtistsForClimate.org

A project of

Learning for a Sustainable Future
LSF

Supported by Natural Resources Canada's Building Regional Adaptation Capacity and Expertise (BRACE) Program

Ressources naturelles Canada
Natural Resources Canada
Canada

Chapter 4. It's Easy Being Green!

This chapter explores energy and the green options available to consumers. It then explores the difference between needs and wants, as well as rights and responsibilities so that students understand and can act on the dire need to explore alternative energy options in their lifetime. The chapter concludes with students exploring and identifying careers that are greener to broaden their knowledge and understanding from those traditional professions many aspire to.

Art by Burcu Köleli for ArtistsForClimate.org

Before You Begin: Background Information for Educators

The Future of Careers in Climate Change: The Green Economy & Climate Opportunities

The environmental impacts of climate change have a direct effect on the working world. Many jobs that rely on ecosystem services, and therefore also on sustainable environmental management (e.g. farming, fishing, forestry, air and water purification, soil fertilization etc.) are immediately threatened by climate change as it deteriorates these natural ecosystems

and processes. As well, the rising temperatures are increasing the risks and hazards associated with labour-intensive work. These risks being felt in many sectors of work can be contrasted with a progressive shift to a green economy in many other sectors around the world. Green industries have grown exponentially over the past decades, and according to an InfoDev report in 2014, green industries have evolved from “a niche 1970s environmental aspiration into a competitive force motivating many of the world’s most progressive business planners and boardroom strategists”.

According to National Geographic, the top eleven growing green jobs include: urban growers, water quality technicians, clean car engineers, recyclers, natural scientists (measuring and monitoring our impacts on the world around us), green builders (including those using ecologically friendly materials), solar cell technicians, green design professionals, wave energy production workers, wind energy workers, and biofuel jobs (increasing, constructing, and producing renewable fuel). In many ways, it is productive and beneficial for students to conceptualize economic changes in the context of the many emerging careers and climate opportunities that accompany these changes. Throughout the upcoming years, there will be an increasing demand for skilled professionals in not only the green jobs mentioned by National Geographic, but also in sectors like urban planning, health care, architecture and information technology just to name a few. By educating and informing students on the subject of green careers, green energy and the green economy, possibly sparking interest in these fields students will enter the workforce more prepared and more capable of being successful in an economy and workforce that will likely look very different from how it does now.

Climate change is a current reality, but the future remains to be determined by the actions that we take now to stop the impacts from intensifying. The current economic impacts exist and are a part of a much larger interconnected story involving the environment, health, cultural dimensions, infrastructure etc. There is an inevitable level of uncertainty that accompanies any climate forecasting; however, there are concrete adaptation measures that can help prevent job losses and negative effects on workers and income. Governments and citizens can contribute to economic protection measures against climate change by investing in infrastructure, the conservation of treatment water, reforestation, moving to a new energy future (renewables) and skills development to help displaced workers transition to relevant, growing professions.

General Introduction To The Inquiries In This Chapter:

This chapter offers 3 different structured and scaffolded inquiries to support *It’s Easy Being Green!* Numerous strategies are included in each of the inquiries. These explorations can be completed in their entirety as stated, however, because we know inquiry is an organic and fluid

process based on student input, educators may wish to take parts of each of the 3 ideas presented and even adapt, modify or replace what's suggested to create their own inquiry with their class. It is therefore suggested that teachers review the whole chapter first in order to determine and plan what works best with their particular group of learners.

The following 3 inquiries are connected to curricular concepts as shown in this chart. These curricular concepts are applicable across Canada.

Curricular connections	**Concepts**
Science	Sustainability Stewardship Ecosystems Interdependence Changes Cycles Climate Conservation Action Innovation
Language	Critical literacy Media forms Reading Text features Text forms Inference Retelling Restating Communication
Social Studies	Physical features Human-environmental interactions Choice Employment Contribution
Physical Education and Health and Wellness	Motivation Participation Outdoor education
The Arts	Composition

	Interpretation Symbolism
Math	Data literacy

Tool: Journaling
Encourage students to record their thinking and learning throughout the learning process. The main reason for developing a journal is for students to then be able to look back and track their growth and progression with their connection to climate change. Students scaffold their thinking throughout their learning journey. The entries can be a combination of personal reflections and assigned reflections. This can be done as illustrations, concept maps or written reflections.

Inquiry 1: Understanding Green Energies - Alternative Energies

Students will explore innovations in alternative energy production by exploring a true story of a small Danish island that transformed into a model of sustainability. This book will inspire and motivate readers to learn about renewable energy systems.

Resources:

- ***Energy Island: How One Community Harnessed the Wind and Changed their World*** by Allan Drummond (book)
- Access to the Internet

Inquiry 2: Green Economy - Needs, Wants, Rights and Responsibilities

What do children need to survive and live a healthy, happy life? The activities in this inquiry help students distinguish the difference between the things they want and the things they need. Students will come to understand that needs such as clean water, education and protection from abuse are things that all children have a right to. These rights are enshrined in the United Nations Convention for the Rights of the Child.

As citizens of their classroom, school and community, students will also learn that each right that protects them comes with an individual responsibility to act. (Global Education Activity Resource World Vision Canada)

Resources:

- Global Education Activity Resource (GEAR) by World Vision, can be accessed at: Global Education Activity Resource
- Strength Chain handout

Inquiry 3: Green Careers - When I Grow Up I Want to be Green

What are green careers? How do we view career choices with an environmental lens? As an introduction to green career opportunities, begin by having students watch this video by TVO Kids which introduces them to two careers, a forest manager and water treatment technician. Forest Manager & Water Technician

Resources:

- Access to the Internet
- Copies of Exploring Career Choices handout

Chapter 4: It's Easy Being Green!
Inquiry 1: Understanding Green Energies

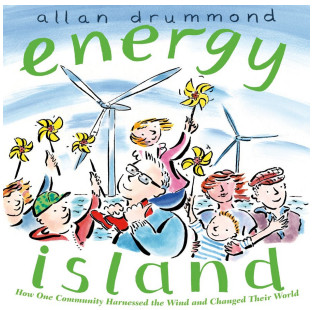
- ***Provocation*** *– Books*
- ***Question Generation*** *– Think, Puzzle, Explore*
- ***Knowledge Building*** *– Energy Audit, Books, Film*
- ***Determining Understanding*** *- Plus Minus Interesting*
- ***Pursuing Learning*** *– Notepad, Jamboard*
- ***Consolidation*** *– Student Created Questions*
- **Assessment** *– 5-3-1*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Book

Using literature is a powerful tool to connect learners to an issue or idea. The book(s) identified here are suggested titles to introduce the concept and spark discussion on alternative energies.

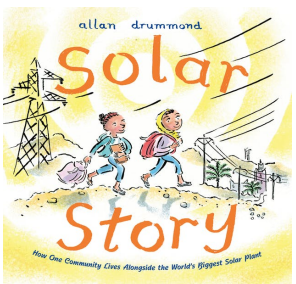


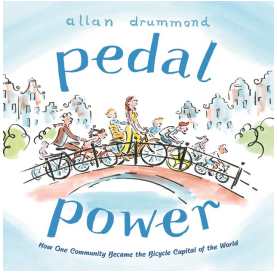
Book: *Energy Island: How One Community Harnessed the Wind and Changed their World* by Allan Drummond is a great place to begin.

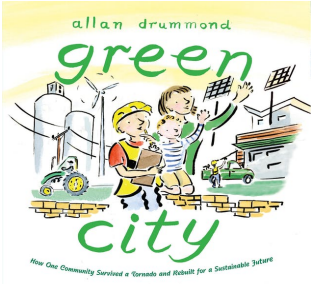
"Hold onto your hats! It's windy on the Danish island of Samsø. Meet the environmentally friendly people who now proudly call their home Energy Island. At a time when most countries are producing ever-increasing amounts of CO2, the rather ordinary citizens of Samsø have accomplished something extraordinary—in just ten years they have reduced their carbon emissions by 140% and become almost completely energy independent. A narrative tale and a science book in one, this inspiring true story proves that with a little hard work and a big idea, anyone can make a huge step toward energy conservation" (Allan Drummand, Energy Island, 2015).

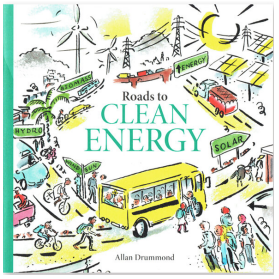
Here is a link to a reading of the story.

Check Allan Drummond's website for many other great selections such as:









B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Use the **Think, Puzzle, Explore** strategy to aid students in generating ideas and continuing their inquiry journey.

Example Activity:
There are many new terms introduced in this story. Begin with a word wall to ensure that all students have access to the new vocabulary.

Create a graffiti board (large butcher block paper on a wall) where students can post their questions and ideas. Divide the board into 3 sections and label them:

Energy Island:

What do you think you know about this topic?	What puzzles you about this topic?	How might you explore what puzzles you (how might you find answers)?

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Have students complete an Energy Audit either at home or at the school in each of the classrooms (or both), such as the one provided by Eco Schools Canada. This energy audit called Switch Off Lights & Devices is a fillable tracking sheet that identifies 3 areas to focus on: lights, computers & monitors and printers & photocopiers as well as a final column to add anything else students would like to monitor over a period of time (e.g., blinds closed when possible, no obstructions over vents). From the information collected, students can move to action to help promote and increase energy conservation personally and at the school.

Other alternative energies can be explored during this phase of the inquiry.

The Boy Who Harnessed the Wind by William Kamkwamba and Bryan Mealer
The story focuses on a Malawian boy named William (Maxwell Simba), who saves his town

from famine by constructing a windmill to provide water and electricity. The Boy Who Harnessed the Wind is **actually based on a remarkable true story**, bringing a wider audience into William Kamkwamba's incredible journey of innovation.
This story is available as a picture book (in a .pdf version), a Young Adult novel and a film on Netflix.

Iqbal and His Ingenious Idea: How a Science Project Helps One Family and the Planet by Elizabeth Suneby, illustrated by Rebecca Green.
It's monsoon season in Bangladesh, which means Iqbal's mother must cook the family's meals indoors, over an open fire. The smoke from the fire makes breathing difficult for his mother and baby sister, and it's even making them sick. Hearing them coughing at night worries Iqbal. So when he learns that his school's upcoming science fair has the theme of sustainability, Iqbal comes up with the perfect idea for his entry: he'll design a stove that doesn't produce smoke! With help from his teacher, Iqbal learns all about solar energy cooking, which uses heat from the sun to cook --- ingenious!

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

At this point in the inquiry you may decide to use a tool such as the **Plus Minus Interesting (PMI) Tool.** Students are instructed to write down the positives, negatives and interesting features of a topic, question or situation, in this case green energy or climate change. Decide whether to do it in groups, individually or as a whole class approach.

For more information on the PMI strategy, check the strategy bank or check here.

E. Pursuing Learning: Impacts and Green Opportunities

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of alternative energies.

Have students explore this website individually or in pairs: NASA Climate Kids. On the main page of this site there are 5 topics: weather & climate, atmosphere, water, energy and plants & animals so you could choose to assign partners to one of these areas.

Using an app such as **Notepad** on their electronic device, or collectively using an electronic tool such as **Jamboard,** record facts they find in their virtual travels that they learned, intrigued them or found interesting, in preparation for further exploration or in the consolidation phase of this inquiry when they generate questions for other students.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Student Created Questions
For this consolidation exercise, students will work in pairs. Each person will generate several thought-provoking summary questions for their partner. The questions should be based on the learning from this inquiry and could address their own personal gaps in understanding or aim to deepen understanding. Each partner will have an opportunity to write full responses to their questions, and then share their thinking with their partner.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Use the **5-3-1** technique to assess their level of understanding to this point.

Example Activity:
Pose a question about alternative energies that arose from this inquiry. Students work individually to generate 5 facts they've learned about the topic. Then, in pairs students work together to choose the best 3 answers from the 10 facts their combined list has generated. Finally, students join with another pair and collectively choose the best answer to the question from their combined lists.

Take Action

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety. You might introduce the idea of students taking action by sharing the following YouTube "Climate Change Song":

If they need some ideas of simple and immediate measures they can implement you can share this document from Direct Energy. While it is written for parents, students can get the

idea of something that would be attainable for themselves - or to share with their families! Ideas to Think Green

Ideas for Taking Action:

- Model green behaviour - use a reusable water bottle, actively recycle, compost, bring your bags to the grocer, bring your mug to the coffee shop, repair things that need mending, buy second-hand when applicable, pack a litterless lunch, use cloth napkins, use toxic-free cleaners (or make your own), walk or bike instead of driving when possible - these are just some basic ideas. Check out Ideas to Think Green for more suggestions.
- Collect rainwater for the garden
- Compost your kitchen waste
- Try more plant-based foods
- Conduct a clothing drive
- Collect food donations for the local food bank
- Enrol in the EcoSchools program and complete as many initiatives as the class decides. “The core of the EcoSchools program is the EcoSchools Certification Application (ECA), a bilingual, online application platform that enables schools across the country to create and implement a customized environmental action plan that meets the needs of their community. At the end of each year, school plans are submitted and assessed by EcoSchools staff, and schools are awarded a certification level ranging from Bronze to Platinum.”
- Develop a plan to conserve energy at home and/or at school and communicate this to this to the rest of the student body. Take part in one of Green Learning’s Challenges like the “Energy Revealed Challenge” here.
- Enter one of the Little Inventors Climate Champions invention challenges offered by the Child Rights International Network. At Little Inventors Events you can find current, past and upcoming events such as Climate Champion Inventions and Protect Our Oceans Mission. It’s worth exploring prior contests so students can see what other students across the globe have designed.
- The Little Inventors site (https://www.littleinventors.org/) also provides a variety of mini challenges under the heading “Challenges” with many related to the environment and climate change. Students can upload their creation to the site and hope it gets published and/or complete to share with the class or upload to a class’ shared Google document. Here are some relevant mini challenges:
    - Challenge to Protect Nature
    - Invention to Protect Trees & Wildlife
    - Make Sustainable Energy Through Exercise
    - Invention to Waste Less Food

Action Project Examples

Earth Ranger’s Project 2050

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The program will provide an easy and fun way for youth and their families to contribute to the fight against climate change by adopting small but impactful climate-friendly habits.

To participate **select and complete at least three** of the following actions to contribute to Project 2050:

- Active and Sustainable School Travel
- Divert Textile Waste
- Heating and Cooling
- Meatless Mondays
- Reduce Your Food Waste
- Sort Your Waste
- Switch Off Lights and Devices
- Tree Planting and Maintenance at School
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- Waste-Free Lunch

National GOOS Paper Day

GOOS stands for Good On One Side. GOOS paper is paper that has been used on one side, but is still blank and usable on the other side. Using GOOS paper means ensuring both sides of a piece of paper are used before it is recycled.

A GOOS paper bin collects and stores your GOOS paper in a convenient and accessible place to help ensure it can be used easily. Get creative and decorate your GOOS bins with a “goose” theme or other eye-catching styles.

Join students, teachers, workplaces, and families across the country on the **first Thursday in April** to celebrate National GOOS Paper Day.

On this day of action, get creative as you learn about responsible paper use and promote effective ways to reduce, reuse, and recycle paper.

The [Roberta] Bondar Challenge

Dr. Roberta Bondar is unique, not just for being the world’s first neurologist in space, the first Canadian woman in space, or for her pioneering space medicine research. Academically one of the most distinguished astronauts to have flown in space, Dr. Bondar is also the only astronaut to use fine art photography to explore and reveal Earth’s natural environment from the surface.

The Bondar Challenge is an opportunity for students to learn about the art of photography and to discover new perspectives on nature through a camera lens. The challenge is designed for students aged 6-18. Student entries will be judged in one of three age categories: 6-10; 11-14; or 15-18.

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Activists and organizers across the country are working to transition their communities away from fossil fuels. We created our community-based green energy project grants to provide critical funding for these local efforts.

All bullfrogpowered customers help fund these small-scale, community-led projects, including solar panels on schools and in Indigenous communities, education and training programs, and a cleantech accelerator.

Some examples of education-related initiatives, including Canadian Rockies Public School solar project can be found at the link above.

Young Reporters for the Environment (For Grade 6 only):

YRE Canada is a national environmental education program that gives youth the opportunity to be part of the solution by producing creative and engaging environmental journalism. Participants (ages 11-14 and 15-18) investigate and report on environmental issues, and propose solutions, by using video, photography or writing.

YRE Canada is part of Young Reporters for the Environment – an international program by the Foundation for Environmental Education (FEE).

Each year there is a contest available to students with an April deadline. This Canadian National Competition is open to entrants in two categories: **ages 11-14**, and **ages 15-18**. Article, photo, or video submissions must meet a few criteria. Pieces should:

- Investigate solutions to a local environmental issue/problem based on this year's themes of **pollution, loss of biodiversity**, or **climate change** that have to be linked to a chosen Sustainable Development Goal (SDG).
- Report on the chosen issue through writing, photos, or video.

Students may submit more than one piece and can work individually or in groups of up to three people. Please note, winners in each category and age group will be publicly displayed and promoted on EcoSchools Canada's social media and website.

Chapter 4: It's Easy Being Green!
Inquiry 2: The Green Economy - Wants and Needs, Rights and Responsibilities

- ***Provocation*** *– Game: Journey to a New Planet*
- ***Question Generation*** *– Does It Fit?*
- ***Knowledge Building*** *– Knowledge Building Circle*
- ***Determining Understanding*** *- Game: The Rights Balloon*
- ***Pursuing Learning*** *– Strength Chains*
- ***Consolidation*** *– Persuasive Letter Writing*
- **Assessment** *– I Used to Think… Now I Think… Exit Ticket*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Journey to a New Planet Game (refer to pages 27-29)
The following activity is adapted from "GEAR, (Global Education Activity Resource) for grades 2 to 8, developed by World Vision Canada, (adapted from Defining Peace and Conflict, UNICEF, 1995).

In this game students will be told they are taking a journey to a new planet with their partner. There are many collaborative decisions that need to be made so students will have to work together.

Objectives:
Students will differentiate between wants and needs, generate, gather and exchange ideas, use critical thinking skills and demonstrate understanding of basic human rights.

Preparation:

- Prepare a simple drawing of the solar system and a spaceship (optional).
- Collect and have available a stack of magazines that students can cut up for pictures of items to take on their journey.

Instructions:

1. Explain that Mission Control (which you represent) has discovered a new planet and each pair will go there to start up a new community. Set the mood by naming the planet and the reasons for going there.
2. Ask the students to close their eyes and imagine the new planet. How long will it take to get there? What does it look like? Do other people live there? Where will they set up the new community? Tell them to form a picture of this community in their minds.
3. With their eyes still closed, ask students to think about the things they will want and need in their new community. Have students open their eyes and discuss their ideas with their partners.
4. Students, working in pairs, have a designated amount of time (30 minutes) to find and cut out 20-30 pictures from magazines of items that they would take with them on their journey to a new planet.

5. Next, explain that Mission Control will provide each pair of students with the number of items they could bring with them to set up their new community. Ask them to spread out their images. Using a T chart, divide the images into two categories, *Wants* and *Needs.*
6. Announce that Mission Control says space on the journey is limited. The students can now take only 16 items on the spaceship. Partners negotiate to eliminate some items and set them aside. As they are completing the task, announce that Mission Control has changed their mind, now allowing only 12 items. Again, students negotiate with each other to decide which items to set aside.
7. Finally, inform the students that Mission Control has issued an emergency announcement and there is even less space available. Students may now take only 8 items with them. Partners negotiate to eliminate four more items, leaving only the eight most essential for their survival.

Post Activity Discussion:
Questions taken from (GEAR, p. 27)

- What was difficult about doing this activity? What was easy?
- Which items were easy to discard first? Why?
- Were some items harder to eliminate than others? Which ones? Why?
- What is the difference between a want and a need?
- What do we need for survival?
- What do different people, communities, contexts need to survive?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Students will use the **Does It Fit?** strategy to make decisions from a variety of options available to them.

Example Activity:
You and a partner are planning your ***Journey to a New Planet*** trip. Each pair has a copy of the 21 Needs and Wants cards (p. 28-29). There are also 3 blank cards if you feel you want to include something that isn't in the cards.
Consider these 3 perspectives when asking if the item is appropriate:

- **Ideal:** - How well does each item fit with what you think would make life on the new planet ideal? Discuss why this item would make life ideal;

- **Criteria** - How well does each item fit the criteria of what you need or want for a good life on this new planet? What is your criteria for a good life (older students)

- **Personally** - How well does each item fit with your personal understanding of needs and wants?

Once you have made a decision of which items are “wants” and which items are “needs”, you must narrow down your choices to the most important items to take to the new planet. **How do you and your partner decide?**

Are there any other items you would add or take away? The following videos may create some ideas that promote discussion and generate more questions on the difference between needs and wants.

Videos:

- **Needs and Wants for Kids**: A basic description of the differences between needs and wants.
- **Needs vs Wants**: Learn the difference, when it comes to economics, between your needs and your wants.
- **Need vs Want**: Understand how paying attention to your needs helps you work towards your wants.

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Following the exercises on understanding the differences between “needs” and “wants”, engage students in a knowledge building circle to explore the differences between “rights” and “responsibilities”.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

After the knowledge building circle play a second game from GEAR, called **The Rights Balloon** (p. 30-31). This game is played individually.

The following is an excerpt from GEAR, (Global Education Activity Resource) for grades 2 to 8, The Rights Balloon is adapted from Children Changing the World by SOPAR, 2002. 1, chemin des Érables, Gatineau, PQ J8V 1C1. (www.sopar.ca) Conflict, UNICEF, 1995).

Objectives:
Students will understand the difference between rights and wants, and prioritize various rights in their lives; brainstorm and communicate ideas in collaboration with others and apply critical thinking skills.

Preparation: Photocopy a class set of The Rights Balloon (page 31).

Instructions:

1. Ask students to brainstorm things they need or enjoy having in their lives. Write their responses on the board or chart paper.

2. Hand out The Rights Balloon activity sheet to each student and explain that a right is something every person is entitled to for survival and a good life.

3. Ask students to close their eyes and imagine they are alone in a hot-air balloon floating high above the ground. Describe what they might see and ask them to choose a destination (e.g. another country or visiting a friend) Tell them they each have 10 rights on board and each one weighs 2 kilograms.

4. Suddenly the balloon begins to drop. To stop descending they must throw one right overboard. Ask students to open their eyes and, without discussion, select one item from the list they are willing to give up. Instruct them to write number 1 in the “Me” column beside their choice.

5. Tell students to close their eyes again. They can continue imagining their journey now that the balloon has safely levelled out. After a few seconds tell them the balloon is descending again and they must select another item to throw overboard. Write number 2 in the “Me” column beside the second right they surrender.

6. Continue in this way, with students choosing rights to throw overboard each time the balloon descends and numbering their choices until only one item remains in the balloon. The last right—the one most important to them—is numbered 10.

7. Ask students to share responses with a partner. Discuss each other’s decisions. If necessary, agree on a new ordering of the rights, and record this new order in the “Us” column. Reassure them that the way they prioritize their choices may differ from their classmates.

Post Activity Discussion (Global Education Activity Resource, p. 30)

- Which rights were easiest to give up? Which were the most difficult?
- What is the difference between the things you need (rights) and the things you want?
- Are there any rights so basic you would never give them up? Which ones and why?
- How would you define a basic or universal human right?

The concept of human rights is based on the belief that we have rights simply because we are human beings. A right is something you are entitled to in order to survive and have a meaningful, healthy, satisfying life.

- What responsibilities come with the rights on the Rights Balloon list? (e.g. the right to to go to school and the right to learn about your own culture, comes with the responsibilities to getting to school on time, doing your homework, supporting practices that promote your culture)

- Debate this statement: "*Those who have rights should speak out for those whose rights are denied."*

E. Pursuing Learning: Understanding Rights and Responsibilities

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of rights and responsibilities of citizens.

Explore the **12 Rights of a Canadian Child** from **Children First Canada.**

"What if we taught our children, not that they have rights to land, but that they have responsibilities to the land? You would have children who would know how joyful having a purpose would be. Children would know their purpose in the world which would be to find their gifts and give them back! That's reciprocity and that's an empowering stance!"
Robin Wall Kimmerer, 2021.

Based on this quote from Robin Wall Kimmerer, have children explore their strengths/"gifts" and how these strengths can provide direction for how they can understand their role in responding to climate change and deciding on actions to take that will make a difference.

What Are My Strengths:
"To help kids thrive, recognizing their strengths is just as important as working on their challenges". (Amanda Morin, 2018) Have students identify kids' strengths by creating a paper chain, called a strengths chain".

Along with the understanding of the differences between "needs" and "wants", extend this idea by exploring "rights and responsibilities".

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Write a persuasive letter that demonstrates your understanding of the responsibilities that go with rights.

Example Activity:
Students write a letter to a parent or caregiver explaining that they understand the responsibilities that go along with having a right. For example: I understand that the right to

own a pet goes along with certain responsibilities. I believe that I would make a great owner of a _____ because I would be responsible for its health and well-being. I would take these responsibilities seriously because I would…(list all of the responsibilities that would go with maintaining the health and well-being of an animal.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Use the **I Used to Think…Now I Think…** strategy as an Exit Ticket for students.
Example Activity:
Students write one sentence explaining how their thinking about needs and wants has changed (with a personal example) and one sentence about how their understanding of rights and responsibilities has changed (with a personal example) as a result of this inquiry.

Take Action

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety. You might introduce the idea of students taking action by sharing the following YouTube "Climate Change Song".

If they need some ideas of simple and immediate measures they can implement you can share this document from Direct Energy. While it is written for parents, students can get the idea of something that would be attainable for themselves - or to share with their families!
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Action Project Examples

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- Report on the chosen issue through writing, photos, or video.

Students may submit more than one piece and can work individually or in groups of up to three people. Please note, winners in each category and age group will be publicly displayed and promoted on EcoSchools Canada's social media and website.

Chapter 4: It's Easy Being Green!
Inquiry 3: Green Careers - When I Grow Up I Want to be Green

- ***Provocation*** *– Videos, articles*
- ***Question Generation*** *– Inside Outside circles*
- ***Knowledge Building*** *– Exploring career choices*
- ***Determining Understanding*** *- I used to think, now I think*
- ***Pursuing Learning*** *– Writing an advertisement*
- ***Consolidation*** *– Student Created Questions*
- **Assessment** *– One Minute Paper*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student thinking.

Videos
As an introduction to green career opportunities, begin by having students watch this video **Forest Manager & Water Technician** by TVO Kids which introduces them to two careers, a forest manager and water treatment technician.

Other Supportive Videos

Written Interviews by Nasa (Climate Kids)
These links can also be shared with students either as a whole group perhaps projected on a screen or that they read individually.

- Renewable Energy Scientist: A Conversation with Tom Zambrano
- Ocean Scientists Studying Coral Reefs: A Conversation with Eric Hochberg
- Earth Scientist Studying Glaciers: A Conversation with Kimbely Casey

Students can also activate prior knowledge and engage in discussion around career choices by playing the game "When I Grow Up!" either by themselves or with a partner.

- When I Grow Up Dream Job Adventure

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline pathways for question generation depending on the provocation(s) that your class engaged with.

Using the **Inside/Outside Circles** routine will help students generate ideas and assist in furthering their inquiry as they focus on potential future careers that are of interest to them, emphasizing ones that are "green".

Example Activity:
For the first few rounds, have students share **any job** that currently they think interests them. They can share some of the qualities of the position that interests them (e.g., it's hands on; indoors/outdoors; can work from home; works alone/with others; allows for creativity; etc.).

After a couple of passes, change the question to specifically discuss a **career that is "green"** that they would consider exploring further.

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and ideas that have been generated thus far in the inquiry process.

Working in pairs or triads, have students complete this template adapted from careercruising.com called Exploring Career Choices (or modify it for your use). An interesting link that could be explored prior to filling this chart discusses what it means to be nature smart and identifies 10 occupations that are suitable to those that are nature smart. This 2-page document can be found at: Nature Smart Guide.

Example Activity:
In the Exploring Career Choices chart the first column identifies some examples of jobs that might appear obvious as to how they can be "green" by supporting the environment and helping reduce climate change effects, while others are not so apparent. Beside each, is an example of how the career is green or could be modified in order to make it so. There are several empty boxes at the bottom of this chart so that you and a peer can think of and record some other examples.

Review the dozen examples that are listed along with how that career directly is a green choice or how it can be adapted to be green. Then in their groups they should brainstorm several more jobs that come to their minds or that interest them and fill in the second column as to how it would need to be modified to be greener.

Additional information, questions and ideas are available at the Career Cruising website at careercruising.com should you wish to explore this further.

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Have students work in small groups different from any other they have so far, and use the strategy "I Used to Think & Now I Think".

Example Activity:
Each student should take a turn sharing a job/career and what they initially thought of its role and then how they think it could be modified to make it "greener". This will give students an opportunity to listen to others to gain even more information and ideas as well as succinctly share their thoughts orally.

E. Pursuing Learning: Impacts and Green Opportunities

At this stage, students may begin research to pursue some of their questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of green jobs and careers.

Have students write an ad for a green career of their choice. The ad should include:

- a description of the role and its responsibilities,
- what qualities candidates require,
- the hours involved,
- the experience required
- the salary, and
- several sentences as to why this is an appealing opportunity.

Prior to writing their own ad, students may wish to explore current opportunities that are posted online such as the environmental, sustainability and nature jobs found by using key words to search positions on sites such as Indeed Job Search Canada | Indeed.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, it helps them to solidify knowledge and deepen their understanding.

Example Activity:
For this consolidation exercise, students will work in pairs. Each person will generate several thought-provoking consolidation questions for their partner. The questions should be based on the learning from this inquiry and could address their own personal gaps in understanding or aim to deepen understanding. Each partner will have an opportunity to write full responses to their questions, and then share their thinking with their partner.

Assessment Idea

Teachers will assess learning at different points throughout the inquiry using multiple methods. The following assessment provides an alternative evaluation method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

The One-minute paper is a classroom assessment technique that uses a focused question generated by the teacher that can be answered within a minute or two. The activity asks students to reflect on their understanding of a lesson or concept and provides the teacher with rapid feedback on students' perceptions on key learnings. Check here for more information on this strategy.

Example Activity:
In one minute have students record their career choice and rationale based on their exploration and new learning.

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco anxiety. You might introduce the idea of students taking action by sharing the following YouTube "Climate Change Song"

If they need some ideas of simple and immediate measures they can implement you can share this document from Direct Energy. While it is written for parents, students can get the idea of something that would be attainable for themselves - or to share with their families! Ideas to Think Green

Ideas for Taking Action:

- Model green behaviour - use a reusable water bottle, actively recycle, compost, bring your bags to the grocer, bring your mug to the coffee shop, repair things that need mending, buy second-hand when applicable, pack a litterless lunch, use cloth napkins, use toxic-free cleaners (or make your own), walk or bike instead of driving when possible - these are just some basic ideas. Check out Ideas to Think Green for more suggestions.
- Collect rainwater for the garden
- Compost your kitchen waste
- Try more plant-based foods
- Conduct a clothing drive
- Collect food donations for the local food bank
- Enrol in the EcoSchools program The core of the EcoSchools program is the EcoSchools Certification Application (ECA), our bilingual, online application platform

that enables schools across the country to create and implement a customized environmental action plan that meets the needs of their community. At the end of each year, school plans are submitted and assessed by EcoSchools staff, and schools are awarded a certification level ranging from Bronze to Platinum.

Action Project Examples

Earth Ranger's Project 2050

Welcome to **Project 2050: *Climate-friendly habits to change the world!*** This national movement, powered by Earth Rangers in partnership with EcoSchools Canada, is about connecting youth with the knowledge and skills needed to tackle climate change.

The program will provide an easy and fun way for youth and their families to contribute to the fight against climate change by adopting small but impactful climate-friendly habits.

To participate **select and complete at least three** of the following actions to contribute to Project 2050:

- Active and Sustainable School Travel
- Divert Textile Waste
- Heating and Cooling
- Meatless Mondays
- Reduce Your Food Waste
- Sort Your Waste
- Switch Off Lights and Devices
- Tree Planting and Maintenance at School
- Vermicomposting and School-based Composting
- Waste-Free Lunch

National GOOS Paper Day

GOOS stands for Good On One Side. GOOS paper is paper that has been used on one side, but is still blank and usable on the other side. Using GOOS paper means ensuring both sides of a piece of paper are used before it is recycled.

A GOOS paper bin collects and stores your GOOS paper in a convenient and accessible place to help ensure it can be used easily. Get creative and decorate your GOOS bins with a "goose" theme or other eye-catching styles.

Join students, teachers, workplaces, and families across the country on the **first Thursday in April** to celebrate National GOOS Paper Day.

On this day of action, get creative as you learn about responsible paper use and promote effective ways to reduce, reuse, and recycle paper.

The [Roberta] Bondar Challenge

Dr. Roberta Bondar is unique, not just for being the world's first neurologist in space, the first Canadian woman in space, or for her pioneering space medicine research. Academically one of the most distinguished astronauts to have flown in space, Dr. Bondar is also the only

astronaut to use fine art photography to explore and reveal Earth's natural environment from the surface.

The Bondar Challenge is an opportunity for students to learn about the art of photography and to discover new perspectives on nature through a camera lens. The challenge is designed for students aged 6-18. Student entries will be judged in one of three age categories: 6-10; 11-14; or 15-18.

Bullfrog Power Community Projects

Activists and organizers across the country are working to transition their communities away from fossil fuels. We created our community-based green energy project grants to provide critical funding for these local efforts.

All bullfrogpowered customers help fund these small-scale, community-led projects, including solar panels on schools and in Indigenous communities, education and training programs, and a cleantech accelerator.

Some examples of education-related initiatives, including Canadian Rockies Public School solar project can be found at the link above.

Young Reporters for the Environment (For Grade 6 only):

YRE Canada is a national environmental education program that gives youth the opportunity to be part of the solution by producing creative and engaging environmental journalism. Participants (ages 11-14 and 15-18) investigate and report on environmental issues, and propose solutions, by using video, photography or writing.

YRE Canada is part of Young Reporters for the Environment – an international program by the Foundation for Environmental Education (FEE).

Each year there is a contest available to students with an April deadline. This Canadian National Competition is open to entrants in two categories: **ages 11-14**, and **ages 15-18**. Article, photo, or video submissions must meet a few criteria. Pieces should:

- Investigate solutions to a local environmental issue/problem based on this year's themes of **pollution, loss of biodiversity**, or **climate change** that have to be linked to a chosen Sustainable Development Goal (SDG).
- Report on the chosen issue through writing, photos, or video.

Students may submit more than one piece and can work individually or in groups of up to three people. Please note, winners in each category and age group will be publicly displayed and promoted on EcoSchools Canada's social media and website.

CHAPTER 5:
Indigenous ways of knowing

A Project of Learning for a Sustainable Future

Contributor: Deborah Miller

Art by Ana Pacheco for ArtistsForClimate.org

A project of

Learning for a Sustainable Future
LSF

Supported by Natural Resources Canada's Building Regional Adaptation Capacity and Expertise (BRACE) Program

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Natural Resources Canada
Canada

Chapter 5. Indigenous Ways of Knowing

This chapter looks at how Indigenous peoples' traditional knowledge, skills and practices, passed down from generation to generation, play a vital role in understanding climate action. Indigenous peoples have been, and are leaders, of climate action; their roles in monitoring climate change impacts and the environmental effects on their traditional lands and waters play a critical part in our fight against climate change (NRCan p.117).

There is a great deal that we can learn from how Indigenous peoples have lived sustainably with the Land for countless generations. Indigenous peoples have adapted by travelling throughout their Land in creating a balance with food sources and balancing resource use, depending on the season. We need to listen carefully to better understand how Traditional knowledge, and its application, contribute to environmental sustainability and planning for the future. According to the NRCAN report, incorporating diverse perspectives and sources of knowledge, such as Indigenous Knowledge Systems, is also imperative for effective adaptation (NRCan all chapters).

Art by Ana Pacheco for ArtistsForClimate.org

The National Issues Report identifies four key strengths of Indigenous and local knowledge systems (NRCan p.118) in the context of understanding and responding to climate change, including:

1. understanding, monitoring and recording climate change impacts;
2. enhancing adaptive capacity and building resilience;
3. supporting sustainable risk reduction strategies; and
4. informing decision-making and policy change.

In this inquiry, we suggest activities, books, and resources that explore various examples of these Indigenous Ways of Knowing and how the teachings and learning is passed on from one generation to the next. Indigenous communities have their own experts, elders, knowledge keepers and ways of knowing; their knowledge is a valuable and essential resource for learning how to adapt to climate change (NRCan.p.131). Indigenous Ways of Knowing is knowledge that we need to value so we can learn what they understand to help the climate conversation and actively seek it to guide us (NRCan p.115).

Mi'kmaq Elder Albert Marshall coined the phrase Etuaptmumk/"two-eyed seeing" this way: (2004)

"I, you and we need to learn to see from one eye with the best or the strengths in the Indigenous knowledges and ways of knowing… and learn to see from your other eye with the best or the strengths in the (Western) knowledges and ways of knowing… but most importantly, I, you, and we need to learn to see with both eyes together, for the benefit of all." Elder Albert Marshall, EdCan Network, May 29, 2018

View Indigenous Knowledges and Two-Eyed Seeing: An In-Depth Conversation with Elder Albert Marshall - A dialogue about the importance of Indigenous Knowledge and the Two-Eyed Seeing in addressing climate change and creating a resilient future. The webinar was organized by *Prairie Climate Centre at the University of Winnipeg*

Background Information for Educators (Background info from ELWW 7-12)

The rapid and profound climate changes are putting lands and territories of many Indigenous communities (Metis, Inuit and First Nations) on the front lines of mitigation and adaptation efforts. According to Terry Teegee, regional chief of the BC Assembly of First Nations, Indigenous communities are often the first to experience the impacts of climate change. Indigenous communities have a strong dependence on and close relationship to the environment and its resources. Threats to Indigenous ways of life due to the changing climate are complex and wide-reaching. Specific experiences vary considerably based on the area or region in which communities are located. One of the general impacts that climate change is

having on Indigenous communities in Canada includes an increased risk of physical harm associated with traditions or activities including hunting and fishing. (NRC p.131) Very experienced harvesters are being forced to alter hunting strategies and take into consideration the lack of rescue facilities available (Canadian Geographic Indigenous Atlas of Canada). Therefore many people are also experiencing a loss of food security in part due to altered animal migration patterns as well as human travel routes impacting people's ability to access country foods. Indigenous people may be experiencing threatened sovereignty and a loss of communities and culturally significant locations due to rising sea levels, flooding, coastal erosion, and melting permafrost. “Climate change impacts are dependent on a number of connected factors that are rooted in specific places. As a result, climate change is impacting individuals and communities in rural and remote areas across Canada in many different ways. It is important that place-based knowledge systems—including local and Indigenous Knowledge—be drawn upon in understanding and responding to climate change impacts. Both local knowledge and Indigenous Knowledge Systems are based on long-term, ongoing relationships between people and their natural environments. Such knowledge can provide useful insights on changing climatic conditions and on the lived experiences of those affected by climate change.” (NRCAN p.118)

How does climate change disproportionately affect Indigenous communities?

Indigenous people in Northern communities have historically demonstrated an incredible ability to adapt to varied and changing circumstances. However, as the impacts of climate change intensify, successful adaptation becomes increasingly challenging. When considering climate change and its effect on Canadian citizens, it is imperative to acknowledge the social and cultural inequalities that exist when it comes to contribution, mitigation and adaptation. For instance, according to the Government of Nunavut, despite the small contribution made by a territory like Nunavut to national greenhouse gas emissions, the effects of the global excess are felt heavily by the citizens.

Impacts and path forward in The Arctic - Inuit Peoples

According to the IPCC (2019), the cryosphere changes in the Canadian Arctic have negatively impacted human health in several key ways. There have been dramatic increases in food and waterborne diseases, malnutrition, injury and serious mental health challenges especially among Indigenous people. Additionally, Indigenous peoples and other Arctic residents have had to change the timing of various activities in response to seasonal changes and safety of travel on ice, land and snow. Some coastal communities have planned for relocation due to failures associated with flooding and thawing permafrost. According to the IPCC, "limited funding, skills, capacity and institutional support to engage meaningfully in planning processes have challenged adaptation." Inuit people have used and occupied Arctic and Subarctic Land, ice and water for thousands of years, documenting use and reliance on the Land and waters for many generations. It is imperative to recognize the critical role that Inuit people must play in developing adaptation and mitigation strategies to address the many complex challenges that define the Canadian North.

Moving Away from indigenous stereotypes ('passive witnesses,' media portrayal)

First Nations people have been and continue to be leaders in the fight against climate change. Inuit leaders brought warnings about the impacts of climate change to the international stage as far back as the Earth Summit in 1992. There are many groups working towards reconciliation in Canada that recognize the leadership of Indigenous cultures when it comes to sustainability as a central tenet of their relationship with the environment (Sustainable Canada Dialogues). ”Local and Indigenous Knowledge are key to adaptation and understanding climate impacts. Residents of rural and remote communities have a strong connection to the environments that they depend on for their livelihood, sustenance, well-being and way of life. Place-based knowledge systems, including local and Indigenous Knowledge, and lived experience are key to understanding and adapting to climate change impacts in rural and remote communities and areas.” (NRCAN p.117)

Due to the unique context of Indigenous rights and impacts, (governance, economy, infrastructure and activities) many wide-spread solutions that policy makers have put forward do not acknowledge that Indigenous communities are already engaged in important climate change mitigation strategies that are deeply rooted in Indigenous customs and traditional practices (ICA, 2019). In many ways, Indigenous knowledge and practices can be an incredible resource for learning strategies to adapt to climate change (NRCAN p.117). It is important to think critically about the sources from which we gather information on indigenous rights. In too many instances, a biased version of an event is told and shared widely through the media; stereotyping indigenous activists and protestors, misconstruing actions and portraying a radical, negative picture to the general public.

According to the 2018 Indigenous Climate Action Report, the implications of culturally embedded perspectives are significant: National "Environmental" policies often ask relatively narrow questions about how to reduce emissions and mitigate or stall damage, whereas Indigenous water walkers, for example, are asking us, "How do we get to a spiritually grounded and more fully integrated way of life where we can swim, eat and drink from uncontaminated lakes and rivers?" There is a great deal that we can learn from the way that Indigenous people have lived harmoniously and sustainably with the Land for many years. Indigenous perspectives should be a centra; a voice for policymakers and citizens of Canada to hear as we are adapting and developing sustainable communities of the future.

General Introduction to the inquiries in this chapter:

Indigenous Ways of Knowing

This chapter offers three different structured and scaffolded inquiries to support Indigenous Ways of Knowing. Indigenous People have passed on traditional knowledge from one generation to the next to learn to live sustainably with the Land. These enquiries explore various examples of these Indigenous Ways of Knowing and how the teachings and learning are passed on from one generation to the next. Each of the three inquiries begins with a provocation followed by numerous strategies and examples. These explorations can be completed in their entirety as written; however, because we know inquiry is an organic and fluid process based on student input, educators may wish to take aspects of each of the ideas presented and adapt, modify or replace what’s suggested to create their inquiry with their class. Therefore, it is

suggested that teachers review the whole chapter first to determine and plan what works best with their particular group of learners.

The following three inquiries are connected to curricular concepts, as shown in this chart. These curricular concepts are applicable across Canada.

Curricular Connections	**Concepts**
Citizenship	Respect Foster appreciation Cultural awareness
Social Studies	Diverse perspectives - First Nations, Métis, Inuit Cultural diversity Indigenous languages Indigenous Ways of knowing Traditional Knowledge Balance Family and community roles Elders
Language	Critical literacy Oral communication Retelling Storytelling Active listening Responding Storytelling Speaking and listening activities to share ideas
Science	Ecosystems Seasonal cycle Time and place Experiential learning Natural environment Adaptations Environmental sustainability Climate change

The Arts	Creativity Innovation Interpretation Colour Space Media

Inquiry 1: Indigenous Perspectives Elder Knowledge

The inquiry explores the topics of respect for Elders and caring for the environment. Students learn how we can apply Elder knowledge and understanding of sustainability to reduce the effects of climate change.

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Resources:

- **Book -** Read aloud the Elders are Watching by David Bouchard or watch online

Inquiry 2: IndigenousTraditional Knowledge

This inquiry examines traditions, connections to nature and how Indigenous People interact with their environment. The activities invite students to reflect on Indigenous perspectives and knowledge as sources of information to reduce the effects of climate change.

Resources:

- Video – Maq and the Spirit of the Woods by Phyllis Grant

Inquiry 3: Elder Knowledge: Connections to the Land

Students learn about the importance of Elder knowledge and guidance needed to help us live sustainably. They will inquire into the necessary skills for adapting to and reducing climate changes, taking lessons from Indigenous Peoples who have witnessed the environmental changes to the land.

Resources:

- Provocation 3: Community Expert – Elder Visit

Chapter 5: Indigenous Ways of Knowing

Inquiry 1: Indigenous Perspectives Elder Knowledge

- ***Provocation*** *– Book*
- ***Question Generation*** *– 5W's and H questions, Creative Question Starts, Ask Questions template*
- ***Knowledge Building*** *– Community Expert – Elder visit, Umbrella Questions*
- ***Determining Understanding*** *-KHWLAQ chart, Knowledge Building Circle, Video, Talking Circle*
- ***Pursuing Learning*** *– Natural Inquirer, Arctic Survivor, Climate Connections, Observing Change*
- ***Consolidation*** *– Doodling/Sketching, Consolidation Discussion, Think-Pair-Share*
- **Assessment** *– Tableau Assessment Suggestions*
- ***Take Action****– Action Project Suggestions*

Land Acknowledgement

Begin the inquiry by offering a land acknowledgment and discussing why we acknowledge the land. It is essential to teach students that we must recognize the Indigenous land that the school is on to learn about and from it.

As educators, recognizing that these lands are the traditional territories of Indigenous people and that all Canadians benefit from the land plays an essential role in modelling reconciliatory behaviour with your students. Reciting your school's land acknowledgement helps create a foundation in students for learning about and from Indigenous people whose land we live on.

A land acknowledgement reinforces that we benefit from the land, and we all have a responsibility to actively work towards honouring Indigenous Peoples as equal partners in sharing the land. Land acknowledgments are only one step in cultivating greater respect for and inclusion of Indigenous Peoples, with the understanding of the importance of our Treaty responsibilities.

Chapter 5 Indigenous Ways of Knowing recognizes the importance of Indigenous perspectives and connections to land and place as we work towards reconciliation 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).

Sharing stories is a way of sharing knowledge among Indigenous communities. Your classroom materials should be culturally diverse and inclusive of Canada's three distinct Indigenous groups. Here are a few examples of children's books that illustrate the importance of learning from our Elders and include the three distinct Indigenous groups.

- ***The Elders are Watching*** by David Bouchard and Roy Henry Vickers (Métis)
- ***Nimoshom and His Bus*** by Penny M. Thomas (First Nations Cree), illustrated by Karen Hibbarb

- ***Nokum is My Teacher*** by David Bouchard, illustrated by Allen Sapp (Métis)
- ***Oral Traditions and Storytelling*** by Anita Yasuda (First Nations)
- ***The Tree by the Woodpile*** by Raymond Yakeleya, Jane Modeste (First Nations Dene)
- ***Jigging for Halibut with Tsinii*** by Robert and Sara Davidson, illustrated by Janine Gibbons (First Nations Haida)
- ***Making a Whole Person: Traditional Inuit Education*** by Monica Ittusardjuat (Inuit)
- ***Fishing with Grandma*** by Maren Vsetula and Susan Avingaq (Inuit), illustrated by Charlene Chua
- ***A Walk on the Tundra*** by Rebecca Hainnu and Anna Ziegler (inuit), illustrated by Qin Leng
- ***Siha Tooskin Know the Nature of Life*** by Charlene and Wilson Bearhead, illustrated by Chloe Bluebird Mustooch (First Nations Nakota)
- ***Sila and the Land*** by Shelby Angalik, Araian Roundpoint and Lindsay Dupré, illustrated by Halie Finney (First Nations, Métis and Inuit)

Teaching and discussing controversial and sensitive topics is essential because it helps students think in-depth and fosters critical thinking. Many issues involving First Nation, Métis and Inuit peoples are controversial (land claims, self-government, blockades, hunting and fishing rights) or sensitive (residential schools, worldview). Building in and addressing controversial or sensitive topics at an early age allows students to explore and question in the safety of the classroom. Teachers may use some of the suggested questions in this inquiry to introduce more sensitive issues regarding the inequalities faced by Indigenous People. Please keep in mind that Acts of Reconciliation and Reclamation are fundamental as we move forward as a country. Our acknowledgement, and inclusion of Indigenous literature and media helps to create an understanding of the history, diversity, and issues that many Indigenous peoples face.

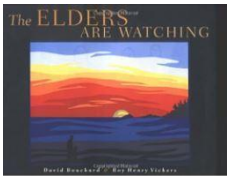
It would be helpful for the learners to understand that traditional/cultural knowledge is passed as an: I Do, We Do, You Do model. This mentorship model provides the close watching and coaching of the learner by the teacher. This model would aid in learning from mistakes, as well as identifying areas of strength and need for reflection. This helps the person who is learning of how knowledge is passed on, to connect with the sacredness of our relationship with Creator, Mother Earth, the plants, animals, and all other animate and inanimate beings as part of the Creators making. (Daniel Sylvestre)

A. Provocation 1: Book

To hook student interest, use the following provocation to initiate student thinking.

Book - Read aloud the Elders are Watching by David Bouchard or watch online

As Native elders have advised from time immemorial, this is a gentle plea to respect the natural environment. A plea to respect the natural treasures of our environment and a message of concern from indigenous leaders of the past to the people of the new millennium, The Elder Are Watching has both a timelessness and an urgency that must be heard.



Vickers, Roy Henry, Cover Illustrations, The Elders are Watching by Bouchard, David, Raincoast Books, 2003

As you read the book, help students become aware of the knowledge, information and guidance older people such as Elders, Knowledge Keepers, grandparents, teachers, uncles, aunts, or mentors can offer. Students should be made aware that one must earn the right to become an Elder or Knowledge Keeper in a First Nations community. Not all Elders or Knowledge Keepers are seniors, nor are all old people Elders, and some Elders are younger. Elders or Knowledge Keepers are honoured because they have gifts of insight and understanding and are willing to share their knowledge. Discuss the role Elders or Knowledge Keepers play in Indigenous communities, provide picture books and other media that illustrate the connection Indigenous People have with the land to enhance the learning.

Discussion questions

What do you think the author means by The Elders are Watching?
What is an Elder or Knowledge Keeper? And what are they watching in this book?
Elders are often considered wise and share their Indigenous Knowledge, can you explain why?
Identify one of the messages that the author is trying to portray in his book.
The last visual of the online book identifies different indigenous People. Name three distinct Indigenous groups in Canada*?
Do all Indigenous People share the same traditions and knowledge*? In what ways do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
Why is it important to hear the views and stories of other people?
Who do you have in your life that you would consider an Elder?
How do you show respect to your parents or other adults? How do you think respect is shown in Indigenous cultures? Why do people not always respect Indigenous knowledge?
Do you have an Elder, a grandparent, an uncle, an aunt or a mentor that shares knowledge with you about the land, family traditions, family recipes?

* *Cultural diversity within the Indigenous people is frequently misinterpreted. There is a misconception that Indigenous People are one group who share the same culture, traditions, language and knowledge. Take the time to identify the three distinct Indigenous groups—First Nations, Metis and Inuit—and their unique connections to the land. Understand that these three*

distinct groups are identified by the Federal Government, that each Indigenous group on Turtle Island is distinct and that they all have their own distinct culture, traditions, language, governance, education, laws, customs, and ways of knowing. A small step students can take in respecting Indigenous people, and their culture is learning the three Indigenous groups and their unique traditions and knowledge.

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline several pathways for question generation depending on the provocation(s) that your class engaged with.

5W's and H Questions - Students will be able to ask and answer questions using the five Ws and an H (who, what, when, where, why, and how) to show understanding of key details in a text.
Lead a whole-group discussion and brainstorm around the book's theme with the goal of students generating questions about the role of Elders, their Indigenous Ways of knowing and the message they are sharing with the readers

With younger students, review the pictures in the book and have them think about what questions they would ask? Use the Creative Question Starts thinking routine to help students generate a list of interesting questions.
Older students can work independently using the Ask Questions template to help develop questions that provoke thinking and inquiry

Possible Questions

Who do you have in your life that you would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?
What do we need to know about the land to live on it? What do indigenous People teach us about the land?
How can knowledge from Elders help scientists study climate change?
How can we apply the Elders understandings of sustainability to reduce the effects of climate change?
What can we learn from Elders to help us live sustainably in the face of climate change?
What messages are Elders trying to share? What changes have Elders seen in life on the land?
Research different ways Indigenous people have used their knowledge of living things to meet their own needs.
How has the weather affected the Elders' community?

What are some of the changes in birds, animals and insects in yours and other communities?
How have the weather patterns changed in the community?
Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge-building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and the ideas generated thus far in the inquiry process.

Community Expert - Sharing knowledge and storytelling is an integral part of Indigenous culture, and a visit from an Elder is an excellent way to bring this experience to students. Indigenous Elders, Knowledge Keepers and Cultural Advisors play a central role in Indigenous communities; they are teachers within and beyond their communities. Elders, Knowledge Keepers and Cultural Advisors are not self-taught individuals. They have been gifted with their respective teachings by other Elders or Knowledge Keepers, typically over years of mentorship and teaching.

Connect with your school's Indigenous Education department to speak to an Indigenous education specialist and enquire about education or cultural programs available. Also, to inquire about who you can utilize in your classroom/school for the curricular concepts that you feel need connections to Indigenous ways of knowing that will enhance inquiry into environmental sustainability and relationships with Mother Earth.
Observe appropriate protocols and acknowledgements when including elders and knowledge keepers in your school/classroom.
Plan a field trip that fosters a greater understanding of Indigenous Ways of Knowing.

In Indigenous cultures, the Elder is highly regarded as a role model in their community and is considered the keeper of knowledge. A gift must be prepared by the person requesting the visit and offered to the Elder at the time of the request. For more information regarding Elder Wisdom in the Classroom

Umbrella Questions Brainstorm some umbrella questions with your students. An umbrella question is developed to help ground the inquiry. The question should be focused – it's not

aiming to answer all aspects of an issue. The question should be of interest to the students and also connect to the topic of the inquiry.

Who do you have in your life that you would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?
How can the knowledge that the Elders share in the story help us learn about climate change?
How can we apply the Elders understandings of sustainability to reduce the effects of climate change?
What can we learn from Elders to help us live sustainably in the face of climate change?
What are the Elders observing and learning by the changing seasons?
What wisdom and warnings are the Elders sharing regarding ways people are abusing the land and resources?
What impact do people have on the land? How does that make you feel?
What type of knowledge did Elders need to know about their environment to survive in it for thousands of years?
Can you create a list of the different things Indigenous people learned about to survive on the land?
Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)
Research different ways Indigenous people have used their knowledge of living things to meet their own needs.
What types of change have most affected First Nations, Métis and Inuit people? Identify the changes for each distinct Indigenous group.
What can First Nations, Métis and Inuit peoples teach other Canadians about sustainability?

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Knowledge Building Circles - A Knowledge Building Circle is a class discussion activity that is specifically reserved for working out students' questions and ideas. The aim of the circle is to help all students to improve their understandings as they share their learning, ideas and ask questions, This communal activity deepens students' understanding through increased exposure to the diverse perspectives of the class. The KBC aligns with the Indigenous time-honoured tradition of the Talking Circle where individuals take turns sharing ideas.

With younger students, begin by viewing the book The Sharing Circle by elder and author Theresa "Corky" Larsen-Jonasson. During your knowledge-building circle, use a talking stick so students listen and share respectfully. The student holding the talking stick, and only that student, is designated as having the right to share while the other students listen quietly and respectfully. This Indigenous cultural tradition is used during ceremonies, storytelling and sharing experiences with Elders.

Here is an example of Putting the Talking Stick into practice - use during speaking and listening activities to allow students to interact with others, contribute to a class goal, share ideas and opinions, and solve problems. Making a Talking Stick for the class.

Some Indigenous peoples use a rock when having a talking circle. This connects students to Grandfather Rock teachings, and to our connection with Mother Earth and our Ancestors. We seek guidance and wisdom when we include a rock in our talking circles, to ensure we are moving forward in a good way, as Creator intended us to be, Kind and Compassionate.

KWHLAQ Chart – Have students complete a KWHLAQ chart. The chart provides teachers with information regarding the student's learning process. The chart asks the following questions:

- K – What students already KNOW about Indigenous ways of knowing or Elders?
- W – WHAT students want to learn about Elders ways of knowing?
- H – HOW they will research or find the information they want to learn?
- L – What students have LEARNED about Indigenous knowledge after taking action?
- A – How will students APPLY the Indigenous knowledge they've learned?
- Q – What QUESTIONS do they still have or have thought of as a result of this inquiry?

KWHLAQ Chart

K	W	H	L	A	Q
What do I know?	What do I want to know?	How do I find out?	What have I learned?	What action do I take?	What new questions do I have?

E. Pursuing Learning

At this stage, students may begin research to pursue their umbrella questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Indigenous peoples have been and are leaders of climate action; their role in monitoring climate change impacts and the environmental effects on traditional lands and waters play a critical part in our fight against climate change. There is a great deal that we can learn from how Indigenous peoples have lived sustainably with the Land for many years. They have adapted by travelling

throughout their Land in search of food and other resources depending on the seasons. We need to listen carefully to better understand the value of Traditional knowledge and its contribution to sustainability and planning for the future. Indigenous communities have their own experts, elders, knowledge keepers and ways of knowing; their knowledge is an essential resource for learning how to adapt to climate change. We need to value what they can bring to the climate conversation and actively seek it to guide us.

Watch Norma's Story an animated true tale of the profound effects of climate change on the environment, culture and food security on the people and wildlife of the Arctic. What happens when we do not respect the land, the environment?

Natural Inquirer – students use interview techniques to research and write about an animal or plant affected by climate change

Arctic Survivor - Students role-play polar bears and the habitat components of food, water, shelter and space to understand how polar bear populations are affected by changes in their habitat. In the second part of the game, some possible impacts of climate change on the Arctic habitat of polar bears are explored.

Climate Connections - Bring news reports of weather events that have happened in the world. Discuss with the students the impact these events may have had on local habitats. Use the climate connection picture cards to play a variety of non-competitive games that explore connections between human actions, climate change, and positive and negative impacts on wildlife habitat.

Observing Change - In this outdoor activity, students will complete a series of neighbourhood walks with an observation chart over a period of a few months to predict and observe changes in living and non-living components of the local ecosystems in order to understand the impact of weather, climate and climate change. Discuss how humans can impact habitats in positive and negative ways (e.g., provide water for plants; create diverse habitats in gardens; remove native plants and in the process, risk destroying habitat for native animals; pollute water and soil, etc.). Help the students to identify how to show respect for the environment and what actions they can take to positively affect the school environment.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Doodling/Sketching

- Share news reports of major weather events that have happened in the community, province, country or the world. Discuss with the students the impact these events may

have had on local habitats, cities, towns, ecosystems. Have students make a now and then community comparison picture.

Consolidation Discussion

- Ensure that every student can describe what they did, why they did it, and what they found out regarding Indigenous Ways of Knowing or the importance of listening to and respecting Elders wisdom.

Think-Pair-Share

- Have students write a thank-you letter to the land, the seasons, Elders, grandparents or other adults who teach them things about your culture or nature. Describe how and why you are thankful.
- Students reflect on their learning by reading their letter or sharing their picture/sketch and simply turn around and share with one other person

Assessment Ideas

- Tableau - In this activity, students create a still picture, without talking, to capture and communicate the meaning of a concept. Students must truly understand the meaning of a concept or idea to communicate it using physical poses, gestures, and facial expressions rather than words. Use Tableau to check for understanding or see what new insights students have gained during the inquiry.
- Assess students' knowledge and understanding by inviting them to write a text about an Elder in their life
- Invite students to brainstorm the teachings that their elders have shared with them and how these teachings connect us with others, the land, histories, and our ancestors (to show we are accountable and that our decisions that we make affect others and the future generations).
- Assess students thank you letters to verify the learning between Elders and the land
- Connect with another class/school in the Arctic virtually. Learn how climate change is affecting their schoolyard and community and how their elders share knowledge with them.
- Students could write letters, send emails to pen pals or connect virtually to other classrooms around the globe to explore and explain how climate change affects their communities explaining how climate change affects their community
- Have students create a poster informing how Mother Earth provides for them and what they can do to protect her. Share the posters with other students by posting them on the classroom bulletin board or in the school hallway/entryway.

- Gather evidence of learning with observations, thumbs up thumbs down, listening to conversations, anecdotal notes and comments, rough drafts
- Conference with students - conversations can also include written evidence such as journals in which educators can read what students have to say about their learning rather than listening
- Have older students complete a What I Learned Today self-assessment (*eftoassessments.ca*)
- Have students express different ways to act in forests, parks, and other natural areas to show you respect the land in the medium of their choice.

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety. **Ask the students** what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:

- Create a video or presentation urging others to take action. Presentations can be in the classroom or at a school assembly
- Have students create a poster informing how Mother Earth provides for them and what they can do to protect her. Share the posters with other students by posting them in the school hallway
- Organize a Cleanup in your schoolyard or nearby park
- Bottled water-free day: educate your school about bottled water and its impact on the environment. Commit to reducing the use of bottled water at school and consider selling reusable water bottles for students to purchase as a fundraiser.
- Waste-free lunches: school lunches are a significant source of waste in schools. Reduce the amount of food and packaging waste heading to the landfill by hosting a waste-free lunch day. Take it a step further and host these days regularly on "Trashless Tuesdays" or "Wasteless Wednesdays".
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- Walk for water - When senior students at Seven Oaks Met School learned that the local community of Shoal Lake 40 First Nation (the very community where most of Winnipeg's drinking water is sourced!) has been under a boil water advisory for over 20 years, they were inspired to take action. They organized speakers and elders from Winnipeg and Shoal Lake to educate the audience about the water crisis. The event raised over $7,000 for the Shoal Lake 40 First Nation community and spread awareness across the region.

- The Shaughnessy Medicine Wheel Garden in Winnipeg was designed as a teaching garden, incorporating the medicine wheel's circle teachings, including fire, Water, air, and Earth. The plants and flowers reflect these elements and colours in each quadrant and feature Manitoba's traditional medicines and indigenous plants. Thirteen boulders encircle the garden to represent the 13 moons of the year, and seven cedar benches will represent the seven teachings. Providing an outdoor learning space for students and a natural setting to enjoy the environment for the local community.

- MMHS Arboretum, Community, Indigenous and Medicinal Plant Gardens Students, staff, community members and partners began planting trees, shrubs and wildflowers at Milliken Mills High School in 1994. Since that time, the arboretum and associated gardens have been enhanced and have flourished. This year we have made every effort to expand the nature of the gardens with an interpretive guide created by students across the curriculum. This, while the physical and plant make-up of the garden continues to evolve. This year, despite the challenges of face-to-face learning and participation, we established the indigenous medicinal plant garden and created a strong cross-departmental partnership in the school, which will see the roots truly become shoots as the project will become stewarded through teamwork.

- The Herb Campbell Public School has created a visual landscape plan for a Medicine Wheel Garden Outdoor Classroom on our school site, which includes: A centred medicine wheel garden with indigenous plants surrounded by stone seating and an outdoor classroom frame; 9 local food gardens including six raised-bed gardens (for herbs, vegetables, fruit, and edible flowers) and three in-ground gardens (a Three Sisters garden, an indigenous berry garden, and a pumpkin patch); 4 outer garden areas with indigenous plants, shrubs, and trees connected to the four cardinal directions of our centred Medicine Wheel Garden; A wildlife observation/inquiry area with feeders, water supply, and log stump seating; Interpretative learning signs; Pathways connecting to our natural forest, meadow, and wetland habitats and other planting areas.

- Oak Park Outdoor Indigenous Learning Place created an outdoor Indigenous learning space that allows students, staff, and the community to connect with nature and celebrate Indigenous culture, tradition, and teaching. This project has many stakeholders, including Indigenous and non-Indigenous students, Indigenous knowledge keepers (academics, community members, Elders), and various divisional staff. To have all staff and students embrace Indigenous ways of knowing, doing, and being; to enhance our Indigenous students' engagement and success in school. Having a teaching space in front of our school demonstrates our commitment to our school goal and reconciliation. It will also create endless opportunities for teaching and learning that honours, centres, and celebrates Indigenous culture.

- Youth Climate Solutions is a guide for making a difference for polar bears and their sea ice home. Visit Polar Bears and the Changing Arctic at Polar Bears International to learn more about the Arctic Ecosystem and how we can help protect this remarkable part of the planet.

- Visit Our Canada Project for many more action project ideas! This platform inspires youth to be responsible citizens and share their voice

Chapter 5: Indigenous Ways of Knowing

Inquiry 2: Indigenous Traditional Knowledge

- ***Provocation*** – *Video*
- ***Question Generation*** – *KWL, 5W's and H, Think, Puzzle, Explore*
- ***Knowledge Building*** – *Umbrella Questions, Gallery Walk*
- ***Determining Understanding*** - *Knowledge Building Circle, 3-2-1 Strategy, Concept Map, Video, Talking Stick*
- ***Pursuing Learning*** – *Walking Curriculum, Strangers in a Strange Land, Norma's Story*
- ***Consolidation*** – *Triangle-Square-Circle Headlines, I used to think...but now I think*
- **Assessment** – *Doodle it, Assessment Suggestions*
- ***Take Action***

Land Acknowledgement

Begin the inquiry by offering a land acknowledgment and discussing why we acknowledge the land. It is essential to teach students that we must recognize the Indigenous land that the school is on to learn about and from it.
As educators, recognizing that these lands are the traditional territories of Indigenous people and that all Canadians benefit from the land plays an essential role in modelling reconciliatory behaviour with your students. Reciting your school's land acknowledgement helps create a foundation in students for learning about and from Indigenous people whose land we live on.

A land acknowledgement reinforces that we benefit from the land, and we all have a responsibility to actively work towards honouring Indigenous Peoples as equal partners in sharing the land. Land acknowledgments are only one step in cultivating greater respect for and inclusion of Indigenous Peoples, with the understanding of the importance of our Treaty responsibilities.

Chapter 5 Indigenous Ways of Knowing recognizes the importance of Indigenous perspectives and connections to land and place as we work towards reconciliation 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).

Sharing stories is a way of sharing knowledge among Indigenous communities. Your classroom materials should be culturally diverse and inclusive of Canada's three distinct Indigenous groups. Here are a few examples of children's books that illustrate the importance of learning from our Elders and include the three distinct Indigenous groups.

- ***The Elders are Watching*** by David Bouchard and Roy Henry Vickers (Métis)
- ***Nimoshom and His Bus*** by Penny M. Thomas (First Nations Cree), illustrated by Karen Hibbarb
- ***Nokum is My Teacher*** by David Bouchard, illustrated by Allen Sapp (Métis)
- ***Oral Traditions and Storytelling*** by Anita Yasuda (First Nations)
- ***The Tree by the Woodpile*** by Raymond Yakeleya, Jane Modeste (First Nations Dene)

- ***Jigging for Halibut with Tsinii*** by Robert and Sara Davidson, illustrated by Janine Gibbons (First Nations Haida)
- ***Making a Whole Person: Traditional Inuit Education*** by Monica Ittusardjuat (Inuit)
- ***Fishing with Grandma*** by Maren Vsetula and Susan Avingaq (Inuit), illustrated by Charlene Chua
- ***A Walk on the Tundra*** by Rebecca Hainnu and Anna Ziegler (inuit), illustrated by Qin Leng
- ***Siha Tooskin Know the Nature of Life*** by Charlene and Wilson Bearhead, illustrated by Chloe Bluebird Mustooch (First Nations Nakota)
- ***Sila and the Land*** by Shelby Angalik, Araian Roundpoint and Lindsay Dupré, illustrated by Halie Finney (First Nations, Métis and Inuit)

Teaching and discussing controversial and sensitive topics is essential because it helps students think in-depth and fosters critical thinking. Many issues involving First Nation, Métis and Inuit peoples are controversial (land claims, self-government, blockades, hunting and fishing rights) or sensitive (residential schools, worldview). Building in and addressing controversial or sensitive topics at an early age allows students to explore and question in the safety of the classroom. Teachers may use some of the suggested questions in this inquiry to introduce more sensitive issues regarding the inequalities faced by Indigenous People. Please keep in mind that Acts of Reconciliation and Reclamation are fundamental as we move forward as a country. Our acknowledgement, and inclusion of Indigenous literature and media helps to create an understanding of the history, diversity, and issues that many Indigenous peoples face.

It would be helpful for the learners to understand that traditional/cultural knowledge is passed as an: I Do, We Do, You Do model. This mentorship model provides the close watching and coaching of the learner by the teacher. This model would aid in learning from mistakes, as well as identifying areas of strength and need for reflection. This helps the person who is learning of how knowledge is passed on, to connect with the sacredness of our relationship with Creator, Mother Earth, the plants, animals, and all other animate and inanimate beings as part of the Creators making. (Daniel Sylvestre)

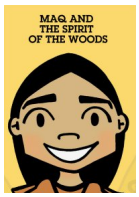
A. Provocation 2: Video

To hook student interest, use the following provocation to initiate student thinking.

Video – Maq and the Spirit of the Woods by Phyllis Grant

Maq and the Spirit of the Woods is the story of Maq, a Mi'kmaq boy who realizes his potential with the help of inconspicuous mentors. When an elder in the community offers him a small piece of pipestone, Maq carves a little person out of it. Proud of his work, the boy wants to impress his grandfather and journeys through the woods to find him. Indigenous people traditionally honour their elders. Their life experiences, combined with the knowledge passed on from previous generations, make them experts and teachers. This information was not

written down but passed down orally to each generation. Maq and his grandfather have a close relationship where they can speak honestly, respectfully and with empathy.



Phyllis Grant, " Maq and the Spirit of the Woods", NFB. 2006,8 mins

After viewing, discuss with students the importance of the knowledge, information and guidance older people such as Elders, Knowledge Keepers, grandparents, teachers, uncles, aunts, or mentors can offer. Students should be made aware that one must earn the right to become an Elder or Knowledge Keeper in a First Nations community. Not all Elders or Knowledge Keepers are seniors, nor are all old people Elders, and some Elders are younger. Elders and Knowledge Keepers are honoured because they have gifts of insight and understanding and are willing to share their knowledge. Discuss the role Elders or Knowledge Keepers play in Indigenous communities, provide picture books and other media that illustrate the connection Indigenous People have with the land to enhance the learning.

Post viewing discussion questions

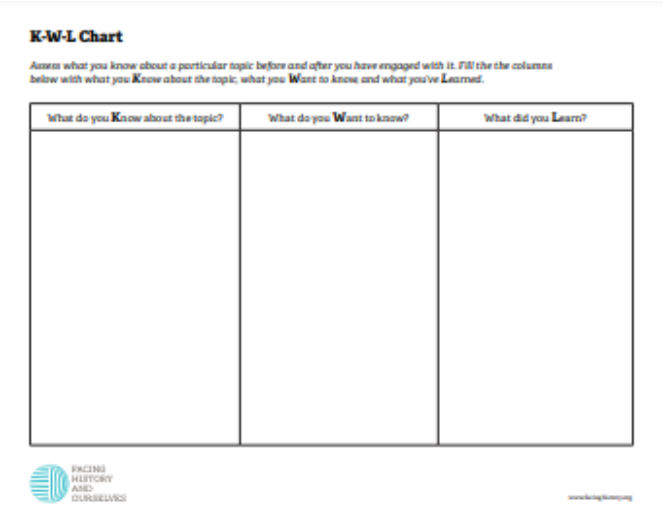
What lessons did Maq learn along his journey? How did Maq develop his self-confidence during his trip?
Maq is a Mi'kmaq boy. Which distinct Indigenous group is Mi'kmaq?
Name three distinct Indigenous groups in Canada*?
Do all Indigenous People share the same traditions and knowledge*? In what ways do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
Who do you have in your life that you would consider an Elder? What are the virtues that they practice and live by?
Elders are often considered wise and share their Indigenous Knowledge, can you explain why?
Why is it important to hear the views and stories of other people? What lessons can we learn from Elder's storytelling?
Who do you have in your life that you would consider an Elder? What qualities do they have that show they are humble, obedient, and have respect?
How do you show respect to your parents or other adults? How do you think respect is shown in Indigenous cultures? Why do people not always respect Indigenous knowledge?
Do you have an Elder, a grandparent, an uncle, an aunt or a mentor that shares knowledge with you about the land, family traditions, family recipes?

**Cultural diversity within the Indigenous people is frequently misinterpreted. There is a misconception that Indigenous People are one group who share the same culture, traditions, language and knowledge. Take the time to identify the three distinct Indigenous groups—First Nations, Metis and Inuit—and their unique connections to the land. Understand that these 3 distinct groups are identified by the Federal Government, that each Indigenous group on Turtle Island is distinct and that they all have their own distinct culture, traditions, language, governance, education, laws, customs, and ways of knowing. A small step students can take in respecting Indigenous people, and their culture is learning the three Indigenous groups and their unique traditions and knowledge.*

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline several pathways for question generation depending on the provocation(s) that your class engaged with.

KWL Chart – Have students use a KWL chart to organize their learning during the question generation activity. In the first section, What We Know, students will activate prior knowledge, lessons they have learned or memories spent with grandparents, Elders, adults, uncles, aunts, teachers. Students can complete the What we Know section individually or in small groups.


K-W-L Chart

Assess what you know about a particular topic before and after you have engaged with it. Fill the the columns below with what you Know about the topic; what you Want to know; and what you've Learned.

What do you Know about the topic?	What do you Want to know?	What did you Learn?

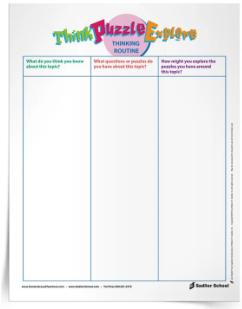
FACING HISTORY AND OURSELVES

www.facinghistory.org

kwl chart handout, www.facinghistory.org 2017

In the second section of the template, *What do you want to know about Indigenous Ways of Knowing* or *What do we want to know about learning from our Elders*, some students may not know where to begin if they don't have much background knowledge on this subject. To help generate questions, use the ***5W's and H Questions*** - Students will be able to ask and answer questions using the five W's and an H (who, what, when, where, why, and how) to show understanding of key details of the video.

Think, Puzzle, Explore is similar to a KWL chart; it activates students' prior knowledge and helps them generate questions and stimulates their curiosity. This thinking routine provides you with a snapshot of what students may already know about the subject or topic.



Possible Questions

Who do you have in your life that you would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?
How can knowledge from Elders help scientists study climate change?
How can we apply the Elders understandings of sustainability to reduce the effects of climate change?
What can we learn from Elders to help us live sustainably in the face of climate change?
What message are Elders trying to share?
What changes have Elders seen in life on the land?
How has the weather affected the Elders community?
What are some of the changes in birds, animals and insects in other communities?
How have the weather patterns changed in the community?
What types of change have most affected First Nations, Métis and Inuit people?
What can First Nations, Métis and Inuit peoples teach other Canadians about sustainability?
Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)
Research different ways Indigenous people have used their knowledge of living things to meet their own needs.
Apart from Metis, First Nations, and Inuit, Name three distinct Indigenous groups in Canada?
Take time to explore and research

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge-building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and the ideas generated thus far in the inquiry process.

Complete a Gallery Walk. Invite students to draw a picture of something they have learned from an Elder. An Elder could be a grandparent, an uncle, an aunt or a mentor or teacher. Suggest to the students that the drawing could represent a tradition/knowledge shared by the adult or mentor. Display images on the classroom walls so they are easily visible to students. Have students get up out of their seats and circulate the room.

The gallery walk can happen silently or be an opportunity for peer discussions or a writing activity. During this activity, students can practice important discussion moves, including building on each others' ideas, asking clarifying questions, respectfully agreeing and disagreeing, and providing meaningful and actionable feedback. ***Have students practice being respectful when viewing other students' pictures; the diversity of cultures and traditions in your classroom is an excellent opportunity for a teachable moment.***

Provide an opportunity for students to share what they saw, thought, and wondered during the Gallery walk. Students can look at the drawings silently while circulating, respond in conversation with a gallery walk partner, or write their comments or questions on post-it notes and paste them next to the drawings.

Umbrella Questions - Brainstorm some umbrella questions with your students. An umbrella question is developed to help ground the inquiry. The question should be focused – it's not aiming to answer all aspects of an issue. The question should be of interest to the students and also connect to the topic of the inquiry.

> How can the knowledge that the Elders share help us learn about climate change?
> How can we apply the Elders understandings of sustainability to reduce the effects of climate change?
> What can we learn from Elders to help us live sustainably in the face of climate change?
> What are the Elders observing and learning by the changing seasons?
> What wisdom and warnings are the Elders sharing regarding ways people are abusing the land and resources?
> What impact do people have on the land? How does that make you feel?
> What type of knowledge did Elders need to know about their environment to survive in it for thousands of years?
> Can you create a list of the different things Indigenous people learned about to survive on the land?
> Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)

Research different ways Indigenous people have used their knowledge of living things to meet their own needs.
What types of change have most affected First Nations, Métis and Inuit people? Identify the changes for each distinct Indigenous group.
What can First Nations, Métis and Inuit peoples teach other Canadians about sustainability?

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Knowledge Building Circles - A Knowledge Building Circle is a class discussion activity that is specifically reserved for working out students' questions and ideas. The aim of the circle is to help all students to improve their understandings as they share their learning, ideas and ask questions. This communal activity deepens students' understanding through increased exposure to the diverse perspectives of the class. The KBC aligns with the Indigenous time-honoured tradition of the Talking Circle where individuals take turns sharing ideas.

With younger students , begin by viewing the book The Sharing Circle by elder and author Theresa "Corky" Larsen-Jonasson. During your knowledge-building circle, use a talking stick so students listen and share respectfully. The student holding the talking stick, and only that student, is designated as having the right to share while the other students listen quietly and respectfully. This Indigenous cultural tradition is used during ceremonies, storytelling and sharing experiences with Elders.

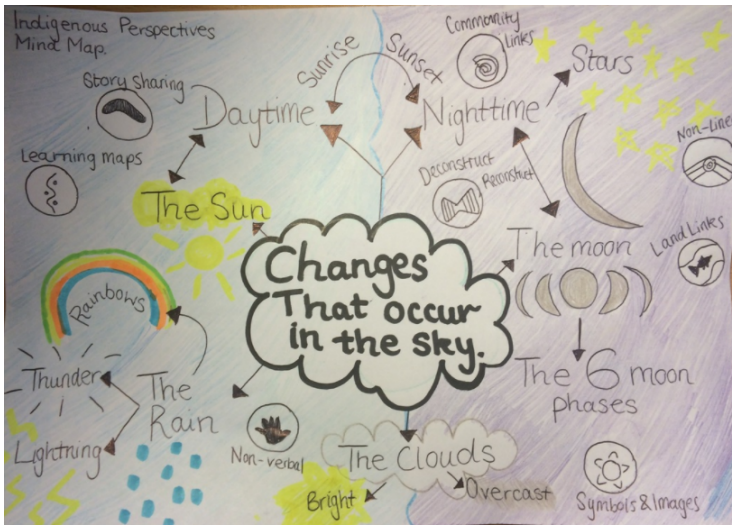
Here is an example of Putting the Talking Stick into practice **-** use during speaking and listening activities to allow students to interact with others, contribute to a class goal, share ideas and opinions, and solve problems. Making a Talking Stick for the class

Some Indigenous peoples use a rock when having a talking circle. This connects students to Grandfather Rock teachings, and to our connection with Mother Earth and our Ancestors. We seek guidance and wisdom when we include a rock in our talking circles, to ensure we are moving forward in a good way, as Creator intended us to be, Kind and Compassionate.

3-2-1 Strategy – this strategy is an easy way to check for student's understanding and use their responses to guide teaching decisions. 3-2-1 allows students to summarize their learning by identifying three things they have learned about Indigenous Ways of Knowing, two things that

interest them about learning from Elders and that they would like to learn more about and one question they still have about Indigenous Ways of Knowing

Concept Maps allow students to share their learning and knowledge with visual representations. Encourage the students to draw, incorporate words, messages, ideas anything they have learned about Indigenous Ways of Knowing. The concept map allows you to see how students understand the content. Example below.



Indigenous Perspectives Mind Map

E. Pursuing Learning

At this stage, students may begin research to pursue their umbrella questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Indigenous peoples have been and are leaders of climate action; their role in monitoring climate change impacts and the environmental effects on traditional lands and waters play a critical part in our fight against climate change. There is a great deal that we can learn from how Indigenous peoples have lived sustainably with the Land for many years. They have adapted by travelling throughout their Land in search of food and other resources depending on the seasons. We need to listen carefully to better understand the value of Traditional knowledge and its contribution to sustainability and planning for the future. Indigenous communities have their own experts, elders, knowledge keepers and ways of knowing; their knowledge is an essential resource for learning how to adapt

to climate change. We need to value what they can bring to the climate conversation and actively seek it to guide us.

Watch Norma's Story an animated true tale of the profound effects of climate change on the environment, culture and food security on the people and wildlife of the Arctic.

These next two outdoor activities can help students understand the essential question How can Indigenous Ways of Knowing help scientists study climate change?

The Walking Curriculum provides the opportunity to take your students outdoors. The suggested walks introduce an indigenous perspective to the learning activities. For example, the What's Under Foot Walk relates the walk to Indigenous Peoples sense of the interconnectedness of all things. There is an understanding of the importance of taking care of the land and it will take care of you. Indigenous knowledge tells of an understanding of life cycles, sustainable harvesting practices and only taking what you need.

Strangers in a Strange Land – helps students appreciate the value of traditional knowledge in understanding the impacts of climate change on nature. Each student interviews several long-term members of the community who have spent a lot of time out of doors. Then, have the class share survey outcomes and compare and analyze the results.

Have student list ways in which climate affects his or her community. For example, fall weather brings salmon upstream and allows us to fish, winter snow makes it possible to ski, spring rain floods the fields where we grow crops, the break-up of sea ice in summer brings bowhead whales close to shore.

Encourage students to write down what they observe in their schoolyard, look at both the big and the small, and examine plants, rocks, and insects up close. Have them make a record in their journal of what they experience with each of their senses. Ask students to draw and label their pictures. Have them note the changes during the different seasons at different times of the year. Have them note/draw any changes they have observed over the school year and if the changes were caused by climate change.

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Triangle-Square-Circle - This strategy encourages students to reflect on their learning and process information presented in this inquiry. This strategy should be used with the whole group

rather than as an independent task with the teacher charting ideas. Students share important pieces of information they have learned during the inquiry and question anything they don't completely understand.

1. Draw a triangle - next to it write three important points from the video or Elders
2. Draw a square - next to it write down anything that students agree with or squares with their thinking
3. Draw a circle - next to it write down anything that is still circling in their heads

Headlines – this activity allows students to reflect on their learning, understanding and beliefs. They examine how and why their thinking has changed and come to some tentative conclusions. What have the students learned from the video and activities throughout the inquiry. Have students share their headlines and create a bulletin board to display the learning.

I used to think...but now I think this activity helps students reflect on their thinking about an issue or topic and explore how and why their thinking has changed. It is important to encourage students to reflect on their learning as they investigate the impacts of climate change through diverse perspectives.

Assessment Ideas

Doodle it - Have students quickly draw a picture of what they understand instead of writing it. Create a collective poster depicting what students have learned from the Elders, stories and activities throughout the inquiry.

Assess students' knowledge and understanding by inviting them to write a text about an Elder in their life
Invite students to brainstorm the teachings that their elders have shared with them and how these teachings connect us with others, the land, histories, and our ancestors (to show we are accountable and that our decisions that we make affect others and the future generations).
Assess students thank you letters to verify the learning between Elders and the land
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Have students express different ways to act in forests, parks, and other natural areas to show you respect the land in the medium of their choice.

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety. **Ask the students** what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:
Find a resource or field guide that describes how Indigenous communities have used plants for medicine, food or cultural purposes.

- Create a video or presentation urging others to take action. Presentations can be in the classroom or at a school assembly
- Have students create a poster informing how Mother Earth provides for them and what they can do to protect her. Share the posters with other students by posting them in the school hallway
- Organize a Cleanup in your schoolyard or nearby park
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Chapter 5: Indigenous Ways of Knowing

Inquiry 3: Elder Knowledge: Connections to the Land

- ***Provocation*** *– Community Expert - Elder Visit*
- ***Question Generation*** *– Wonder Wall or Q-matrix, Inside Outside circles*
- ***Knowledge Building*** *– Umbrella Questions, Inside/Outside Circles*
- ***Determining Understanding*** *- Concept Maps, Doodling/Sketching*
- ***Pursuing Learning*** *– Video, Step Inside, Walking Curriculum, Plant Adaptations*
- ***Consolidation*** *– Neighbourhood Walk, Accountable Discussion*
- **Assessment** *– Poster/Assessment Suggestions*
- ***Take Action***

Land Acknowledgement

Begin the inquiry by offering a land acknowledgment and discussing why we acknowledge the land. It is essential to teach students that we must recognize the Indigenous land that the school is on to learn about and from it.
As educators, recognizing that these lands are the traditional territories of Indigenous people and that all Canadians benefit from the land plays an essential role in modelling reconciliatory behaviour with your students. Reciting your school's land acknowledgement helps create a foundation in students for learning about and from Indigenous people whose land we live on.

A land acknowledgement reinforces that we benefit from the land, and we all have a responsibility to actively work towards honouring Indigenous Peoples as equal partners in sharing the land. Land acknowledgments are only one step in cultivating greater respect for and inclusion of Indigenous Peoples, with the understanding of the importance of our Treaty responsibilities.

Chapter 5 Indigenous Ways of Knowing recognizes the importance of Indigenous perspectives and connections to land and place as we work towards reconciliation 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).

Sharing stories is a way of sharing knowledge among Indigenous communities. Your classroom materials should be culturally diverse and inclusive of Canada's three distinct Indigenous groups. Here are a few examples of children's books that illustrate the importance of learning from our Elders and include the three distinct Indigenous groups.

- ***The Elders are Watching*** by David Bouchard and Roy Henry Vickers (Métis)
- ***Nimoshom and His Bus*** by Penny M. Thomas (First Nations Cree), illustrated by Karen Hibbarb
- ***Nokum is My Teacher*** by David Bouchard, illustrated by Allen Sapp (Métis)
- ***Oral Traditions and Storytelling*** by Anita Yasuda (First Nations)
- ***The Tree by the Woodpile*** by Raymond Yakeleya, Jane Modeste (First Nations Dene)

- ***Jigging for Halibut with Tsinii*** by Robert and Sara Davidson, illustrated by Janine Gibbons (First Nations Haida)
- ***Making a Whole Person: Traditional Inuit Education*** by Monica Ittusardjuat (Inuit)
- ***Fishing with Grandma*** by Maren Vsetula and Susan Avingaq (Inuit), illustrated by Charlene Chua
- ***A Walk on the Tundra*** by Rebecca Hainnu and Anna Ziegler (inuit), illustrated by Qin Leng
- ***Siha Tooskin Know the Nature of Life*** by Charlene and Wilson Bearhead, illustrated by Chloe Bluebird Mustooch (First Nations Nakota)
- ***Sila and the Land*** by Shelby Angalik, Araian Roundpoint and Lindsay Dupré, illustrated by Halie Finney (First Nations, Métis and Inuit)

Teaching and discussing controversial and sensitive topics is essential because it helps students think in-depth and fosters critical thinking. Many issues involving First Nation, Métis and Inuit peoples are controversial (land claims, self-government, blockades, hunting and fishing rights) or sensitive (residential schools, worldview). Building in and addressing controversial or sensitive topics at an early age allows students to explore and question in the safety of the classroom. Teachers may use some of the suggested questions in this inquiry to introduce more sensitive issues regarding the inequalities faced by Indigenous People. Please keep in mind that Acts of Reconciliation and Reclamation are fundamental as we move forward as a country. Our acknowledgement, and inclusion of Indigenous literature and media helps to create an understanding of the history, diversity, and issues that many Indigenous peoples face.

It would be helpful for the learners to understand that traditional/cultural knowledge is passed as an: I Do, We Do, You Do model. This mentorship model provides the close watching and coaching of the learner by the teacher. This model would aid in learning from mistakes, as well as identifying areas of strength and need for reflection. This helps the person who is learning of how knowledge is passed on, to connect with the sacredness of our relationship with Creator, Mother Earth, the plants, animals, and all other animate and inanimate beings as part of the Creators making. (Daniel Sylvestre)

A. Provocation 3: Community Expert – Elder Visit

To hook student interest, use the following provocation to initiate student thinking.
Sharing knowledge and storytelling is an integral part of Indigenous culture, and a visit from an Elder is an excellent way to bring this experience to students. Indigenous Elders or Knowledge Keepers play a central role in Indigenous communities; they are teachers within and beyond their communities. They have been gifted with their respective teachings by other Elders or Knowledge Keepers, typically over years of mentorship and teaching.

Invite an Elder to share their knowledge and experience with the students. Ask them to share a traditional legend through oral storytelling or to lead a nature walk around your schoolyard or nearby park.
Connect with your school's Indigenous Education department to speak to an Indigenous education specialist and enquire about education or cultural programs available. Also, to inquire about who you can utilize in your classroom/school for the curricular concepts that you feel need connections to Indigenous ways of knowing that will enhance inquiry into environmental sustainability and relationships with Mother Earth.
Observe appropriate protocols and acknowledgements when including elders and knowledge keepers in your school/classroom.
Plan a field trip that fosters a greater understanding of Indigenous Ways of Knowing.

In Indigenous cultures, the Elder is highly regarded as a role model in their community and is considered the keeper of knowledge. A gift must be prepared by the person requesting the visit and offered to the Elder at the time of the request. For more information regarding Elder Wisdom in the Classroom

Discuss with students the importance of the knowledge, information and guidance older people such as Elders, Knowledge Keepers, grandparents, teachers, uncles, aunts, or mentors can offer. Students should be made aware that one must earn the right to become an Elder or Knowledge Keeper in a First Nations community. Not all Elders or Knowledge Keepers are seniors, nor are all old people Elders, and some Elders are younger. Elders and Knowledge Keepers are honoured because they have gifts of insight and understanding and are willing to share their knowledge. Discuss the role Elders or Knowledge Keepers play in Indigenous communities, provide picture books and other media that illustrate the connection Indigenous People have with the land to enhance the learning.

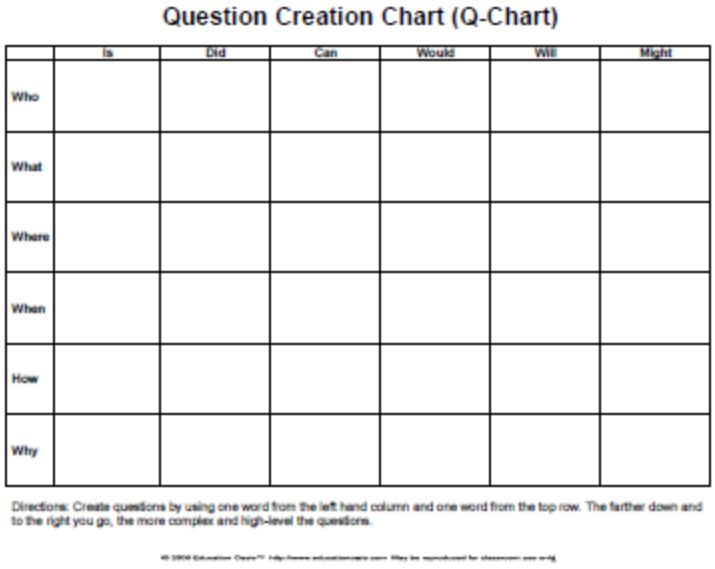
Prepare questions for the Elder's visit, some possible questions are:

What is an Elder or Knowledge Keeper? Why are they an important natural resource?
What is the difference between an Elder and Knowledge Keeper?
What have you learned from living off the land? What can we learn from Elders to help us live sustainably?
What changes have you noticed in life on the land or in the seasons?
Have any of the changes on the land been good or bad for your community?
Why is it important for humans to connect to the land?
How can we as students connect to the land, plants and animals and share their space?
How have the changes in the weather affected you and your community? What will happen if the weather keeps changing?
What messages are Elders trying to share?
What changes have Elders seen in life on the land? How is this "lived" experience different than that of statistical data?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocations that have captured their interest by generating meaningful questions to continue to drive the learning process. This section will outline several pathways for question generation depending on the provocation(s) that your class engaged with.

The Q-Chart is designed to help students in generating deep, relevant, inquiry questions. The goal is to ask the questions at the bottom right corner of the matrix. These questions require higher thinking and produce answers that are deeper and more complex.



Question Creation Chart (Q-Chart)

	Is	Did	Can	Would	Will	Might
Who						
What						
Where						
When						
How						
Why						

Directions: Create questions by using one word from the left hand column and one word from the top row. The farther down and to the right you go, the more complex and high-level the questions.

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Possible Questions

- How can knowledge from Elders help scientists study climate change?
- How might we apply the Elders' understandings of sustainability to reduce the effects of climate change?
- How can we learn from Elders to help us live sustainably in the face of climate change?
- Who do you have in your life that you would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?
- What message are Elders trying to share?
- What changes have Elders seen in life on the land?
- How has the weather affected the Elders community? How have the weather patterns changed in the community?

What are some of the changes in birds, animals and insects in other communities?
What impact do people have on the land? How does that make you feel?
What type of knowledge did Elders need to know about their environment to survive in it for thousands of years?
What can First Nations, Métis and Inuit peoples teach other Canadians about sustainability?
Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)

Wonder Wall or Wall of Inquiry offers the students the opportunity to post their questions on a bulletin board using post-it notes. By adding words and photos to the Wonder Wall, this provokes students to think about Indigenous Ways of Learning. Students use the post it notes to write questions about the Elder visit, photos and words. As a class, brainstorm different types of questions that work well for inquiry learning and post them as examples on the bulletin board.

C. Knowledge Building

At this stage, students may be ready to engage in a group knowledge-building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and the ideas generated thus far in the inquiry process.

Umbrella Questions –

Who do you have in your life that you would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?
How can the knowledge that the Elders share in the story help us learn about climate change?
How can we apply the Elders understandings of sustainability to reduce the effects of climate change?
What can we learn from Elders to help us live sustainably in the face of climate change?
What are the Elders observing and learning by the changing seasons?
What wisdom and warnings are the Elders sharing regarding ways people are abusing the land and resources?
What impact do people have on the land? How does that make you feel?
What type of knowledge did Elders need to know about their environment to survive in it for thousands of years?
Can you create a list of the different things Indigenous people learned about to survive on the land?
Can you identify some other pressing environmental issues that are currently taking place in Canada? (Pipelines, clean drinking water in Northern communities)
Research different ways Indigenous people have used their knowledge of living things to meet their own needs.

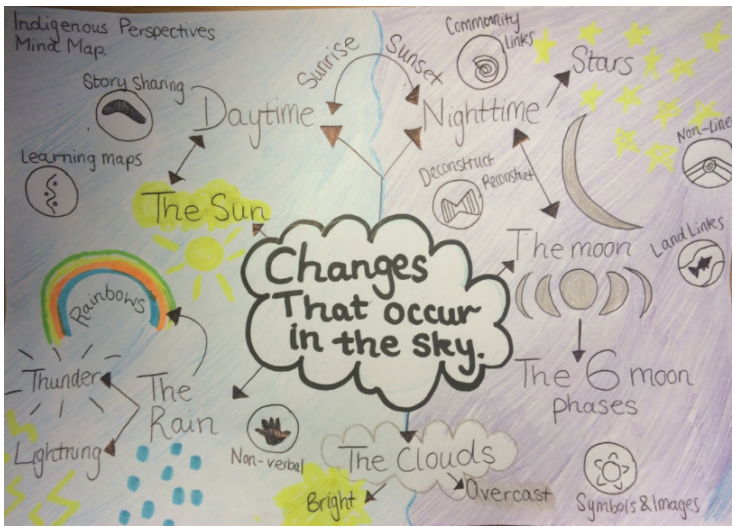
What types of change have most affected First Nations, Métis and Inuit people? Identify the changes for each distinct Indigenous group. What can First Nations, Métis and Inuit peoples teach other Canadians about sustainability?
Why are trappers, fisherman, hunters, and land users valuable when it comes to our understanding of climate change and sustainability?
How do courses like Trappers Certification, Hunters Safety, Scouts, etc. include sustainable practices in their teaching?
How are management, data collection and statistical projections different than lived-experience, traditional knowledge, and story-telling? What are the pros and cons of each and how can balance be created, understanding that all aspects have our planets best interests in mind?

Inside /Outside Circles – Use this discussion technique to give students the opportunity to discuss what they enjoyed or learned during the Elder Visit. During the second round, students can discuss who they have in their life that they would consider an Elder? Grandparent, coach, teacher, uncle, aunt or mentor? What important things do you learn from this adult?

D. Determining Understanding

Use responses to inform and guide the learning process. They can provide insight into which concepts need clarity, what many students are already well informed about, and a general direction that many students want to pursue.

Concept Maps allow students to share their learning and knowledge with visual representations. Encourage the students to draw, incorporate words, messages, ideas anything they have learned about Indigenous Ways of Knowing. The concept map allows you to see how students understand the content.



Indigenous Perspectives Mind Map

Doodling/Sketching strategy

- Ask students to draw some of the significant people in their lives and how and what they learn from those people. (an Elder, a grandparent, a teacher, a coach). Have students draw out their understanding using the doodle/sketching strategy
- Draw this significant person in their role in the community; how does this person help you, how does this person help others in your community?

E. Pursuing Learning

At this stage, students may begin research to pursue their umbrella questions, or some of the following activities could be integrated into the process to ensure that students have an understanding of foundational climate science. The activities listed below will enrich the understanding of climate change.

Indigenous peoples have been and are leaders of climate action; their role in monitoring climate change impacts and the environmental effects on traditional lands and waters play a critical part in our fight against climate change. There is a great deal that we can learn from how Indigenous peoples have lived sustainably with the Land for many years. They have adapted by travelling throughout their Land in search of food and other resources depending on the seasons. We need to listen carefully to better understand the value of Traditional knowledge and its contribution to sustainability and planning for the future. Indigenous communities have their own experts, elders, knowledge keepers and ways of knowing; their knowledge is an essential resource for learning how to adapt to climate change. We need to value what they can bring to the climate conversation and actively seek it to guide us.

Watch Norma's Story an animated true tale of the profound effects of climate change on the environment, culture and food security on the people and wildlife of the Arctic.

Step Inside activity helps students view a place, situations, events or things through different lenses and points of view. Ask students to imagine themselves in the role of an elder and note/describe what they can see, observe or notice. Students can identify what elders believe, care about, wonder or question. Allow students to use visuals or words for their responses on the Step Inside template. For this activity the students responses can be in response to the Elder visit or they can respond to an Elder/adult in their life such as a grandparent, coach, teacher or mentor.

The Walking Curriculum provides the opportunity to take your students outdoors. The suggested walks introduce an indigenous perspective to the learning activities. For example, the What's Under Foot Walk relates the walk to Indigenous Peoples sense of the interconnectedness of all things. There is an understanding of the importance of taking care of the land and it will take care of you. Indigenous knowledge tells of an understanding of life cycles, sustainable harvesting practices and only taking what you need.

Ask students to identify how climate change affects their schoolyard or local environment. Brainstorm with the students the needs of a plant such as the sun, water, soil nutrients, pollinators, etc. Discuss how plants are affected by climate change.

Watch the Plant Adaptations video, then have students draw a garden full of plants that could adapt to a changing climate. Discuss which plants they would plant and why? Awesome Adaptations How do plants adapt to their environment

F. Consolidation

This step is designed to encourage students to integrate and synthesize key ideas. When students make connections and see relationships within and across lessons, this helps them to solidify knowledge and deepen understanding.

Neighbourhood Walk
Walk and explore the neighbourhood and have students use their senses to explore trees and plants. Draw a map with the students of plants, trees, shrubs in the schoolyard. Identify any changes in the schoolyard that may have been affected by climate change.

Accountable Discussion

Conduct a class discussion by defining accountable talk. During the discussion students contributing to the discussion are held accountable to give reasons and evidence for opinions.

Before the discussion allow students to complete the accountable cards templates to record their reasons and evidence. The cards can be completed individually or in groups.

Ex: I believe climate change is because certain provinces in our country are being afflicted by wildfires and floods.

I agree with the Elder because having lived on the land his wisdom is knowledge that we humans can use to guide us in protecting the land.

Assessment Ideas

- Poster - Have students create a poster informing how Indigenous Ways of knowing can provide us with respectful ways to protect the planet. Share the posters with other students by posting them on the bulletin board in the school hallway.
- Assess students' knowledge and understanding by inviting them to write a text about an Elder in their life
- Invite students to brainstorm the teachings that their elders have shared with them and how these teachings connect us with others, the land, histories, and our ancestors (to show we are accountable and that our decisions that we make affect others and the future generations).
- Assess students thank you letters to verify the learning between Elders and the land
- Connect with another class/school in the Arctic virtually. Learn how climate change is affecting their schoolyard and community and how their elders share knowledge with them.
- Students could write letters, send emails to pen pals or connect virtually to other classrooms around the globe to explore and explain how climate change affects their communities explaining how climate change affects their community
- Have students create a poster informing how Mother Earth provides for them and what they can do to protect her. Share the posters with other students by posting them on the classroom bulletin board or in the school hallway/entryway.
- Gather evidence of learning with observations, thumbs up thumbs down, listening to conversations, anecdotal notes and comments, rough drafts
- Conference with students - conversations can also include written evidence such as journals in which educators can read what students have to say about their learning rather than listening
- Have older students complete a What I Learned Today self-assessment. (*eftoassessments.ca*)
- Have students express different ways to act in forests, parks, and other natural areas to show you respect the land in the medium of their choice.

Take Action:

Allowing time for students to take action is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety. **Ask the students** what they want to do to positively impact climate change. List their ideas and come up with a plan to put their action in place.

Ideas for Taking Action:
Get outside and learn the names of the plants and animals in your area with local indigenous and non-indigenous groups. Look for plants that can be used for simple home remedies.

- Participate in the Planting for Change program, which helps your school create a schoolyard planting site that acts as a mini-climate change outdoor classroom/lab.
- Have students create a poster informing how Mother Earth provides for them and what they can do to protect her. Share the posters with other students by posting them in the school hallway
- Students can collect data on the health and yearly growth of their tree plantings as they explore issues surrounding climate change locally and globally.
- Bottled water-free day: educate your school about bottled water and its impact on the environment. Commit to reducing the use of bottled water at school and consider selling reusable water bottles for students to purchase as a fundraiser.
- Waste-free lunches: school lunches are a significant source of waste in schools. Reduce the amount of food and packaging waste heading to the landfill by hosting a waste-free lunch day. Take it a step further and host these days regularly on "Trashless Tuesdays" or "Wasteless Wednesdays".
- Have regular “No-Tech” days. Encourage the understanding of how tech usage has an invisible drain on our electric infrastructure. Also include the need for our reliance upon our local environments, as opposed to a virtual one. This will help our students mental and physical health, to ensure that they can “turn-off” to reflect and recharge without distraction.

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