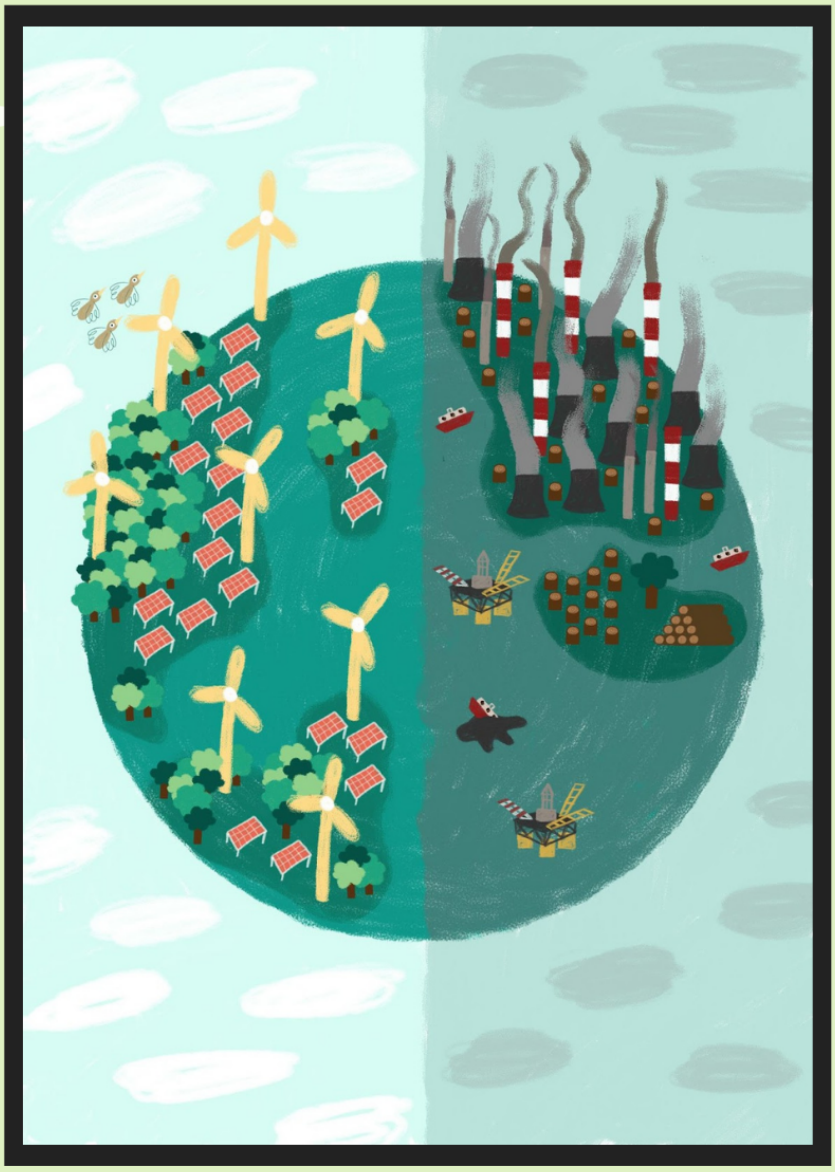
CHAPTER 1:

What is climate change? Why care?

A Project of Learning for a Sustainable Future

Contributors: Janice Haines, Nathalie Lauriault



Art by Joana Campinas for ArtistsForClimate.org

A project of

Learning for a Sustainable Future

LSF

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Canada

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. We have included several suggestions so that every kind of learner will find ideas, questions and activities to explore based on their unique and diverse community characteristics and circumstances, inspiring learning that ultimately 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.

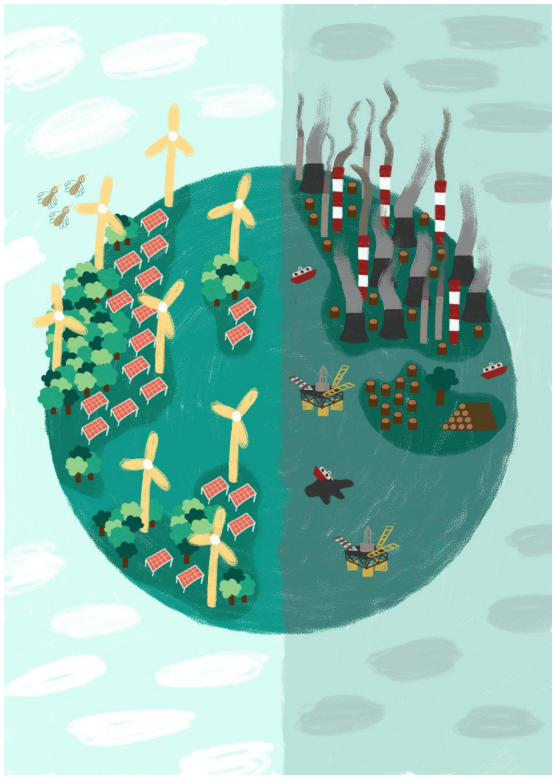

Illustration by Joana Campinas for ArtistsForClimate.org

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 [IPCC Working Group I Co-Chair Valérie] Masson-Delmotte. Yet the new [IPCC] 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.

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 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. 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.

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.

Greenhouse Effect

According to Let's Talk Energy, "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." (Greenhouse Effect, Let's Talk Energy)

Let's Talk Science explains that "A blanket of gases called the **atmosphere** surrounds the Earth. Some of these gases are **greenhouse gases** (carbon dioxide being the most common greenhouse gas). They trap heat, like the walls of a greenhouse. The greenhouse gases in our atmosphere keep our planet warm enough for us to survive. Not enough greenhouse gases would make the Earth too cold for humans. In fact, without greenhouse gases in our atmosphere, Earth's average temperature would be -18 degrees Celsius. But, too much greenhouse gas in the atmosphere would make the Earth too warm."

"Many greenhouse gases exist naturally. Greenhouse gases cycle through the Earth's systems. There are greenhouse gas **sources** and greenhouse gas **sinks**. Sources are parts of the cycle that add greenhouse gases to the atmosphere. Sinks are parts of the cycle that remove greenhouse gases from the atmosphere. Recently, the concentration of greenhouse gases in our atmosphere has gotten higher. This is because humans have dramatically increased the amount of sources, which now outweigh the sinks." (Climate Change 101, Let's Talk Science)

Climate vs. Weather

The difference between weather and climate is that weather describes an event occurring at a particular time and place (a storm moving in over a city for example), whereas 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 and Ingenium)

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

General Introduction to the inquiries in this chapter:

This chapter offers three different structured inquiries to support *What is Climate Change and Why Care?* Each of the three inquiries begin with a provocation followed by the other steps of the inquiry model and many strategies and examples are included.

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 inquiries in this chapter 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 Characteristics Protection Living things Energy Environment
Language	Media form Retelling Restating Communication Critical Literacy
Social Studies	Location Physical features Community Interactions
Physical Education and Health	Participation Outdoor education Energy Vitality Relationships Self-awareness Appreciation Motivation
The Arts (Visual Arts, Drama, Dance)	Composition Interpretation Symbolism Form Line Colour Space
Mathematics	Data literacy Quantity Number sense

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: Understanding Weather

Students will explore and learn about weather through storybooks, sensory walks and charades. They will acquire an understanding of how weather is the condition of the atmosphere in one area at a particular time.

Resources:

- Read Aloud: What Makes It Rain?
- Visual Processing Cards (Chiji or Climer cards)

Inquiry 2: Understanding Climate

Students will explore and learn about climate by exploring the outdoors and through sorting activity.They will acquire an understanding of how climate is the weather of a specific region over a long period of time.

Resources:

- Sorting Activity
- Visual Processing Cards (Chiji or Climer Cards)

Inquiry 3: Understanding Climate Change

Students will explore and learn about the difference between weather and climate and understand how climate change impacts our world. They will have opportunities to further learn by watching videos to obtain solid background information on the concept of climate change.

Resources:

- Weather vs. Climate Infographic (NOAA, 2020)
- Visual Processing Cards (Chiji or Climer Cards)
- Climate Change for Kids | A fun engaging introduction to climate change for kids
- Climate Change Science Experiments For Kids

Chapter 1: What is Climate Change and Why Care?
Inquiry 1: Understanding Weather

- **Provocations** – *book*
- **Question Generation** – *book, Five W's Strategy*
- **Knowledge Building**– *Knowledge Building Circle, Critical Thinking Question*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *sensory walk, charades*
- **Consolidation –** *visual processing cards ($), illustrate*
- **Assessment –** *Graffiti Wall*
- **Take Action**

A. Provocation

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

BOOK

What Makes It Rain? By Katie Daynes, illustrated by Christine Pym

This book, **What Makes It Rain?** is handy to have in the classroom and has six big topics with a lot of information on each. Note suggestions for when to use each chapter in brackets below:

- Rain (spring or when it is raining)
- Rainbows (spring or if you see one)
- Sun (any season/temperatures)
- Lightning and thunder (after a storm)
- Wind (any season)
- Snow (winter or if it snows when it shouldn't)

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

**If you don't have access to this book there are other suitable titles in your school or public library that could be used instead such as Questions and Answers About Weather by the same author*

Possible Discussion Questions:

- What would happen if it never stopped raining? Or if it didn't rain at all?
- What would happen if it only rains in one part of the world and not the rest?
- What would happen if the sun overheats a farmer's field?

- What would happen if all the glaciers melted?
- What is your favourite weather? Why?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off the provocation that has captured their interest by generating meaningful questions to continue to drive the learning process.

Book: What Makes It Rain?
Have the students look at the pictures in the book. Ask them to think about what questions they would have. Start with one of the suggestions from **Five Ws and an H and Developing Higher Order Questions** (Who, What, Where, When, Why and How) to see what students come up with. Write these questions down so that students can see their questions come to life.

Extra Resource for helping students asking questions:
- 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.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated after the What Makes it Rain Book provocation or the example below.

Possible **Critical Thinking Question**:
- **"What do I know about weather?"** (easier)
- **"Do we need different kinds of weather? Why?"** (more difficult)

D. Determining Understanding

At this stage of the inquiry, 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.

Based on their understanding of weather, work together with your class to fill out the "Know" and

"Want" columns of a KWL (Know-Want-Learned) Chart.

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 questions, or the following activity could be integrated into the process to ensure that students have an understanding of foundational climate science. The activity listed below will enrich the understanding of climate change.

The purpose of this activity is to make students aware of their environment using their senses.

Start with a **Sensory Walk** (this can be done during every season and all weather!).
Begin by having students take note of the weather on a particular day.

Example prompts:

- If it is windy, ask them, "Can you feel the wind on various parts of your body?" or "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? Ask, "Do the shapes of the clouds remind you of anything?".
- In the winter, if it is snowing, go outside to have students closely look at snowflakes. Suggest that they look at their snowflakes and compare them with a friend. Ask if they are the same.

**For other ideas on focused sensory walks, explore *A Walking Curriculum* by Gillian Judson.

Follow up: Weather Element Charades
After the walk, divide the students in groups of 4 or students can choose to perform alone. Explain the instructions to the **Charade Game**.

In their groups, students pick a weather element that they observed outside during the sensory walk, talked about in the book or that they would like to share. Instruct them to work together to determine how to illustrate the element using their bodies and movement. Once they have rehearsed they will present their charade to the rest of the class. The spectators are invited to guess what they are acting out.

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.

Illustrate
Have the students show their learning about climate with playdough, illustrations or movement in groups.

AND/OR

Visual processing cards (will need to be purchased)
Using a deck of **Visual Processing Cards** (**Chiji** or **Climer Cards**), spread these out on the floor or on a table. Ask students to pick a card that reflects something that they have learned today. This is ideally facilitated in a circle.

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.

Tell the students they are **school artists** and have been invited to explain to the **school community** about **weather.** They have been given a space on a wall called a **graffiti wall**.

Divide the wall into 3 and ask students to visually represent their ideas and opinions about **weather** in the first third. The other two thirds will be filled over the course of the next two inquiries (climate and climate change).

Spend some time learning about the history of graffiti: **Graffiti Facts for Kids**.

Take Action:

Once the students have a good understanding of weather, climate, and climate change, allow time for students to take action. This is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact

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

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:

- Organize an assembly to present information learned in an engaging manner
- Plant trees
- Collect data as a citizen scientist (e.g., bird counts)
- Encourage families to use eco-friendly options in place of single-use items (e.g., plastic water bottles, paper coffee cups, etc.)
- Take a class pledge to make changes:
    - Use both sides of paper
    - Turn off the lights when leaving the room
    - Unplug things that aren't being used
    - Or check out these ideas: 50 Classroom Climate Actions - Resources and Descriptions

Action Project Examples:

*How could you use these great examples to come up with action projects with your K-2 students?

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

These kindergartens share what they learned about "Fast Fashion" in order to educate and create change.
Fashiontakesaction_03_24.mp4

Informative Article about using Dr. Seuss' book "The Lorax"
How Dr Seuss Wrote The Ultimate Takedown Of Fast Fashion

*Please note: LSF supports the removal of other Dr. Suess materials that have been discontinued because of anti-Black and anti-Asian racism.

"TEACHER" – Gladys Speers PS- Oakville, ON (2019) K-6

- The vision of this project was to educate the youth and the community on making choices in order to live in a sustainable and healthy way. Environment issues addressed: Convenience vs. sustainability, pace of life vs. nature appreciation,

consumer choices vs. rights to a clean environment, and ignorance of important life skills which help sustain a healthy environment. See their project here.

- Ten Canadian Schools' Stories of Climate Action
- Climate Action Project K-12
- Our Earth: How Kids are Saving the Planet - JANET WILSON

Chapter 1: What is Climate Change and Why Care?
Inquiry 2: Understanding Climate

- **Provocations** – *Neighbourhood Walk*
- **Question Generation** – *Neighbourhood Walk*
- **Knowledge Building**– *Umbrella Questions, Knowledge Building Circle*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *Sorting Activity, Story Writing, Video*
- **Consolidation –** *Illustrate, Visual Processing Cards ($)*
- **Assessment –** *Graffiti Wall*
- **Take Action**

A. Provocation

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

Neighbourhood Walk

Neighbourhood walks and learning can be done all year in all seasons.

Take your class outside on a **Neighbourhood Walk** to look for things in their neighbourhood that depend on the weather/climate. Focus on the natural, human and built systems that are in place to help all species that depend on the weather/climate (e.g., rain gardens, umbrellas, energy sources, trees, etc.). Look for features that might have been altered because of the weather/climate (e.g., erosion on the schoolyard).

While you are out in your community, think of potential community partners that are focusing on weather systems and climate change (e.g., local conservation authorities, local businesses, transportation companies).

Ask students to document their observations through photos or sketches.

Some other examples of features to note on the walk:

- Bike paths
- Parks (natural areas)
- Cars/trucks/buses
- Rivers/Ponds (Storm Drains)
- Solar Panels/Wind Turbines

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off the provocation that has captured their interest by generating meaningful questions to continue to drive the learning process.

Neighbourhood Walk Follow-up

1. After the walk, display the photos or sketches that students documented throughout the walk.
2. Give students a chance to observe one another's drawings/notes. After observing, ask the students to sort the pictures into groups based on themes/similarities.
3. Ask students to explain their sorting and use the groupings to narrow down one "Big Idea" as a class.
4. Based on the big idea, generate a key question about climate.

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.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated after the Neighbourhood Walk provocation or the example below.

Possible **Umbrella Question**: **"What is the difference between 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 many students are already well informed about, and a general direction that many students want to pursue.

Based on students' questions or the Umbrella Question, "What is the difference between weather and climate?", work together with your class to fill out the "Know" and "Want" columns of a KWL (Know-Want-Learned) Chart.

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 the umbrella question, or 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.

Sorting Activity (Weather vs Climate)
Adapted from 15 Meaningful and Hands-On Climate Change Activities For Kids

Explain to students that you will read cards with clues and they will try to identify which is referring to weather and which is referring to climate. Discuss as a class which card belongs in each category.

OR

Story Writing
Create a story with the class explaining the weather on a particular day.

For example:
Today is a sunny day and there are no clouds in the sky. Everyone is wearing shorts because it is hot. We have to wear sunscreen and hats so that we don't get sunstroke. We are sweating so we also need to remember to drink a lot of water to stay hydrated.

Then create a story with class explaining the climate of the region that the students live in.

For example:
In the winter it often snows and the temperature drops. It is more difficult for animals to find food and water. Some animals hibernate and some birds begin to migrate south. At home we close the windows and turn the heat on.

Extension:
What's the Difference Between Weather and Climate?
This video explains the difference between weather and climate and how change can impact our world.

Extension:
Video Follow up Questions

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

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.

Illustrate
Have the students show their learning about climate with playdough, illustrations or movement in groups.

AND/OR

Visual processing cards (needs to be purchased)
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- **Watch these kindergartens share what they learned about "Fast Fashion"** in order to educate and create change.
- Informative Article about using Dr. Seuss' book "The Lorax": How Dr Seuss Wrote The Ultimate Takedown Of Fast Fashion

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“TEACHER” –Gladys Speers PS-Oakville, ON (2019) K-6

- The vision of this project was to educate the youth and the community on making choices in order to live in a sustainable and healthy way. Environment issues addressed: Convenience vs. sustainability, pace of life vs. nature appreciation, consumer choices vs. rights to a clean environment, and ignorance of important life skills which help sustain a healthy environment. See their project here.

Ten Canadian Schools’ Stories of Climate Action

- Climate Action project K-12
- Our Earth: How Kids are Saving the Planet - JANET WILSON

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

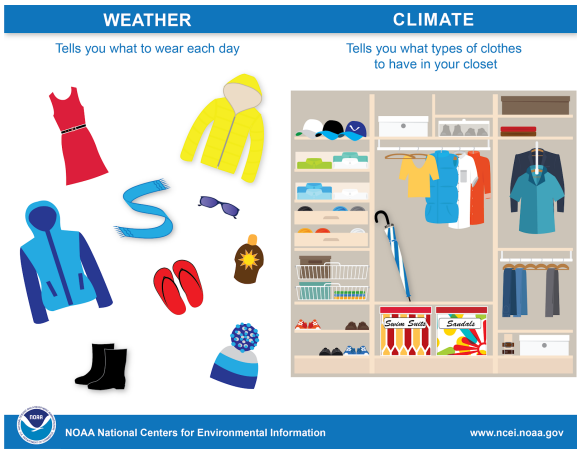
- **Provocations** – *Poster*
- **Question Generation** – *Umbrella questions,*
- **Knowledge Building**– *Umbrella Questions, Knowledge Building Circle*
- **Determining Understanding** – *KWL*
- **Pursuing Learning** – *videos, science experiments*
- **Consolidation –** *illustrate, visual processing cards ($)*
- **Assessment –** *Graffiti wall*
- **Take Action**

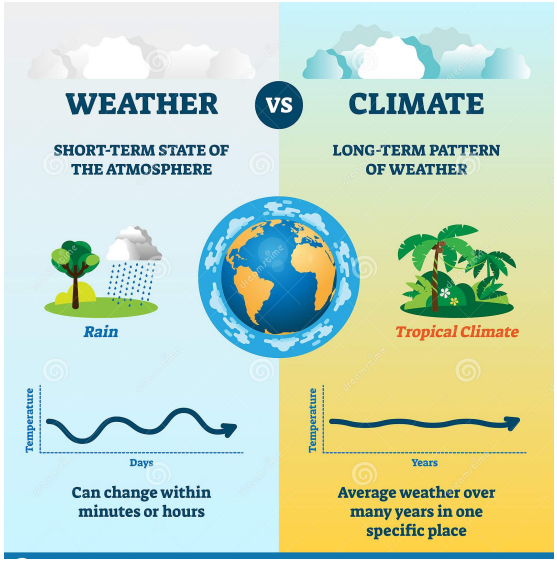
A. Provocation

To hook student interest, introduce the provocation idea to initiate student thinking using the following pictures.

Posters

Posters can be a great tool for education and motivating children.





*This is a very difficult concept for young children who are very literal. They have challenges seeing the closet as climate. This video might also help the teacher and students see the patterns Trend and variation (challenging vocabulary).

1. Display the weather picture first. Have a discussion as to what they observe in the picture.
2. Display the climate section of the poster. Have a discussion as to what they observe.
3. Read the subtitles under each title. Have a discussion about the meaning of each subtitle and the relationship between the two.
4. Look at the second poster. Talk about the pictures and the lines. Think about animals that survive in tropical climates. Would they be able to survive here? Watch the

beginning of this video about Monarch butterflies. Unraveling the Great Butterfly Migration Mystery Why do you think they need to take this long journey south? Are there other animals that also need to go to a different climate?

5. Come up with a class statement that explains the difference between weather and climate.

Potential Questions:

- When would you wear a toque? Or a raincoat? Or flip flops?
- Does the weather change from day to day?
- Can we plan ahead for the weather?
- Do we have an idea of what kinds of weather we have in each season?
- What would it be like if the seasons didn't change?
- What if we had snow in the summer or no snow in the winter?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off the provocation that has captured their interest by generating meaningful questions to continue to drive the learning process.

Poster Follow up

After observing and discussing the differences between weather and climate, invite students to develop **Umbrella Questions** focused on the "big ideas" of climate change. Post the questions around the poster. These questions will help ground the 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.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated after the poster provocation or the example below.

Possible **Umbrella Question**: **"How does Climate Change impact our world?"**

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.

Based on students' questions or the **Umbrella Question: How does climate change impact our world?**, work together with your class to fill out the “Know” and “Want” columns of a **KWL (Know-Want-Learned) Chart**.

Sample KWL Chart:

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

E. Pursuing Learning: Foundational Climate Science Concepts

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

Video and experiments
The following climate change video helps to consolidate climate change vocabulary such as the greenhouse effect and global warming. We encourage teachers to watch the video beforehand and identify the teachable moments or sections applicable for your age group.

1. Watch the video: **Climate Change for Kids | A fun engaging introduction to climate change for kids**
2. After you have watched the video, choose one, two or all three of these **Climate Change Science Experiments For Kids** to help the students understand climate change.

Extension: Video

What is Climate Change?
The video explains how climate change refers to long-term shifts in temperatures and weather patterns, mainly caused by human activities.

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.

Illustrate
Have the students show their learning about climate change with playdough, illustrations or movement in groups.

AND/OR

Visual processing cards: (these would need to be purchased)
Using a deck of **visual processing cards** **(chiji or climer cards)**, spread these out on the floor or on a table. Ask students to pick a card that reflects something that they have learned today. This is ideally facilitated in a circle.

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.

Tell the students they are **school artists** and have been invited to explain to the **school community** about **climate change.** They have been given a space on a wall called a **graffiti wall**.

Divide the wall into 3 and ask students to visually represent their ideas and opinions about **weather** in the first third. The other two thirds will be filled over the course of the next two inquiries (climate and climate change).

Spend some time learning about the history of graffiti: **Graffiti Facts for Kids**.

Take Action:

Once the students have a good understanding of weather, climate and climate change, allow time for students to take action. This is an essential part of the learning process on climate change, as it empowers students and eases their eco-anxiety. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

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

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:

- Organize an assembly to present information learned in an engaging manner
- Plant trees
- Collect data as a citizen scientist (e.g., bird counts)
- Encourage families to use eco-friendly options in place of single-use items (e.g., plastic water bottles, paper coffee cups, etc.)
- Take a class pledge to make changes:
    - Use both sides of paper
    - Turn off the lights when leaving the room
    - Unplug things that aren't being used
    - Or check out these ideas: 50 Classroom Climate Actions - Resources and Descriptions

Action Project Examples

How could you use these great examples to come up with Action Projects with your students?

"POLLINATOR GARDEN" –Algonquin Public School- Woodstock, ON (2017) K-2

- The main focus of the project is to inform and support young children in developing their understanding of insect life cycles and the interconnectedness of the beautiful creatures to our lives and to begin to foster an appreciation for nature and how they can have a direct impact on their local and national environment. They learned about the decline in the Monarch Butterfly populations during a professional development workshop and decided to plant a pollinator garden. See their project here.

- Ten Canadian Schools' stories of Climate Action
    - This document outlines a collection of promising practices of climate action taking place in 10 Canadian UNESCO Associated Schools. These 10 schools participated in a worldwide UNESCO pilot project to implement climate action as

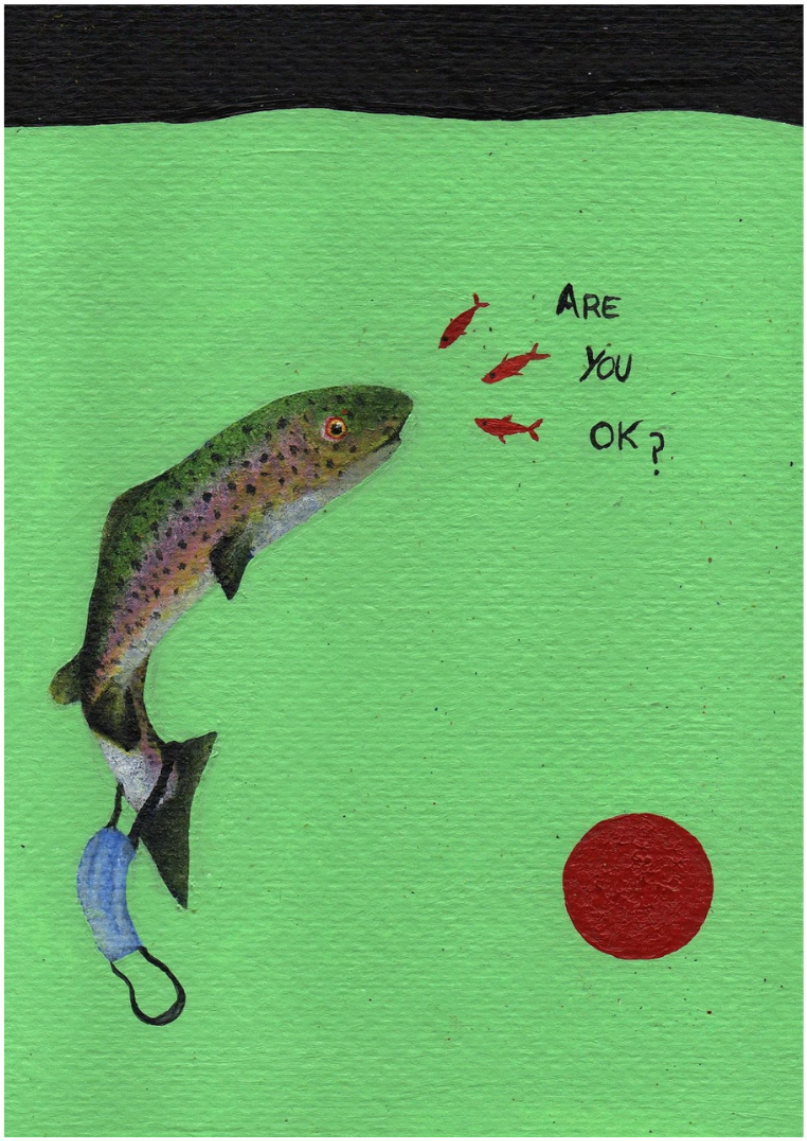
recommended in the UNESCO (2016) publication, *Getting Climate-Ready: A Guide for Schools on Climate Action.* https://bit.ly/3mpPtiY

- Young Voices for the Planet
    - This website documents youth speaking out, creating solutions and leading the change. These youth solutions to the climate crisis include stories of California kids banning plastic bags, Florida students saving their school $53,000 in energy costs, an 11-year-old German boy planting millions of trees and other young people changing laws, changing minds and changing society as they reduce the carbon footprint of their homes, schools and communities.Young Voices for the Planet
    - Resources for Kids Taking Action: Young Voices for the Planet | Award-Winning Film Series and Civic Engagement & Democracy Curriculum | For Kids
- The Great Plant Hunt from Ecoschool Global
    - The campaign aims to educate students about biodiversity, its importance and encourages them to take positive action. About the Campaign — Eco Schools
- Warming, Waste, Water, Watts, Wildlife (W5)
    - Through this project, thousands of students will be given opportunities to assess, design, and build innovative solutions to environmental challenges. Warming-Waste-Water-Watts-Wildlife (Alcoa W5) — Eco Schools
- Community Conversations for Climate Change
    - In this activity, students talk to members of their community about some of the environmental and climate changes they have noticed since they were young. Community Conversations for Climate Change | The World's Largest Lesson

CHAPTER 2:

How does climate change affect our world?

A Project of Learning for a Sustainable Future
Contributors: Janice Haines, Nathalie Lauriault



Art by Belen Gonzalez 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 2. How Does Climate Change Affect Our World?

These inquiries delve 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 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.
    - The effects of melting permafrost include the release of harmful greenhouse gases previously trapped within the ice and the 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 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 - from 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.” (NRCan p. 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)

Human Impacts & Disproportionate Effects:
Note: Environmental racism and environmental justice can be discussed in age appropriate ways. Suggested Resource to learn more: Environmental racism in Canada: What is it and what can we do about it?).

General Introduction to the Inquiries in this Chapter:

This chapter offers 3 different structured and scaffolded inquiries to support *How Does Climate Change Affect Our World.* 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	Ecosystems Systems Interdependence Changes Characteristics Stewardship Environment Sustainability
Social Studies	Physical features Location Systems Natural resources Human activities Interrelationships Cause Human-environmental interaction

The Arts	Improvisation Body Space Movement Interpretation Line Shape Form Colour
Physical Education and Health and Wellness	Fulfillment Contribution Connection Relationships Self-awareness Choice
Language	Communication Retelling Interpretation Objectivity

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: Systems in our World

Students will be introduced to systems and how a system is made up of interdependent parts. It is important for them to understand the basics of systems before they can understand how they are affected by climate change. They will discover through various activities how all the parts need to work together to create a healthy system, illustrated through different examples from all over the world and within the natural environment.

Resources:

- Bike (can be as an artifact or images Bike Parts)
- Art activity: play doh or pipe cleaners
- Put the "Quest" in Question

- This resource explains how you can use system thinking to tackle the Sustainable Development Goals. Using Systems Thinking to Tackle the Sustainable Development Goals (SDGs)

Inquiry 2: Systems in our Community

Students will explore their local community through a neighbourhood walk, noting the systems at work that make it function. Students will begin to discover how they are part of different systems like their community, and how they can take responsibility and make positive contributions that can ultimately have an effect on climate change.

Resources:

- A Kid's Guide to Building Great Communities
- Put the "Quest" in Questions
- Community Game Board
- Systems for Community Game Part 2
- Descriptive Words for Places in Your Community
- Scenarios for Dream Community
- Animal or Insect
- Footage Of One Tree Over 365 Days Bringing Out Animals

Inquiry 3: Systems in our Natural World

Students will explore the systems at work in a local natural habitat. They will discover and understand the importance of how all parts of the natural world are connected. Students will realize that humans create climate change and can affect the natural system. They will be encouraged to find solutions to help the natural habitat.

Resources:

- Kindergarten - K-ESS2 Earth's Systems
- Natural Systems
- Bottle Ecosystem
- Rainforest in Canada! Where? - Pacific Rim National Park Reserve
- Put the "quest" in questions
- Places to look for a local community expert:
    - Naturalist groups
    - Climate adaptation representative (municipal, provincial)
    - Ministry of Natural Resources
    - Conservation Authority/Agency
    - Conservation NGO

Chapter 2 : How Does Climate Change Affect Our World?
Inquiry 1: Systems in Our World

- **Provocations** – *Artifact*
- **Question Generation** – *"I Wonder" Wall, Question Formation Technique, Video Question Lesson*
- **Knowledge Building** – *Knowledge Building Circle*
- **Determining Understanding** – *Small Group Activity, "is/can/has" chart*
- **Pursuing Learning** – *Art, Drama, Home Extension, Video*
- **Consolidation –** *What's All True*
- **Assessment –** *Illustrate a system, Video*
- **Take Action**

A. Provocation

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

Artifact

Bring in a bike as an **Artifact** or look at this picture of a bike and explain to the students that the bike is a **system**. Have the students explore and manipulate the different parts of the bike.

Possible Questions:

- Why is the bike a **system**?
- How does it work?

Note: If you have a bike, you can spend some time moving the different parts, take it apart so that students see how a system is made of interdependent parts. If you use the picture, also print off **bike parts** so you can talk about how they work together.

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 an idea for question generation based on the provocation that your class engaged with.

Create an **"I Wonder" Wall**.

Start with these two questions or a couple of your own and post them around the bike.

- *I wonder how one part impacts the other parts of the bike?*
- *I wonder what would happen if we took the tire off?*

Have the students come up with their own "I Wonder" questions. In groups, create as many questions as possible.

To generate questions, use the **Question Formulation Technique** to guide you:

- Ask as many questions as you can
- Do not stop to answer, judge or to discuss the questions
- Write down every question exactly as it is stated
- Change any statement into a question

Once the board is filled with many questions, group the duplicate questions together.

Next, watch this video: "Put The Quest in Questions" to help identify different types of questions to ask, inspire questions by developing tools and vocabulary to pose questions. Teach the students the difference between open and closed questions. Using an "O" for open and an "C" for closed, sort the questions into those that can be answered with some simple research (closed) and those that may lead to further investigation or a deeper inquiry (open). Review the questions together and prioritize those that they think will help the class better understand systems.

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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated from the bicycle activity or the "I Wonder" wall or the example below.

Possible Umbrella Question: "What is a system?"

D. Determining Understanding

At this stage of the inquiry, 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.

Small Group Activity:
Divide the class into groups of 3 or 4. Ask each group to identify another system in the real world. Each group must be able to share their evidence of why it is a system.
Examples: car, solar system, human body, community, school, etc.

After completing the activity, complete this chart to help determine students' understanding of systems.

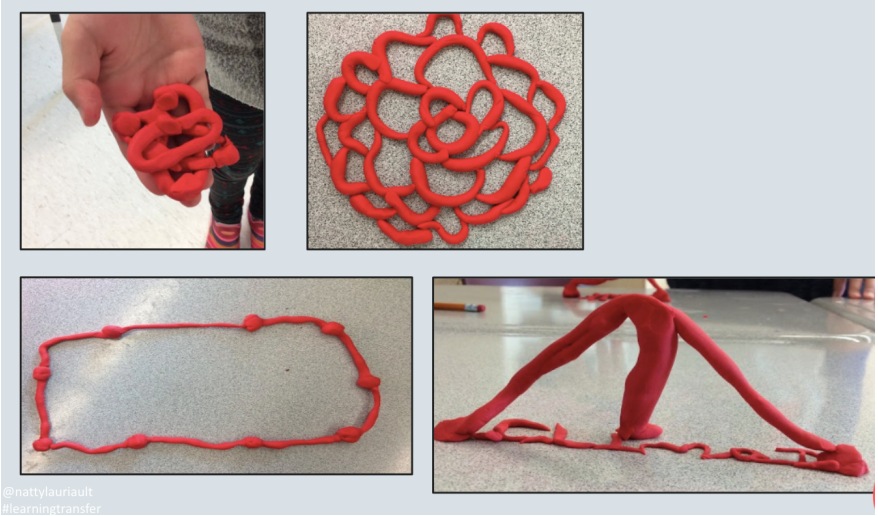
A SYSTEM…		
is	**can**	**has**

E. Pursuing Learning

At this point, students can begin researching to answer their general questions, or some of the following activities can be incorporated into the process to ensure that students understand basic concepts of systems and the relationship to climate change. The activities listed below will enrich the understanding of the concept of a system and the relationship to climate change.

Art: In pairs or independently, have students interpret what a system is using plasticine or pipe cleaners.

Example:



Drama: Create a People System *(adapted from: source: Tribes Learning communities by Jeanne Gibbs)*
One person begins the activity by assuming an interesting position and making a repetitive movement with a repetitive sound. The next person connects physically in whatever creative way he or she chooses, making a different movement or sound. People keep adding themselves to the system. Once the system is working, lightly tap one of the students (on the shoulder) or pass them a bean bag or other object to indicate to the student to sit up. Explain that this part is broken, notice what happened to the system. How does one faulty part of a system affect the whole system?

EXTENSION Video
What Are Systems?
"Systems educator Linda Booth Sweeney considers what is a system and what's not, what systems do, and why understanding systems is important."

Home extension: Encourage students to go home and look for other systems in their world. Invite them to share their findings and evidence of why it is a system.

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.

Use the "All True" strategy from Learning that transfers. Some additional information is found at What's All True Explanation? Students brainstorm while the teacher notes all the things they know that are true about the concept of systems.

Possible Question: What is all true about systems?

And

Explain how the bicycle is a system that helps the world. It reduces the carbon footprint and is a healthy system. Encourage students to find other systems in the world that are healthy systems.

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.

Illustrate a System

Students will demonstrate their understanding by showing how a tree is a system. They are encouraged to present their understanding using the medium of their choice. As a class, make a list of the different presentation media (e.g., dance, visual art, concept map, film).

Extension

This first video: "Trees | Educational Video for Kids" and a second video: "Mangroves as a System" are great examples of a tree system. Watch one or both of the videos and have the students compare and explain how a tree in their schoolyard/ neighbourhood is also a system.

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. Remind students that even when things get hard and seem so big they can always do something by taking an action. Their actions will create an impact.

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

Ask the students what things can be done to make sure that all of the systems we talked about are working well and will help climate change?

Are there any projects that your students could partner with a community expert to increase biodiversity or help to restore a specific habitat?

One system that was talked about was a bicycle. What can we do with a bicycle that will help climate change? What can we do to encourage other students and people in our community to ride their bikes more often such as to school and work?

Other Ideas for Taking Action:

- Habitat restoration
- Conduct a clothing drive
- Collect food donations for the local food bank
- Innovate sustainable solutions for school or community questions and problems
- Share your learning within your school and share your learning outside the class

Action Project Examples

How could you use these great examples to come up with action projects with your K-2 students?

“POLLINATOR GARDEN” – Algonquin Public School- Woodstock, ON (2017) K-2

- The main focus of the project is to inform and support young children in developing their understanding of insect life cycles and the interconnectedness of the beautiful creatures to our lives and to begin to foster an appreciation for nature and how they can have a direct impact on their local and national environment. They learned about the decline in the Monarch Butterfly populations during a professional development workshop and decided to plant a pollinator garden. See their project here.

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- Community Conversations for Climate Change
    - In this activity, students talk to members of their community about some of the environmental and climate changes they have noticed since they were young. Community Conversations for Climate Change | The World's Largest Lesson

Chapter 2: How Does Climate Change Affect Our World?
Inquiry 2: Systems in our Community

- **Provocations** – *Neighbourhood Walk*
- **Question Generation** – *"I Wonder" Wall, Question Formation Technique, Video Question Lesson*
- **Knowledge Building**– *Neighbourhood Walk, Community game*
- **Determining Understanding** – *Think/Pair/Share*
- **Pursuing Learning** – *Book, 3D Art (Dream Community), Descriptive Words*
- **Consolidation –** *Scenarios, Candy Wrapper Exercise*
- **Assessment –** Video*, Choice of Media*
- **Take Action**

A. Provocation:

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

Neighbourhood Walk

Take students on a **Neighbourhood Walk**. Before setting off, tell students that they will go outside to look for systems in the community. Remind them that a system is made up of interdependent parts and that all parts work together. Some examples include a road system, home settings, park, and forest.
Take photographs of the systems your students notice in the neighbourhood.

Possible questions:

- What systems do you notice?
- Could we add parts to make it a better system?
- Could we take away parts to make it a better system?

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 an idea for question generation based on the provocation that your class engaged with.

Continue to add to your **"I Wonder" Wall**. Post photographs of the systems that the students noticed on their neighbourhood walk. Have the students come up with their own "I Wonder" questions. In groups, create as many questions as possible.

Possible Questions:

- I wonder what would happen if there were no road signs?
- I wonder what would happen if we added another school to the neighbourhood?
- I wonder what would happen if we planted more trees?
- I wonder if there are the same amount of trees in all neighbourhoods?
- I wonder if all communities are set up in similar ways?

*Remember to generate questions following Question Formulation Technique rules for producing questions:

- Ask as many questions as you can
- Do not stop to answer, judge or to discuss the questions
- Write down every question exactly as it is stated
- Change any statement into a question

Add more questions to the board and put the duplicate questions together.
Watch the "Put The Quest in Questions" video (feel free to repeat the video as a reminder or review some of the prior lessons).

Have the students categorize the questions again using an "O" for open and an "C" for closed. Remind them that the closed questions can be answered with some simple research and the open questions may lead to further investigation or a deeper inquiry. Review and prioritize those questions that they think will help the class better understand systems in their community.

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 provocation and ideas that have been generated thus far in the inquiry process.

Part 1- Take another neighbourhood walk in your community. Use this **Community Game Board** to emphasize activities which stimulate more selective observation. Students use all their senses to identify different aspects of the community. Page 56 of **A Kid's Guide to Building Great Communities** offers an example of the game that can be modified to your class needs.

Possible questions:

- Why is it important to use all your senses while making observations?
- What did you learn about the community that you did not notice before?

Part 2- When back in class, invite the students to review the things that they found and think about which systems that they interact with. Use system pictures, Systems for Community Game Part 2, to sort the items. See if students can explain which system each picture could be a part of.

D. Determining Understanding

At this stage of the inquiry, 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 together with your class to complete the following activity.

After spending some time learning about their community and the different systems that make it work, explore the **Think Pair Share** strategy to determine next steps.

Possible Questions:

- We are all part of the classroom. Let's consider how!
- Are you part of the classroom system? How?
- Are you part of the school system? How?
- Are you part of the school yard system? How?
- Are you part of the community system? How?
- Are you part of the world system? How?
- How are you responsible for helping your community? What kinds of things can you do or do you do to help out?
- What makes you feel like you are part of the community?
- How are you part of a system?

E. Pursuing Learning:

At this point, students can begin researching to answer their general questions, or the following activity can be incorporated into the process to ensure that students understand basic concepts of systems, community and climate change.

Read the book: All Are Welcome by Alexandra Penfold illustrated by Suzanne Kaufman
Readers will follow a group of children through a day in their school, where everyone is welcomed with open arms. A school where students from all backgrounds learn from and celebrate each other's traditions. A school that shows the world as we will make it to be.

Have a discussion about different communities in the local/broader areas. Talk about the assets that different communities might have.

- How are rural and urban communities the same and different?

Potential Questions:

- Should all communities have parks and trees?
- Do all communities have parks and trees?
- Are all communities the same? How are they different?
- What do all communities need so all people can access them and feel happy?
- What are some of the rules and laws that impact communities?

Activity
As a class, build a dream community that is inclusive and accessible by all. *What would a dream community need for people of all identities to feel like they belong and have a space in the community?*

Place a large white paper in an area of the classroom where it is accessible to the students. Explain to the students that as a class they will add to the board to create a dream community. They can choose whatever type of medium they'd like (paint, crayon, markers) or use boxes and recycled materials. Use the descriptive words found in this link to help students think of places in their community

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.

Try to be "solutionaries". Think about how your decisions affect everyone including the plants and animals: What is a Solutionary?

Once your community is built, look at these different Scenarios for a Dream Community and see what kinds of places that your students might add to their community depending on the problem that they have encountered.

Extension: **The Candy Bar Wrapper Exercise** (page 8)
Help students identify their own sphere of responsibility. Ask this question, "How far will you lean out of bed to pick up a candy bar wrapper?"

Possible Questions:
- What does "sense of responsibility" mean?
- Does accepting responsibility mean that you will do something?

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.

How the Systems Interact
Watch the following video prompt of a tree and note how many different animals pass by this tree in a year.

Students then choose an Animal or Insect and think of three ways a tree is important to this animal or insect (e.g., home, food, shelter). Students are encouraged to present their understanding using a medium of their choice. As a class, make a list of the different presentation media (e.g., dance, visual art, concept map, video, etc.).

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. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. *Please note that the suggestions are consistent in each chapter.*
Ask the students what things we can do to make sure that all of the systems we talked about are working well and will help climate change?

Are there any projects that your students could partner with a community expert to increase biodiversity or help to restore a specific habitat?

One system that we talked about was a bicycle. What can we do with a bicycle that will help climate change? What can we do to encourage other students and people in our community to ride their bikes to school and work?

Other Ideas for Taking Action:

- Habitat restoration
- Conduct a clothing drive
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- Share your learning within your school and share your learning outside the class

Action Project Examples

How could you use these great examples to come up with action projects with your K-2 students?

"POLLINATOR GARDEN" – Algonquin Public School- Woodstock, ON (2017) K-2

- The main focus of the project is to inform and support young children in developing their understanding of insect life cycles and the interconnectedness of the beautiful creatures to our lives and to begin to foster an appreciation for nature and how they can have a direct impact on their local and national environment. They learned about the decline in the Monarch Butterfly populations during a professional development workshop and decided to plant a pollinator garden. See their project here.

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Chapter 2: How Does Climate Change Affect Our World?
Inquiry 3: Systems in the Natural World

- **Provocations** – *Posters, See/Think/Wonder, Think/Pair/Share*
- **Question Generation** – *"I Wonder" Wall, Question FormulationTechnique,*
- **Knowledge Building**– Invite a Speaker, Knowledge Building Circle
- **Determining Understanding** – *3-2-1 Strategy*
- **Pursuing Learning** – *Science Experiment*
- **Consolidation –** *Science Experiment*
- **Assessment Idea–** *Story, Art*
- **Take Action**

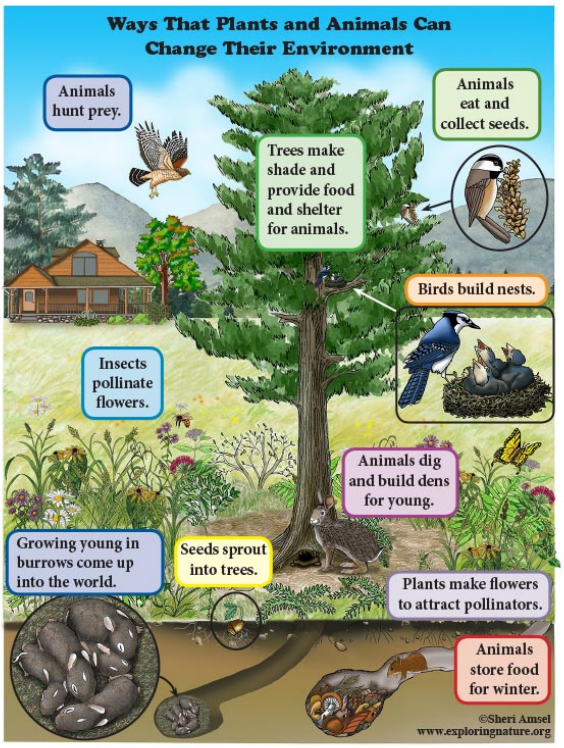
A. Provocation:

An initial provocation, also sometimes referred to as a "hook," is used to spark interest and curiosity.

Poster

Posters can be a great way of gaining student attention and interest. This link identifies the advantages to poster use in education and suggests 6 attributes of an effective poster.

Use the following poster along with the See / Think / Wonder strategy to initiate discussion with your students.



Possible questions:

- What do you notice about the animals?
- What systems do you notice in the poster?

AND

Display the quote:
"Look deeper into nature and then you will understand everything much better." - Albert Einstein

Use the Think Pair Share strategy. Students first spend some time thinking about the quote, then turn to a partner and discuss their answers with each other.

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 an idea for question generation based on the provocation that your class engaged with.

I Wonder Wall

Continue to add to your **"I Wonder" Wall**. Post photographs of Natural Systems (ocean, grassland, temperate rainforest, lakes, mountains, wetlands). Have students come up with their own "I Wonder" questions about the natural systems.

In groups, create as many questions as possible.

Possible Questions:

- I wonder what animals live in these different systems?
- I wonder what would happen if I built a house here?
- I wonder what would happen if the water was polluted with plastics?
- I wonder what would happen to the plants and animals if there was a huge fire in the mountains?

Remember to generate questions following Question Formulation Technique rules for producing questions:

- Ask as many questions as you can
- Do not stop to answer, judge or to discuss the questions
- Write down every question exactly as it is stated
- Change any statement into a question

Add more questions to the board and put any duplicate questions together.

Feel free to repeat the "Put The Quest in Questions" video or some of the lessons).

Have the students categorize the questions again using an "O" for open and an "C" for closed. Remind them that the closed questions can be answered with some simple research and the open questions may lead to further investigation or a deeper inquiry. Review and prioritize those questions that they think will help the class better understand natural systems.

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 provocation and ideas that have been generated thus far in the inquiry process.

Invite a speaker

Invite a local community expert to learn about local climate impacts and local climate action responses.

Places to look for a local community expert:

- Naturalist groups
- Climate adaptation representative (municipal, provincial)
- Ministry of Natural Resources
- Conservation Authority/Agency
- Conservation NGO
- Indigenous Elders/Communities

Students can have the questions they generated on hand to prompt them to ask the speaker. Following the visit from the speaker, hold a **Knowledge Building Circle** example (outside is recommended if possible) so that students can voice what they've learned and build on their previous knowledge.

Possible Question:

- How is climate change affecting the systems in our community and natural world?

D. Determining Understanding

At this stage of the inquiry, 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.

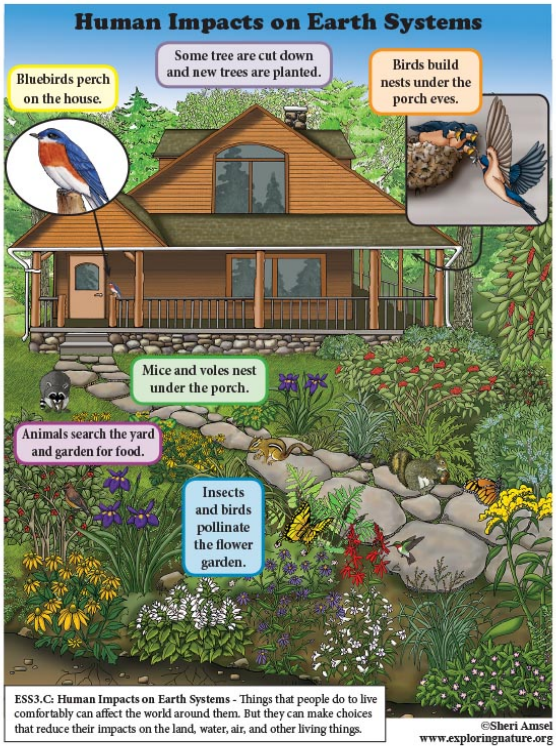
After hearing from your community expert, explore this strategy and follow up with the second poster to determine next steps.

Summarize Guest Speaker using the **3-2-1 Strategy:**

3-2-1		
3 things I learned	**2 things I want to learn more**	**1 question I have**

Note: For younger students it is recommended you do this as a whole class exercise.

Poster
Ask the students how human habitation affects the natural systems.



(Source: [Kindergarten - K-ESS2 Earth's Systems](#))

Possible Questions:
Is there a relationship between animals and humans?
How do humans affect the environment? (address this question from both a positive and negative perspective).

E. Pursuing Learning: Impacts on the Environment

At this point, students can begin researching to answer their general questions, or some of the following activities can be incorporated into the process to ensure that students understand basic concepts of systems, community, natural world and climate change.

Science experiment: [Build a Bottle Ecosystem](#)

The purpose of this experiment is to show how an ecosystem works. By varying certain parts of the system, we will show how the ecosystem can be affected.

Before starting the experiment, divide the class into 4 groups. Each group will build a bottle ecosystem but each will be slightly different.

Create an ecosystem so that you can make comparisons between the control and their bottles. Each group should use this worksheet to document the process: Bottle Ecosystem

Group 1: add more pebbles (half soil and half pebbles)
Group 2: add some moss instead of soil
Group 3: add compost instead of soil
Group 4: add only one seed and no pebbles

Possible questions:

- How is your bottle a system?
- How does the system work?
- By changing one interdependent part of the system, does it affect the other parts? How?
- Which bottle seems to be doing the best? Why?
- If you add something to your bottle or take away something will it help make it better?

Interesting article to share with the students: The sealed bottle garden still thriving after 40 years without fresh air or water | Daily Mail Online

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.

Once the Bottle Ecosystem is complete, have students observe it over the next few days, encouraging them to record their observations in their journals.
Older students are encouraged to measure the growth of their plants.

Possible Question:
Can you think of other situations in the real world where changing something affects other systems?

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.

Story

Once upon a time there was a forest and all living things lived peacefully together. The birds ate the seeds that the trees produced. The mice hid under the trees for shelter and warmth. The birds also built nests in the trees. Their young felt safe there, away from predators. Caterpillars ate the leaves and then cocooned to become beautiful butterflies. In the Fall, the squirrels buried the nuts the tree produced to prepare for winter. They also liked to climb up and down the trees for exercise.

One day, a family came along and cut down the trees to build a beautiful log house. Suddenly, all the living things were confused and didn't know where to find shelter, food and water!

Can you help the family by showing them what they could do to help the natural world stay happy and safe?

Instructions:

- On a large sheet of paper, invite students to draw a wooden house in the center of the paper.
- Encourage students to draw things around the house that humans could add to improve or help the natural environment.

Take Action:

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

- Ask the students what things can be done to make sure that all of the systems we talked about are working well and will help climate change?
- Are there any projects that your students could partner with a community expert to increase biodiversity or help to restore a specific habitat?
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Other Ideas for Taking Action:

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

A Project of Learning for a Sustainable Future
Contributors: Janice Haines, Nathalie Lauriault

Art by Preeti Singh 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 collection of inquiries 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.

Illustration by: Preeti Singh for ArtistsForClimate.org

Before you Begin: Background Information for Educators

To help you have conversations with your students about their feelings on the existential threats of climate change, we recommend several additional resources. 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 (NRCAN, 2022)

General Introduction to the Inquiries in this Chapter:

This chapter offers 3 different structured and scaffolded inquiries to support *How Addressing Climate Change Makes us Healthier.* Each of the 3 inquiries begin with a provocation followed by the other steps of the inquiry model which includes many 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 Change Environment
Language	Communication Retelling
Physical Education and Health	Motor skills Locomotor

	Cooperation Relationships Choice Self-awareness
The Arts	Creativity innovation Interpretation Colour Space

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: Impacts on Health- *Campaign for Vitamin D*

Through yoga exercises, observing nature and understanding the importance of keeping our planet earth healthy, students will explore the concepts of health and its benefits.

Resources:

- Possible Pictures for Concept Maps
- Frames: These can be made out of cardboard or cereal boxes
- Happy vs. Sad Earth Sorting Activity

Inquiry 2 : Impacts on Health - *Sustainable Well-being*

Students will explore idling and its impact on our health. Through games, observations and collection of data, students will educate other students or the community about anti-idling.

Resources:

- 

- Pollution and Ecosystems Role Play Simulation
- Sit Spots
- Possible Pictures for Concept Maps

Inquiry 3 : Impacts on Health - *Water*

Students will further explore how climate change impacts water pollution. This will be investigated through observing and analyzing environmental impact.

Resources:

- Possible Pictures for Concept Maps
- The Lump! A Rhyming Kids' Story About Plastic Pollution in the Sea

Inquiry 4 : Impacts on Health - *Food Security*

Students will further explore how climate change impacts food security. This will be investigated through experiments,observing images of environmental impact and videos.

Resources:

- Plant Experiment
- Possible Pictures for Concept Maps
- Use of Photographs as a Powerful Tool in Teaching/Learning Environment

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

Inquiry 1: Impacts on Health - Campaign for Vitamin N

- ***Provocation*** *– Gallery Walk, See Think Wonder*
- ***Question Generation*** *– Outdoor Frames, Five Ws and an H and developing higher order questions*
- ***Knowledge Building*** *– Knowledge Building Circle, Umbrella Question*
  Determining Understanding *– Concept Map*
- ***Pursuing learning*** *– Creation of class book, Yoga , Video*
- ***Consolidation*** *– Card Sort*
- **Assessment** *– Choice Board*
- ***Take Action***

A. Provocation

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

Gallery Walk

Vitamin N (Vitamin Nature): Invite the students to bring pictures from home of them outside or print photographs of the kids outside at school or print pictures from the internet. (Unsplash, Pixabay). Post the pictures around the room. Ask the students to walk around the classroom looking at the pictures conducting a **Gallery Walk.**

With younger students it is encouraged to do the gallery walk three times. After each step, come back to a circle and discuss their observations and questions.

- Step 1: Have the students focus on what they see.
- Step 2: Have the students focus on what they think.
- Step 3: Have the students focus on what they wonder.

More information about this strategy and examples are available at the following link: See Think Wonder

Possible Discussion Questions:

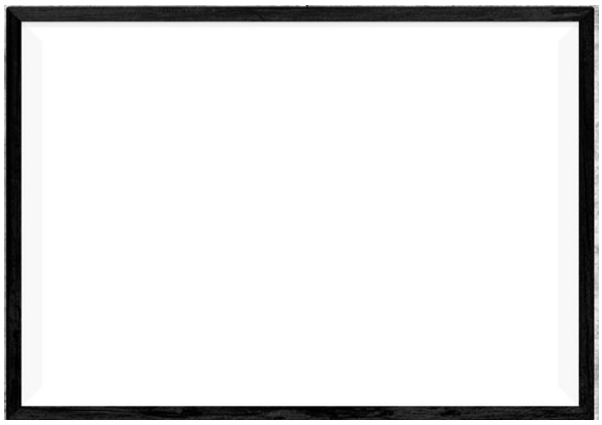
- How does it make you feel when you are outside?
- Is it different than when you are inside?

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 several pathways for question generation depending on the provocation that your class engaged with.

Outdoor Pictures:



Distribute a frame to each child or pair. They can be made out of cardboard or cereal boxes. Go outside and have the students use the frames to focus their observations on different parts of nature. For example, look at the bark of a tree or a spider web. Invite the students to ask questions about what they see.

Help younger students with question starters such as Five Ws and an H and developing higher order questions and 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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated after the Frames Activity or the example below.

Possible **Umbrella Question**: “**How do you think the trees feel about where they live?”**

D. Determining Understanding

At this stage of the inquiry, 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.

After the Knowledge Building Circle, introduce Concept Mapping to students. This activity can be done in groups or with the whole class. (More info on Concept Maps | Classroom Strategies | Reading Rockets)

1. Introduce the concept map pictures of land, plants, animals, rain, sun, water, trees, wind and anything else you discussed. You can add the images or concepts that were taught on index cards or sticky notes to allow students to move them around the concept map.
2. Place the cards on a large piece of paper and invite students to sort them.
3. Connect the pictures with lines based on ideas they have in common.
4. Save the concept map for inquiry 2, 3 and 4 where more concepts will be introduced.

E. Pursuing Learning

Students will continue 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.

Class Book
Create a Vitamin N classroom book. Have the students choose one of their outdoor pictures for the book. Write down how they felt in the picture or why they selected the picture.

Yoga
Do a sun salutation outside. You could do this every morning and students can talk about how it makes them feel.

Extension Video:
Watch the video Happiness | Sustainability Classroom Resources.
Discuss what is important to the students and what really brings people happiness.

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.

Sorting
Sort these "Happy vs. Sad Earth Sorting Cards" to determine what will make the earth happy and what makes it sad. Create a couple of cards to share with the class based on what your students have learned about.

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.

Choice Board strategy:

Possible Guiding Question: Why is being in nature important for the health of living things?

Sample Choice Board

Create a Bumper Sticker	Oral Story about how the "fish/plant/animal" feel being in nature	Make an Announcement
Draw a Picture	**FREE CHOICE**	Create a dance or yoga session
Make Music (any materials)	Sing a Song	Use Recycled Materials to Make a Model

After the students have decided which activity they would use to improve the health of living things, they should be given an opportunity to present their understanding to other students or parents/administrators.

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. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

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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.

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 decided action in place.

Ideas for Taking Action:

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- Start a campaign for rain barrels to water school gardens
- Think about making a commitment to reducing plastic waste 10,000 Changes

Action Project Examples

"KINDERGARTEN GARDEN PROJECT" - Byron Northview Public School - London, ON (2019) K-2

- Their vision for Canada is to foster healthy and mindful attitudes toward nature and the outside world. It is their hope to show the youngest students how to cultivate and grow a sustainable garden, respect the planning and planting process, and to reap the benefits of growing their own produce. See their project here.

"USING A HYDROPONIC GROW KIT WITH GRADE 1/2" - Anne Hathaway Public School - Stratford, ON (2020) K-2

- The goal of the project was to learn about the importance of eating local produce, sharing local produce with others, and learning about where food comes from. The first step of the project was to use a hydroponic grow kit to see leafy greens grow fairly rapidly in the classroom. Grade 1/2 were intrigued that plants could grow without soil and were very excited to watch the lettuce grow. See their project here.

How could you use these great examples to come up with action projects with your K-2 students?

- Think Big! Collective Action for Climate Change | Sustainability Classroom Resources at Resources for Rethinking
- World's Largest Lesson
  - "In the first activity the students watch a 5 minute video that takes them around the world visiting other young people who have taken individual actions to fight

climate change. From India to Jordan, the students see that individual actions can make a difference while the narrator encourages them to fix things where they live. The message of the video is to invent, collaborate or campaign to make improvements where you live. After watching the video, the students will brainstorm a list of possible actions that could fight climate change."

- **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

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

Inquiry 2: Impacts on Health - Sustainable Well-Being

- ***Provocation*** – *Posters*
- ***Question Generation*** – *Survey*
- ***Knowledge Building*** – *Knowledge Building Circle, Umbrella Question*
  Determining Understanding – *Concept Map*
- ***Pursuing learning*** – *Tally Chart, Graph, Breathing Exercises, Sit Spots*
  Consolidation –*Role Play*
- **Assessment** – *Choice Board*
- ***Take Action***

A. Provocation

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

Posters

Posters can be a great way of gaining student attention and interest. This link identifies the advantages to poster use in education and suggests 6 attributes of an effective poster.

Look at these posters as a class (DADA, 2013):

- "No Idling. Children Breathing"
- "I Am Idle Free"

Possible Questions

- What do you think each poster means?
- Why is it important to have clean air?
- Why is there a dollar sign on the poster?
- Does clean air affect other things? (animals, plants, water)
- Do all areas have clean air? How does air get polluted?
- Which poster do you like the best? Why?

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.

Discovery
If possible go outside and observe the buses and cars that come to the school for pick up in the morning and after school.

Anti-Idling Survey
Create a class survey, to initiate conversation and discussion around the topic of idling. Come up with 3 questions that students will ask peers to see if they have an understanding of idling.

For example: Do you know what idling is?

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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class **Knowledge Building Circle** (outside is recommended if possible) using one of the questions that you generated after the anti-Idling activity or the example below.

Possible **Umbrella Question**: **"How can we educate others about idling?"**

D. Determining Understanding

At this stage of the inquiry, 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.

After the Knowledge Building Circle, introduce Concept Mapping to students. This activity can be done in groups or with the whole class.(More info on Concept Maps | Classroom Strategies | Reading Rockets)

1. Refer to the concept map that was created in the first inquiry.
2. Add the new concept map pictures of pollution, car, train, plane, boat, factory and anything else that you wish. You can add the images or concepts that were taught on index cards or sticky notes to allow students to move them around the concept map.

3. Have students place and connect with lines the ideas that have something in common with the concepts from the first inquiry.
4. Save the concept map for inquiry 3 and 4 where more concepts will be introduced.

E. Pursuing Learning

Students will continue 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.

Survey Follow-Up
After completing the survey, create a graph to analyze all of the responses. Invite students to come up with some conclusions about the graph. Lastly, discuss what they should do about the results. They might choose to educate the school population about vehicle idling.

Mental Health Break

- Option 1: Do some breathing exercises outside.
- Option 2: If students are feeling overwhelmed at any time, 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 (you may have to have the students find a quiet spot by a window if you are indoors). Start with one minute and increase the time every day or week. At school, travel outside as a class with their Sit Upon. Quietly move about the playground and find a place that your class will go back to every week. Encourage students to sit a minimum of two metres apart and invite them to quietly observe what is around them.

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.

Role Play
Children work together in this role play game to understand how pollutants are passed through the ecosystem and how humans make an impact.

Idea Adapted from 10 Hands-On Science Projects to Teach About Pollution

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.

Choice Board Strategy

Possible Guiding Question: How can we educate other students or the community about anti-idling?

Sample Choice Board

Create a Bumper Sticker	Oral Story about how the "plant/animal" feel about the air pollution	Make an Announcement
Draw a Picture	**FREE CHOICE**	Teach a breathing exercise
Make Music (any materials)	Sing a Song	Use Recycled Materials to Make a Model

After the students have decided which activity they would choose to educate others about anti-idling, they should be given an opportunity to present their understanding to other students or parents/administrators.

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. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

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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:

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- Start a campaign for rain barrels to water school gardens
- Create anti-idling posters for the community
- Think about making a commitment to reducing plastic waste 10,000 Changes

Action Project Examples

"KINDERGARTEN GARDEN PROJECT" - Byron Northview Public School - London, ON (2019) K-2

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*How could you use these great examples to come up with action projects with your K-2 students?

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

Inquiry 3: Impacts on Health: Water

- ***Provocation*** *–Video*
- ***Question Generation*** *– Neighbourhood Walk, I Wonder*
- ***Knowledge Building*** *– Knowledge Building Circle, Umbrella Question*
  Determining Understanding *– Concept Map*
- ***Pursuing learning*** *– Garbage Audit, Puppet Show*
- ***Consolidation*** *– Perspective*
- **Assessment** *– Choice Board*
- ***Take Action***

A. Provocation

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

Video

As a class, watch the following video as a springboard for discussion:

- **The Lump! A Rhyming Kids' Story About Plastic Pollution in the Sea**

Possible Questions:

- How does it make you feel when you hear and see what is happening to the animals in the water?
- Why do you think that some animals eat plastic they find in the water?
- How do you think the pollution gets into the water?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation by generating meaningful questions to continue to drive the learning process.

Take students on a Neighbourhood Walk. Before setting off, tell students that they will go outside to look for pollution in the community. Encourage them to ask "I Wonder" questions while on the excursion. Example: *I wonder where the plastic bag came from?*

Note: Bring a camera to take photographs of any pollution that your students notice throughout the neighbourhood.

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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class **Knowledge Building Circle** (recommended to conduct outside if possible) using one of the questions that you generated after the neighbourhood walk or the example below.

Possible **Umbrella Question**: **"What happens to the pollution that is left on the ground or in the water?"**

D. Determining Understanding

At this stage of the inquiry, 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.

After the Knowledge Building Circle, introduce Concept Mapping to students. This activity can be done in groups or with the whole class. (More info on Concept Maps | Classroom Strategies | Reading Rockets)

1. Refer to the concept map that was created in the second inquiry.
2. Add the new concept map pictures of water pollution, and/or photos taken during the neighbourhood walk. You can add the images or concepts that were taught on index cards or sticky notes to allow students to move them around the concept map.
3. Have students place and connect with lines the ideas that have something in common with the concepts from the first inquiry.
4. Save the concept map for inquiry 4 where more concepts will be introduced.

E. Pursuing Learning

Students will continue 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.

Activity Example 1: Garbage Audit
Conduct a schoolyard garbage audit.

- Create a graph of the different types of garbage found around the school or schoolyard and post it in the hallway for other classrooms to see.

- Create and share announcements and information about water pollution and garbage. (e.g. posters, school-wide announcements, send students class to class)
- Do another schoolyard garbage audit in a couple of weeks and compare the graphs. Were there any changes after educating the community? Why or why not?

OR

Activity Example 2: Puppet Show
Create a puppet show.

- Using the story plan below, students work with the teacher to write a story.
    - Beginning: An animal/fish/amphibian/reptile is in a pollution situation in a river/ocean/pond.
    - Problem: How is the character impacted by pollution?
    - Solution: How is the problem resolved?

The story is then presented as a puppet show.

Possible Extension Activity
Make puppets out of recycled material or create sock puppets using mismatched socks.

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.

Perspective
Write, draw or dramatize a story about pollution from a living thing's perspective.

Example: *Ask students to tell you how the fish feels.*

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.

Choice Board Strategy

Possible Guiding Question: *What can we do to prevent pollution in the first place?*

Sample Choice Board

Create a Bumper Sticker	Create a poster	Make an Announcement
Draw a Picture	**FREE CHOICE**	Be a piece of garbage. Show your journey Dance
Make Music (any materials)	Sing a Song	Use Recycled Materials to Make a Model

After the students have decided which activity they would use to prevent pollution, they should be given an opportunity to present their understanding to other students or parents/administrators.

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Ideas for Taking Action:

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

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Chapter 3: How Does Addressing Climate Change Make Us Healthier?
Inquiry 4: Impacts on Health: Food Security

- ***Provocation*** – *Picture Comparison*
- ***Question Generation*** – *Discovery, Question Starters, The Five Whys*
- ***Knowledge Building*** – *Knowledge Building Circle, Umbrella Question*
  Determining Understanding – *Concept Map*
- ***Pursuing learning*** –*Experiment, books*
- ***Consolidation*** – *Experiment Part 2*
- **Assessment** – *Choice Board*
- ***Take Action***

A. Provocation

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

Pictures

Compare these two pictures of a cornfield as a class.


(unsplash.com)

Possible Questions:

- What do you notice about these pictures?
- Why is the weather important to farmers?
- What would happen to the farmers' crops if we didn't get any rain for a month?
- What would happen to the farmers' crops if it rained everyday for a month?
- Do you like to eat corn? Would you be able to if this happened?
- Is this happening in other parts of the world? How will this impact humans?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation by generating meaningful questions to continue to drive the learning process.

Discovery
In the fall, spring or summer, you can take the students outside and look at plants and where they grow. In the winter season they can look at indoor plants. What questions do the students have about the plants, the soil and where they grow?

Extension (Food access):

- How might these plants look different in other countries around the world?
- Do you think all of the countries in the world have the same plants?
- How do people decide what to grow?
- If the plants are different, what does that mean for the food people eat?

Help younger students with question starters.
(Who, What, Where, When, Why and How)
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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class **Knowledge Building Circle** (recommended to conduct outside if possible) using one of the questions that you generated after the picture comparison activity or the example below.

- Possible **Umbrella Question**: "**What would you ask the farmer about their crops?"**

D. Determining Understanding

At this stage in the inquiry, 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.

After the Knowledge Building Circle, introduce Concept Mapping to students. This activity can be done in groups or with the whole class. (More info on Concept Maps | Classroom Strategies | Reading Rockets)

1. Refer to the concept map that was constructed in the first three inquiries.
2. Add the new concept map picture(s) of drought, flood, environment and human impact. You can add the images or concepts that were taught on index cards or sticky notes to allow students to move them around the concept map.
3. Have students place and connect with lines the ideas that have something in common with concepts from inquiry 1, 2 and 3.
4. Finally, together develop a statement or big idea that explains the concept map.

E. Pursuing Learning

Students will continue 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.

Activity Example 1: Science Experiment
Create a science experiment to understand drought and flooding.

Plant three food plants from seed or purchase three plants that are exactly the same. Decide what the plants will need in order to survive and how often they need to be watered. Decide which plant will be overwatered, never watered and which one will be watered when it needs to be. Make some predictions about what will happen to the plants or seeds after a couple of weeks. Students can use this template to record their predictions and subsequent learning.

Example Activity 2: Food Securities
If you would like to delve more into food securities and healthy eating and how it relates to climate change, read the book **The World Came to my Place Today by Jo Readman, illustrated byLey Honor Roberts or find the book here.**

"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 lively, simple text follows George's day as he discovers the wonder of plants and how they affect his daily life." (Jo Readman and Ley Honor Roberts)

Follow up: Activities to introduce the global-ness of food can be found in this document based on the book "The World Came to My Place".

Talk about children in our communities, in the rest of Canada, and in the world and how everyone is affected by climate change and food.
World Hunger Statistics (2016)

Additional Resources:

- **My Food Your Food by Lisa Bullard Illustrated by Christine M. Schneider**
    - "It's food week in Manuel's class. Each student tells about something special his or her family eats. Manuel learns that families have different food traditions. Some eat noodles with chopsticks. Others use a fork. Some families eat flatbread. Others eat puffy bread. Some families eat meat. Others eat no meat. What kind of food will Manuel share with his class? Join him to find out how deliciously different and alike food can be. A diverse cast gives multiple points of comparison."
    - **Sing along book: My Food, Your Food, Our Food by Emma Carlson Berne, illustrated by Sharon Sordo and music by Mark Oblinger**
- **Book: A Hundred Thousand Welcomes by Mary Lee Donovan, illustrated by Lian Cho**
    - "Welcome, come in! You are invited to travel to homes around the world in this beautifully illustrated picture book about hospitality and acceptance, which features the word "welcome" from more than fourteen languages. Fans of Here We Are and The Wonderful Things You Will Be will enjoy this timeless story about family, friendship, empathy, and welcoming others." (Mary Lee Donovan)

Possible Follow-up Questions:

- How does the weather impact our farmers and farmers around the world?
- Is it more difficult to live in other parts of Canada? The world?
- Is everyone able to afford to buy healthy food?
- What are some of the reasons people may not be able to afford to buy healthy food?
- What does it mean to be healthy? Are there different ways to be healthy and different factors to consider?

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.

Plant Experiment Continued

Students can use words or pictures to represent their understanding based on the experiment they conducted in the Plant Experiment

Possible Question: What did you learn about climate change and food?

Assessment Idea

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method to standard quizzes and tests, that can be used after consolidation or at any point in the lesson to check for understanding.

Choice Board Strategy

Possible Guiding Question: What can we do to help our environment?

Sample Choice Board

Create a Bumper Sticker	Oral Story about how one child made a difference	Make an Announcement
Draw a Picture	**FREE CHOICE**	Create a dance or tableau scene
Make Music (any materials)	Sing a Song	Use Recycled Materials to Make a Model

After the students have decided which activity they would use to help the environment, they should be given an opportunity to present their understanding to other students/parents or administrators.

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- Start a campaign for rain barrels to water school gardens
- Create anti-idling posters for the community
- Think about making a commitment to reducing plastic waste 10,000 Changes
- About World Food Day - World Food Day Canada (October 16th every year) What can we do to help that will also help climate change?

Action Project Examples

"KINDERGARTEN GARDEN PROJECT"- Byron Northview Public School- London, ON (2019) K-2

- Their vision for Canada is to foster healthy and mindful attitudes toward nature and the outside world. It is their hope to show the youngest students how to cultivate and grow a sustainable garden, respect the planning and planting process, and to reap the benefits of growing their own produce. See their project here.

"USING A HYDROPONIC GROW KIT WITH GRADE 1/2"- Anne Hathaway Public School- Stratford, ON (2020) K-2

- The goal of the project was to learn about the importance of eating local produce, sharing local produce with others, and learning about where food comes from. The first step of the project was to use a hydroponic grow kit to see leafy greens grow fairly rapidly in the classroom. Grade 1/2 were intrigued that plants could grow without soil and were very excited to watch the lettuce grow. See their project here.

*How could you use these great examples to come up with action projects with your K-2 students?

- Think Big! Collective Action for Climate Change | Sustainability Classroom Resources at Resources for Rethinking

- World's Largest Lesson

    - “In the first activity the students watch a 5 minute video that takes them around the world visiting other young people who have taken individual actions to fight climate change. From India to Jordan, the students see that individual actions can make a difference while the narrator encourages them to fix things where they live. The message of the video is to invent, collaborate or campaign to make improvements where you live. After watching the video, the students will brainstorm a list of possible actions that could fight climate change.”

- 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

CHAPTER 4:

It's Easy Being Green!

A Project of Learning for a Sustainable Future

Contributors: Janice Haines, Nathalie Lauriault

Art by Laura Valdés González 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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Chapter 4. It's Easy Being Green

This chapter explores green energy, the difference between “needs” and “wants” as well as the importance of becoming a climate champion.

Artwork by: Laura Valdés González for ArtistsForClimate.org

Background information: What do educators need to know?

Ripple Effect of Individual Actions

According to Canada’s Institute for Climate Choices, personal changes in behaviour will play a key role in reaching Canada’s net-zero goal. The question that often comes up is *how can one person’s actions have an impact on a problem as large as climate change*?

Behavioural Psychologist Kelly Fielding from the University of Queensland explains, "people are very influenced by what others do, even though we don't think we are". "It's a paradox. We think we make our own decisions, but the truth is we look to others for guidance about how we should behave. When it comes to climate change, the problem is that we just aren't getting the cues we need from our friends and families or, for that matter, from government and business.” This is

what makes individual actions so important: it's less about our actions themselves and more about growing our impact by guiding others to follow suit (Justin Rowlett, BBC, 2019).

Climate change isn't going to *happen or not happen*—it is happening!—but it's up to the government, corporations, and, yes, individuals to determine just how much the climate will change and what impacts will be felt. As Greta Thurnberg says about taking individual action: "We do it because we want to influence the people around us, we want to send a clear signal that we are facing an emergency and when you are in an emergency you change your behavior" (Green Matters, 2022).

Consumer Choice

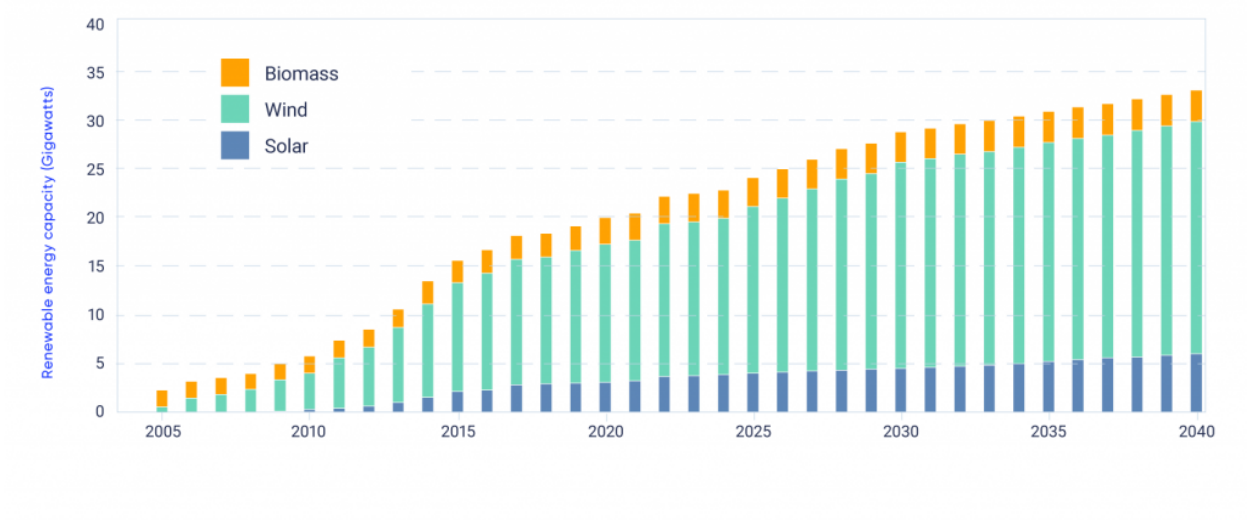
Every day we make choices about what is a necessity vs. a luxury (need vs. want) in our lives. These consumer choices have a big impact on the planet. To keep us fed, clothed, sheltered, and entertained, the earth's resources are being consumed faster than they can be replenished. This is related to humans' overconsumption, but also the linear nature of our economy. A linear economy means the raw materials that were used to make a product are thrown out at the end of its use, and thus become waste. A circular economy, on the other hand, reduces or eliminates waste by recycling and re-introducing used materials back into production, and materials/services are produced with sustainability, longevity, and repairability in mind.

In Canada, many goods and services are consumed without considering the environmental impact. For instance, according to a recent report by Second Harvest, 58% of all food produced in Canada is thrown away. Additionally, according to Elisa Tonda (Head of the Consumption and Production Unit at the UN Environment Programme), fast fashion and irresponsible purchasing of clothing are large contributors to the climate crisis; apparel and footwear industries account for more than 8% of global climate impacts.

While we can work to make our economy more circular, while it remains primarily linear, we need to examine our consumption habits to reduce our waste and impact on the earth.

Green Energy

Globally, the energy sector accounts for over 70% of all greenhouse gas emissions attributed to humans (Our World in Data). To significantly reduce these emissions, humans need to not only reduce their overall energy use but also transition to cleaner and greener energy sources. "Climate change also has direct and indirect impacts on energy demand. Warmer winters reduce fossil fuel and electricity demand for heating (Mantle314, 2019), while the increasing number of hot days in summer increase electricity demand for cooling (Ortiz et al., 2018; Jaglom et al., 2014)." (NRCAN, 7.6.1)



Observed and projected changes in non-hydro renewable energy capacity in Canada between 2005 and 2040 under the National Energy Board reference case scenario. Higher rates of growth are projected under a technology scenario (NEB, 2018).

Source: NRCAN Chapter 7: *Adapted from National Energy Board, 2018.*

There is some confusion among the terms “clean,” “green” and “renewable” energy. “**Clean energy** is energy gained from sources that do not release air pollutants, while **green energy** is simply energy that is derived from natural sources, and “renewable energy is energy derived from natural processes that are replenished at a rate that is equal to or faster than the rate at which they are consumed” (TWI, 2022). Renewable energy includes energy generated from many different natural resources or processes including solar, wind, hydropower, tidal power, geothermal, solid biomass, biogas, and liquid biofuels (NRCAN, 2017). While most green energy sources are renewable, some renewable energy sources may be greener than others. For example, a hydropower dam is clean because it releases no air pollutants, and it is renewable because the source of energy replenishes itself, but it is not green because dams and reservoirs that produce electricity are a large contributor to GHG emissions (WaterKeeper Alliance, 2017). Understanding the difference between these energy sources is important when discussing the environmental implications of energy use, and sustainable alternatives.

This chart below compares the tradeoffs of various energy sources:

Comparing Energy Sources

Explore the table to see the tradeoffs of different sources.

SOURCE OF ENERGY	FOSSIL FUEL	ALTERNATIVE	RENEWABLE	EMISSIONS	LAND USE
Biomass	✗	✓	✓	☁☁☁	🌲🌲🌲🌲🌲
Coal	✓	✗	✗	☁☁☁☁☁☁	🌲🌲🌲
Hydro	✗	✓	✓*	☁	🌲🌲🌲
Natural gas	✓	✗	✗	☁☁☁	🌲
Nuclear	✗	✓	✗	☁	🌲
Petroleum	✓	✗	✗	☁☁☁☁	🌲🌲
Solar	✗	✓	✓	☁	🌲🌲
Wind	✗	✓	✓	☁	🌲

*Because hydropower plants can significantly damage the ecosystems where they are built, hydropower is not always classified as renewable energy.

Source: World 101: What is Climate Change

In Canada, the goal is to reach net-zero emissions before 2030 (Government of Canada, 2020). However, the path to zero emissions will be challenging and complex. Varying solutions will likely be key parts of achieving this goal, including improving energy efficiency, shifting to non-emitting electricity, adopting heat pumps, and switching to electric vehicles (Canadian Institute for Climate Choices,p4, 2021).

"It is easy to be green!" explores climate change with K-2 students by learning about the importance of individual choices in the context of living sustainably. The inquiries focus on green energy, needs vs. want, and finally how these choices can ripple out to have a greater impact. Each of the 3 inquiries begins 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 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	Stewardship Ecosystems Environment Biodiversity Sustainability Protection Habitats Innovation Change Survival Action Conservation
Language	Communication Inferencing Retelling Visual literacy Media forms Persuasion Point of view Critical Literacy
Social Studies	Resources Perspectives Consequences Interrelationships Cause Significance Human-environmental interaction Physical features Rights and responsibilities Scarcity Choice Supply and demand
Physical Education and Health and Wellness	Decision-making Contribution Connection Relationships Self awareness Balance Choice Peer pressure Self-determination Leadership Participation
	Composition

The Arts	Symbolism Interpretation Relationships
Math	Scale Shapes Location Investment Organisation

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: Green Me- Needs vs. Wants

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.

Resources:

- Wall-E Read along Storybook
- Wall-E Movie
- Needs or wants? That is the question! - Bank of Canada Museum.

Inquiry 2: Understanding Green Energy

Students will explore innovations in alternative energy, learn how they function and understand their benefits. They will explore their environment and understand how changes can be put in place to improve the energy system. Students will then create a machine that can help the environment. They will be given choices and encouraged to design and build their prototype.

Resources:

Poster:

- Engage Your Students - Project Learning Tree

Videos:

- 100% Renewable Energy

- Worlds Largest Lesson - Emma Watson Introduction | Global Goals
- 5 inventions changing the world! | Explore | Awesome Activities & Fun Facts | CBC Kids11 Kid Inventors Break Down Their Greatest Inventions | The New Yorker Engineering Design Kindergarten Science
- Seed Launching Backpack, a 3D-printed, pollinator-friendly invention | The Kid Should See This

Worksheets:

- Alternative Energy Pictures
- Invention/Design Idea

Website:

- Schools — Canadian Multicultural Inventors Museum

Inquiry 3: "I Want to be Green!"- Climate Champions

How to get students thinking about being "green". Students will explore how a simple act can have a ripple effect and change and help their world.

Resources:

- Sesame Street: It's Not Easy Being Green (Kermit's Song)
- Kermit the Frog - It's Not Easy Being Green Lyrics

Books:

- Teach kids sustainability: What Does it Mean to be Green?
- What Matters - By Alison Hughes
- I AM ONE (A Book Of Action) Read Aloud For KIDS

Chapter 4: It's Easy Being Green!

Inquiry 1: Green me - Wants and Needs

- ***Provocations*** *– Picture*
- ***Question Generation*** *– Five Whys*
- ***Knowledge Building*** *– Knowledge Building Circle, Critical Thinking Question*
  Determining Understanding *- Story, Simulation, Books, Videos*
- ***Pursuing Learning*** *– Simulation Game, Needs and Wants Game*
- ***Consolidation*** *– State Elaborate Example Illustrate (SEEI)*
- **Assessment** *– I Used to Think… Now I Think… Exit Ticket*
- ***Take Action***

A. Provocation:

To hook student interest, introduce the provocation to initiate students' thinking about needs vs wants.

Picture

(Source: Pixabay)

After viewing the picture. Invite students to give the image a title. Display the titles around the image. Then, as a group, invite students to explain why they chose this title for the poster.

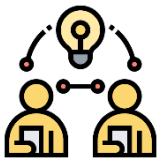
B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation by generating meaningful questions to continue to drive the learning process.

Use the Five-Why's by looking at the picture. This strategy helps students deepen their ideas and understanding.

Possible questions:

- Why do people throw things away?
- Why is there a tractor there?
- Why doesn't garbage disappear when buried?
- Why is there garbage in this beautiful field?
- Why does this hurt the climate?



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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class Knowledge Building Circles -kindergarten (outside if possible)

Use one of the questions that you generated after the picture activity to do a Knowledge Building Circle.

Possible Critical Thinking Question:

- What can we do to reduce the amount of garbage?

D. Determining Understanding

At this stage of the inquiry, 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. After the knowledge building circle, simulate a situation to understand the difference between needs and wants.

Simulation

Begin the activity by sharing the book WALL-E

“When a loveable, lonely robot named WALL•E falls in love with a sophisticated female robot named EVE, he follows his heart all the way into outer space! Young fans will enjoy this Little Golden Book retelling of Disney/Pixar’s WALL•E” (WALL-E, RH Disney).

OR

Explain that we have created too much garbage and polluted our water so in order to survive, we need to leave planet earth and find another planet. The problem is that we only have one rocketship so we are only allowed to bring 12 things with us.

Have a discussion about our needs and wants and how they can be influenced by our lived experiences and context. This will help students understand that they are similar and different to others. (i.e., both students might want an iPad but one student can’t get one because they don’t have internet, one student might want a new pair of shoes but another student may need a new pair of shoes because theirs are too small)

In pairs, invite the students to look around the classroom and collect 12 things they will need or want to bring on the journey to the new planet.

Possible questions:

- Why do you think this item is important?
- Could you sort the items in order from most important to least important or are they all the same?
- How will this item help you on your journey?

EXTENSIONS:

- **Watch:** WALL·E’s “Day At Work” (clip)
- **Watch:** TALKING AND PLAYING WITH MOVIES: WALL-E (study of human impact on earth)

  **Note: The movie is approximately 1 hour and 40 min. You will need to show it in smaller sections to keep the students interested.

These books also speak to needs/wants and how they can be different based on our lived experiences:

- Those Shoes by Maribeth Boelts, illustrated by Noah Z. Jones:
  “All Jeremy wants is a pair of those shoes, the ones everyone at school seems to be wearing. Though Jeremy’s grandma says they don’t have room for "want," just "need," when his old shoes fall apart at school, he is more determined than ever to have those shoes, even a thrift-shop pair that are much too small. But sore feet aren’t much fun, and Jeremy soon sees that the things he has — warm boots, a loving grandma, and the chance to help a friend — are worth more than the things he wants.” (Those Shoes: Boelts, Maribeth, Penguin Random House)

- A Bike like Sergio's by Maribeth Boelts, illustrated by Noah Z. Jones:

  A story about Ruben, who is faced with a difficult choice, and an opportunity to do the right thing when he comes upon a surprise $100 bill. (Scholastic, A Bike Like Sergio’s)

E. Pursuing Learning

At this stage, students may begin research to pursue their questions, or the following activity could be integrated into the process to ensure that students

have an understanding of foundational climate science.

Game
The game below provides students with deliberate and focused opportunities to continue learning about climate change impacts and responses to needs and wants.

Continue the discussion about needs and wants.

1. Inform the students that more people are coming on the rocketship so 6 more items need to be eliminated.
2. With their partner, discuss the reason for keeping those 6 items.
3. Keep telling each pair that they have to eliminate items until they are allowed only one.
4. Discuss and present the reason that they chose that one item with the rest of the class.
5. Display all of the items chosen by the pairs and give each student two post-its with their name on it.
6. Students then place their post it notes beside the two items that they feel are the most important items to bring on the voyage.
7. Reflect on why some items seem to be more important than others.

End the lesson by explaining that they don't have to go on the rocket, but that they should stay here, take care of the planet and make it a more sustainable place for future generations.

Next, play the game Needs or wants? That is the question! - Bank of Canada Museum to help them solidify their understanding of climate change.

Extension 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.

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.

SEE-I Strategy

- **S**- **State it:** with the class clearly state and copy the definition of the concepts onto the board. Needs "a need is something you must have to survive" and wants "something that's nice to have, but you can actually live without". (Teaching kids the difference between needs and wants | ASB Blog)
- **E- Elaborate**: the student reformulates the definition in his own words.

- **E- Example**: the student gives their own examples of need and want.
- **I- Illustrate:** the student illustrates in a non-linguistic way the image he has for the need and the want.

More experienced students might also be able to find an illustration or even a symbol that makes them think of the concept.

Invite students to share their illustration/symbol together.

Assessment Idea

Teachers will use multiple methods to assess learning at various stages. The following method represents an alternative to the usual tests and can be used after the consolidation stage or at any other time during the lesson to check the level of comprehension of the pupils.

Exit Ticket
Use the I Used to Think... Now I Think... strategy as your exit ticket.

Have students write one sentence explaining how their thinking about needs and wants have changed (with a personal example) as a result of this inquiry. For younger students, this can be done with the teacher writing down their thoughts after they share them or illustrate them.

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

You might introduce the idea of students taking action by sharing the following YouTube "Climate Change Song"

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

Action can be taken in many different ways, these are some possible 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
- 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.
- Do some of the Eco-Activities | Earth Rangers: Where kids go to save animals! to reduce our impact on the environment
- Develop a plan to conserve energy at home and/or at school and communicate this to this to the rest of the student body
- 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

"BABY BITES FOR SUSTAINABLE FOOD PRODUCTION"- Sydney Academy- ON (2021) K-6

- This class learned about the impacts food production has on our planet and the limited food production of fresh produce in their region. Each student was provided with the materials needed to grow a tomato plant and some herbs. The students were asked to take it home with a plan to care for it and have a harvest in their homes over the summer. See their project here.

"CLOTHING SWAP AND CLOTHING INDUSTRY POLLUTION"- Port Elgin Regional School- NB (2021) K-1

- This class did an action project of a clothing swap to try to help reduce, reuse and recycle. They also did some research to see what materials are best for

the earth. They want to encourage others to do clothing swaps and try to reduce the amount of clothing everyone uses. See their project here.

"SUSTAINABILITY AT HOME CHALLENGE"-St. Mary Catholic Elementary School-ON (2021) AGE

- The teachers at St Mary developed an educational program to deliver to students virtually through their classroom teachers that involved a presentation, supporting activities and an at-home challenge. The goal was to have students submit photos, videos, drawings and written descriptions of the things they were doing at home to live more sustainably. As a result of participation all students will receive a St. Mary Grafton reusable water bottle to use at home or at school. See their project here.

*How could you use these great examples to come up with action projects with your K-2 students?

Earth Rangers Examples:

- **Eco-Activity #187: Snack like a Rabbit! | Earth Rangers: Where kids go to save animals!**
- **Eco-Activity: Make a difference with just ONE tree! | Earth Rangers: Where kids go to save animals!**
- **Eco-Activity: Eliminate energy-wasters in your home | Earth Rangers: Where kids go to save animals**

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 bullfrog powered 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.

Chapter 4: It's Easy Being Green!

Inquiry 2: Understanding Green Energies

- ***Provocation*** *– Poster, New Vocabulary*
- ***Question Generation*** *– Video, Pictures, New Vocabulary*
  Knowledge Building *– Knowledge Building Circle*
- ***Determining Understanding*** *- Plus Minus Interesting*
- ***Pursuing Learning*** *– Videos, Invention/Design Process, Onomatopoeia*
- ***Consolidation*** *– Inventors Museum*
- **Assessment** *– Green your school*
- ***Take Action***

A. Provocation

To hook student interest, introduce the provocation to initiate student's thinking about alternative energy.

Poster

Posters can be a great way of gaining student attention and interest. This link identifies the advantages to poster use in education and suggests 6 attributes of an effective poster. Suggestion: Put the image up on the whiteboard and have the students circle things that they notice.

Engage Your Students - Project Learning Tree

Possible Questions:

- What do you notice about the school?
- Is this school different from our school?
- Why is the name of the school "Green School"?
- Why is the sun, wind, water and earth used to create an alternative energy?

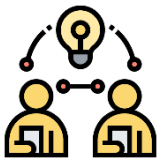
**Begin to introduce new vocabulary. (renewable/non-renewable, biomass (plants, wood, waste), solar power, wind energy, wave energy, geothermal energy, hydro power)

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.

Video
Play the video 100% Renewable Energy and write any new vocabulary on the board with the accompanying Alternative Energy Pictures.

What questions do your students have about the different types of renewable energies? Write them down.



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 provocation and ideas that have been generated thus far in the inquiry process.

Engage in a class Knowledge Building Circles-kindergarten (outside if possible)

Use one of the questions that you generated after the video to do a Knowledge Building Circle.

Possible **Umbrella Question**:

- What alternative energy do you think is the best one to use? Why?

D. Determining Understanding

At this stage of the inquiry, 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.

At this point in the inquiry you may decide to use a tool such as **PMI strategy** .

How Can Plus Minus Interesting Strategy be Used in The Classroom?

School Walk

Have students take a walk through and around their own school and share what they believe is a plus, minus or something interesting around energy use.

PLUS	MINUS	INTERESTING
List all of the positive ideas that you noticed about energy in and around your school.	List all of the negative ideas or problems that you noticed about energy in and around your school.	List all of the interesting ideas, neither positive or negative, that came from your walk through and around the school.

Draw, write or record your thoughts on an iPad or journal.

E. Pursuing Learning

At this stage, students may begin research to pursue a question that has been generated, or the following activity 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 and climate change.

Help students understand the importance of inventions and share examples of students who have already created inventions to help climate change.

Video
This video is for junior students, it is suggested that you stop it often to help the younger students identify the problems and solutions.

Invention
Inventors see a problem and try to come up with a solution. Inventions can also make the world a better place. Use the video Engineering Design Kindergarten Science (Ask, Learn More, Create, Improve) to encourage students to design and construct something that will help with energy and climate change. Have older students label their Invention/Design Idea.

After they have illustrated their design, they can create a prototype (simple model based on a design). This prototype can be made from any material they choose (e.g., playdough, clay, pipe cleaners, recycled materials).

These challenges are taken from or adapted from Little Inventors.

- Choose three to five that you like and give the students a choice.
- Invent a machine to reduce the amount of electricity we use.
- Invent a new way to travel that uses less energy.
- Invent a way to create energy through exercising.

- Invent clothing with an extra ability to save energy.
- Invent a new way to water a garden that saves energy.
- Invent a Superhero outfit that creates renewable energy.
- Invent a hat or shoes that have an ability to create energy.
- Invent a machine that stops plastic from going into the ocean.
- invent an eco-friendly city/home.
- Invent a robot that can help us waste less energy.
- Invent a bicycle that does more than just get us to a different destination.
- Come up with your own idea for an invention.

Drama
When you present your design to the class, use Onomatopoeia.
The Onomatopoeia Alphabet | Onomatopoeia for Kids | Jack Hartmann .
Come up with at least 5 sounds that your invention makes.

Possible Extensions:
- Seed Launching Backpack, a 3D-printed, pollinator-friendly invention | The Kid Should See This (video example)
    - What problem did he notice? What was his solution?
    - What are the pros and cons of this invention?
- 11 Kid Inventors Break Down Their Greatest Inventions | The New Yorker

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.

Create an Inventors Museum

Invite another classroom to come to your Inventors Museum.

- Option 1: Each group will have to explain their invention and how it works to the different groups of students.
- Option 2: Each group will try to sell it to another class. They will need to explain why it is important for climate change and why they should buy it.

Schools — Canadian Multicultural Inventors Museum

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 Your Own "Green School"
Provide a picture of your school to each pair of students or small group in your class. Each group can add changes to the school that they believe will make the school "greener" and help with climate change. Have them present their thinking to the principal /superintendent /custodians or any other stakeholders.

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.

These ideas for action can be utilized at any point in the learning process, whether it's now or after completing more guided inquiries. Please note that the suggestions are consistent in each chapter. Remind students that even when things get hard and seem so big they can always do something by taking action. Their actions will create an impact.

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

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:

- 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
- 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.

- Do some of the Eco-Activities | Earth Rangers: Where kids go to save animals! to reduce our impact on the environment
- Develop a plan to conserve energy at home and/or at school and communicate this to this to the rest of the student body
- 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

"CLOTHING SWAP AND CLOTHING INDUSTRY POLLUTION"- Port Elgin Regional School- NB (2021) K-1

- This class did an action project of a clothing swap to try to help reduce, reuse and recycle. They also did some research to see what materials are best for the earth. They want to encourage others to do clothing swaps and try to reduce the amount of clothing everyone uses. See their project here.

*How could you use these great examples to come up with action projects with your K-2 students?

Project 2050: *Climate-friendly habits to change the world!*

- 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.

Eco-Activity: Make a difference with just ONE tree! | Earth Rangers: Where kids go to save animals!

Eco-Activity: Eliminate energy-wasters in your home | Earth Rangers: Where kids go to save animals

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 bullfrog powered 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.

Chapter 4: It's Easy Being Green!

Inquiry 3: I Want to Be Green! - Climate champions

- ***Provocations*** *– Song, Lyrics*
- ***Question Generation*** *–Five Ws and an H and developing higher order questions*
- ***Knowledge Building*** *– Doodling and Sketching*
- ***Determining Understanding*** *- If….Then…… Book*
- ***Pursuing Learning*** *– Experiment, Book, Create a book*
- ***Consolidation*** *- Making Seedbombs*
- **Assessment** *– Create a Video*
- ***Take Action***

A. Provocation

To hook student interest and get them thinking, introduce a provocation to get them thinking about what it means to be green.

Song

Have the students listen to the song Sesame Street: It's Not Easy Being Green (Kermit's Song) Muppets - Kermit - It's not easy being green (original)

Either share the Kermit the Frog - It's Not Easy Being Green Lyrics on overhead projector or write the lyrics out on large poster paper.

***Students are very literal at this age. This helps them understand that the song can be interpreted many ways and introduces the concept of "being green".**

Possible Questions:

- What message is Kermit trying to say?
- What do you think Kermit means by "It's Not Easy Being Green"? Is he right?
- After listening to the song, do you think you would like to be "green"? Why?

B. Question Generation

At this point in the inquiry, we want to harness students' curiosity and build off of the provocation by generating meaningful questions to continue to drive the learning process. Below are some suggestions for guiding students in creating questions that will drive their inquiry on their understanding of being "green" and being climate champions.

Kermit doesn't want to be green at the beginning of the song but changes his mind at the end.

Use Five Ws and an H and developing higher order questions (Who, What, Where, When, Why and How) to get the students thinking about being green.

Example:

- Who can be “green”?
- What does it mean to be “green”?
- Where are “green” people?
- When is a good time to be “green”?
- Why would you want to be “green”?
- How do I start to be “green”?

C. Knowledge Building

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

Sketch Map

Engage students in the Doodling and sketching strategy. The purpose of this strategy is to begin to understand what “green” means to them. Have them work on their own, in pairs or as a class to sketch some of their ideas. They can add to their sketch or the group sketch throughout the inquiry.

Possible questions:

- What does it mean to be green?
- Is it easy being green?

D. Determining Understanding

At this stage of the inquiry, 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.

After spending some time learning about being “green”, share this book and reflect on their understanding to determine next steps.

Book

Teach kids sustainability: What Does it Mean to be Green? By: Rana Diorio, illustrated by Chris Blair

“In this empowering book, a young boy and girl discover amazing facts (like how our food travels an average of 1,500 miles to be on our plate!) and explore all the different ways they—and we—can help protect the Earth's most precious resources to save the planet and live "green" lifestyles.” (Rana Diorio)

As a class, come up with several IF- THEN statements about what it means to be “green”. Write their statements on poster paper and decorate them. Have the students decide where each of the statements should be put in the classroom or in the school to remind everyone of the importance of being “green”.

Example:
If we use the bottle filling station **then** we save water.The students may decide to put this above the bottle filling station in the school hall.

E. Pursuing Learning

At this stage, students may begin research to pursue a question that has been generated, or the following activity could be integrated into the process to ensure that students have an understanding of foundational climate science. The activity listed below will enrich the understanding of being green and becoming climate champions.

Book
Read: **What Matters** By Alison Hughes, illustrated by Holly Hatam find the read along version here!
“What happens when one small boy picks up one small piece of litter? He doesn't know it, but his tiny act has big consequences. From the miniscule to the universal, What Matters sensitively explores nature's connections and traces the ripple effects of one child’s good deed to show how we can all make a big difference.”(Alison Huges)

AND

Read: **I AM ONE- A Book Of Action**! By Susan Verde, illustrated by Peter H. Reynolds by
“One seed to start a garden, one note to start a melody, one brick to start breaking down walls: Every movement and moment of change starts with purpose, with intention, with one. With me. With you.” Peter H Reynolds.

Experiment
Drop a rock in a pan of water so that the students can see the ripple effect. Ask the students what they notice. Explain that when a rock is thrown, there is a movement in the water that widens and expands. Like the rock, our actions and words can have far reaching effects.

Possible questions:

- What is the relationship between the boy and the ripple that the rock caused?

- Why is a tiny act important?
- What tiny act have you done that you think helped another species?

Climate Champions Book
Create a book together. Each child creates a page for their book illustrating an action they would like to take to become a climate champion. Decide on the title for your book.

Possible title: Climate Champions!

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.

There are many ways that we can help the earth, animals and people. Let's start to answer the question "Is it easy being green?" by creating something that will immediately help our environment and help stop climate change.

Seed Bombs
These wildflower seed bombs are made with local species and natural clay and are thrown into natural spaces anytime of the year. When Spring arrives and the rain washes away the clay, it leaves the wildflower seeds which will hopefully grow and encourage different insects and wildlife to the area. The students will start to understand another important and easy way to be "green" and how much we rely on pollinators.

Suggestion: focus on specific seeds so that you can help certain species in your area.
E.g., milkweed seeds for Monarch butterflies

**Have the students take pictures and short videos of the process so that they will be able to create and share their videos with other students.

Assessment Idea

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Student-Created Videos in the Classroom | Edutopia

- *Learning product videos*
- *Response videos*
- *Reflection videos*
- *Tutorial videos*

Have the students create a video or take pictures and do a voice over to demonstrate their learning. The students show how they made seedballs, where they threw or want to throw them and what they hope will happen. They can finish the video by explaining why they think this will help the climate.

Take Action:

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"SUSTAINABILITY AT HOME CHALLENGE"-St. Mary Catholic Elementary School-ON (2021) AGE

- The teachers at St Mary developed an educational program to deliver to students virtually through their classroom teachers that involved a presentation, supporting activities and an at-home challenge. The goal was to have students submit photos, videos, drawings and written descriptions of the things they were doing at home to live more sustainably. As a result of participation all students will receive a St. Mary Grafton reusable water bottle to use at home or at school. See their project here.

*How could you use these great examples to come up with action projects with your K-2 students?

Project 2050: *Climate-friendly habits to change the world!*

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

Eco-Activity: Collect and Conserve! | Earth Rangers: Where kids go to save animals!

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.

CHAPTER 5:
Indigenous ways of knowing

A Project of Learning for a Sustainable Future
Contributor: Deborah Miller

Art by Joanne Robertson, Water Protection Activist, Author & Illustrator of the Water Walker

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 5. Indigenous Ways of Knowing

This inquiry 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).

Illustration by Joanne Robertson, water protection activist, author & illustrator of The Water Walker.

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*

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- Living in Relation with the Land

Students learn the importance of observing and living in relationship with the natural world through the wonders of the seasons. Relationship to the seasons and seasonal cycles are foundational to many Indigenous People. Indigenous knowledge passed from generation to generation is continuously shifting because of the changes in the seasons caused by climate change.

Resources:

- **Book -** Read aloud Mii maanda ezhi-gkendmaah/This is how I know or watch online

Inquiry 2: Indigenous Perspective - Environmental Sustainability

This inquiry will introduce students to environmental sustainability and present the Indigenous people's way of life and respect for the land. Students will learn how Indigenous knowledge teaches us about sustainable harvesting and how Mother Earth provides. This knowledge is passed from generation to generation and continues to change as time passes, and new learning occurs.

Resources:

- **Lessons from Mother Earth** by Elaine McLeod and Colleen Wood

Inquiry 3: Indigenous Perspectives - Connections To The Land

This inquiry examines Indigenous people's way of life and respect for the land. The activities explore the role of Elders and Knowledge Keepers and the importance of caring for Mother Earth.

Resources:

- Create a provocation table indoors or outdoors

Chapter 5 : Indigenous Ways of Knowing
Inquiry 1: Indigenous Perspectives- Living in Relation with the Land

- **Provocation** – *Book*
- **Question Generation** – *5W's and H Questions*
- **Knowledge Building**– *Umbrella Questions, Gallery Walk, See Think, Wonder*
- **Determining Understanding –** *Yes/No cards, Knowledge Building Circle, Video, Talking Stick*
- **Pursuing Learning** – *Carousel Brainstorming, Outdoor Activity*
- **Consolidation** – *Consolidation Discussion, Think-Pair-Share*
- **Assessment** – *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 demonstrating 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 Indigenous groups.

> ***A Day with Yayah*** by Nicola I. Campbell (Métis, First Nations Salish), illustrated by Julie Flett (Cree-Métis)

Call of the Fiddle by Wilfred Burton and Anne Patton illustrated by Sherry Farrell Racette (Métis)
The Giving Tree: A Retelling of a Traditional Métis Story by Leah Dorion (Métis)

Byron Through the Seasons by Dene Children (First Nations Dene)

The Elders are Watching by David Bouchard and Roy Henry Vickers (Métis, Ojibway, Anishaabeg)
Fishing with Grandma by Maren Vsetula and Susan Avingaq illustrated by Charlene Chua (Inuit)
niwîcihâw / I Help by Caitlin Nicholson (First Nations Cree)
A Walk on the Tundra by Rebecca Hainnu and Anna Ziegler (Inuit), illustrated by Qin Leng

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.

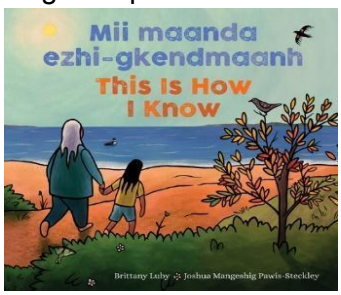
*It would be helpful for the learners to understand that traditional/cultural knowledge is passed as an: I Do, We Do, You Do model. This mentorship model provides the close watching and coaching of the learner by the teacher. This model would aid in learning from mistakes, as well as identifying areas 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 - Mii maanda ezhi-gkendmaah/This is how I know by Brittany Luby, illustrated by Joshua Mangeshig Pawis-Steckley

An Anishinaabe child and her grandmother explore the natural wonders of each season in this lyrical, bilingual story poem. Brittany Luby created the book inspired by her childhood memories of time spent with knowledge keepers.



Mangeshig Pawis-Steckley, Joshua. Cover illustration. Mii maanda ezhi-gkendmaah/This is how I know by Brittany Luby, Groundwood Books Ltd. Front Cover, 2021

As you read the book, help students become aware of the knowledge, information and guidance older people such as elders, grandparents, teachers, uncles, aunts, or mentors can offer. Students should be made aware that one must earn the right to become an Elder in a First Nations community. Not all Elders are seniors, nor are all old people Elders, and some Elders are younger. Elders are honoured because they have gifts of insight and understanding and are willing to share their knowledge. Discuss the role Elders 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

Why did author Brittany Luby decide to write this book?
What kind of signs in nature did the little girl see that let her know which season it was?
What did you notice about the title of the book?
Which Indigenous language do you think that is*?
Can you name the three Indigenous groups in Canada?
The Anishinaabe People are part of which group?
What do you think Anishinaabe means?
Do all Indigenous People share the same traditions and knowledge**?
What is an Elder or Knowledge Keeper?
What can we learn from the Anishinaabe People and their connection with the Land?

***** *This question is an opening to a conversation about how Indigenous children were not allowed to speak in their language at school - this inequality affected children, families, communities and Indigenous People as a whole.*

****** *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.

- Lead a whole-group discussion and brainstorm around the book's theme with the goal of students generating questions about the role of Elders or Knowledge Keepers and their Indigenous Ways of knowing.
- Review the pictures in the book with the students and guide them to generate their questions.

- ***5W's and H Questions*** - Students will be able to ask and answer questions using the five Ws and an H to show understanding of key details in a text. Help younger students with question starters. (Who, what, where, when, why and how)

Who?	What?	Where?	When?	Why?	How?

Possible questions

How do you know which season it is?
How did you learn to identify the different seasons? What physical changes do Indigenous People use to identify changes with the seasons?
How does Mother Earth let you know it is summer, fall, spring, winter? Who helped you learn this?
What do Indigenous People teach us about the land? How are these teachings important to help us understand how we interact with Mother Earth?
In what ways do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
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?
What lesson have you learned from a grandparent, an uncle, an aunt, a mentor or another adult?
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?

C. Knowledge Building

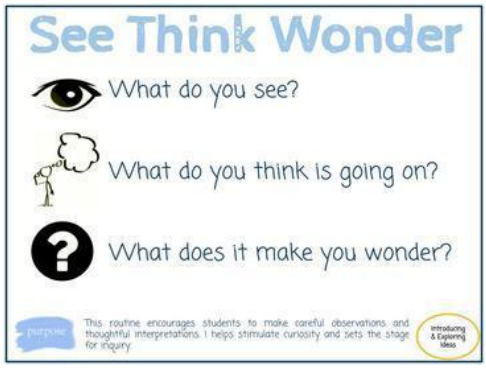
At this stage, students may be ready to engage in a group knowledge-building activity. It will encourage students to open their minds to many alternative ways of thinking about the provocations and the ideas generated thus far in the inquiry process.

Umbrella Questions

> What do we need to know about the land to live on it? What do Indigenous People teach us about the land?
> How do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
> 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?
> What lesson have you learned from a grandparent, an uncle, an aunt, a mentor or another adult?
> What type of knowledge did Elders need to know, and share, about their ecosystems and 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?
> Research different ways Indigenous people have used their knowledge of living things to meet their own needs.

Complete a Gallery Walk. Invite students to draw a picture of themselves with an Elder, a grandparent, an uncle, an aunt or a mentor doing a special activity together or learning a new tradition or skill. 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.

Use the See Think Wonder strategy to explore the pictures drawn by the students. Encourage students to observe and ask questions about other students' traditions, grandparents or other adults. This can be a discussion activity with younger students, while older students can use the template to generate their questions. ***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.***



https://thinkingpathwayz.weebly.com/uploads/1/0/4/4/104440805/published/see-think-wonder.jpg?1519357662

All of the thinking routines mentioned on this website have been adapted from the work of Ron Ritchhart, Mark Church and Karin Morrison (2011) Making Thinking Visible.

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.

Yes/No cards – Use index cards and have students write Yes on one side and No on the other in large letters. Ask review questions about the lesson that require only a yes or no answer, and instruct the students to hold up the correct answer. This activity is a quick and easy way to assess students' understanding.

Knowledge Building Circles - A Knowledge Building Circle is a class discussion activity to work out students' questions and ideas. The circle activity aims to help all students improve their understanding by sharing their learning, ideas, and questions. This communal activity deepens students' knowledge through increased exposure to the diverse perspectives of the class. The KBC aligns with the Indigenous tradition of the Talking Circle, where individuals take turns sharing ideas.

Begin by viewing the book The Sharing Circle by elder and author Theresa "Corky" Larsen-Jonasson. Use a talking stick during your knowledge-building circle, so students listen and share what they have learned 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 practiced 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.

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.

Carousel Brainstorming – Write each topic/question at the top of a chart paper and tape the paper to the wall.
Topics can include:

- Wonders of the four seasons,
- Animals, plants and changes in the natural surroundings
- Indigenous Ways of Knowing,
- Respecting Elders knowledge and wisdom

Complete the activity by identifying the similarities between the chart papers. Discuss how Indigenous knowledge passed from generation to generation is continuously shifting because of the changes in the seasons caused by climate change.

Post guiding questions about the major topics in the story
How is climate change affecting or changing the weather/seasons?
How can listening and reflecting on the knowledge Elders share help us to protect our Mother Earth?
How would I practice the knowledge that Elders share in my daily life?
How can I protect my health during hot, sunny days?
In what ways would we have to adapt in order to cope with climate change?
How will people live off the land if we can't stop climate change?

Outdoor Activity - Get outdoors to play Maple Trees and Marmots, an activity that explores the effects of climate change on animals and plants through role-playing games. This activity allows students to understand how climate change may affect plants and animals. Another game Lynx and Hare introduces the concept of predator and prey relationships and how their adaptations can be affected 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.

Consolidation Discussion

- Ensure that every student can describe what they did, why they did it, and what they found out during the inquiry during a discussion session
- Have students write a thank-you note to the land, the seasons, Elders, grandparents or other adults who teach them things about their culture or nature. Describe how and why you are thankful.
- Have students create a picture or collage of things from the land which they are thankful for

Think-Pair-Share

- Students reflect on their learning by reading their letters or sharing their pictures/collages. They turn around and share their letter or artwork with another student.

Assessment Ideas

- Assess students' knowledge and understanding by evaluating their Gallery Walk pictures
- 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*)
- 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
- 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
- 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.
- Have students write a letter expressing what they can do to help take better care of the land, animals and water.

G. 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. Remind students that even when things get hard and seem so big they can always do something by taking an action. Their actions will create an impact.

Ideas for Taking Action:

- Have students learn more about their local environment and how they can care for it.
- Make 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".
- 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.
- 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.

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

- A Toolkit for Schools - Climate Leadership by EcoSchools provides many easy to implement action project suggestions

Chapter 5: Indigenous Ways of Knowing
Inquiry 2: Indigenous Perspective - Environmental sustainability

- **Provocations** – *Video*
- **Question Generation** – *Round Table Activity*
- **Knowledge Building**– *Umbrella Questions, Knowledge Building Circles, Video, Talking Stick Activity*
- **Determining Understanding** – *Writing Activity, Concept Map*
- **Pursuing Learning** – *I used to think...but now I think, Doodle/Sketch*
- **Consolidation** – *Triangle-Square-Circle*
- **Assessment** – *Doodle it, Assessment Suggestions*
- **Take Action** – *Ideas for Taking 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 Indigenous groups.

> ***A Day with Yayah*** by Nicola I. Campbell (Métis, First Nations Salish), illustrated by Julie Flett (Cree-Métis)

Call of the Fiddle by Wilfred Burton and Anne Patton illustrated by Sherry Farrell Racette (Métis)
The Giving Tree: A Retelling of a Traditional Métis Story by Leah Dorion (Métis)

Byron Through the Seasons by Dene Children (First Nations Dene)

The Elders are Watching by David Bouchard and Roy Henry Vickers (Métis, Ojibway, Anishaabeg)
Fishing with Grandma by Maren Vsetula and Susan Avingaq illustrated by Charlene Chua (Inuit)
niwîcihâw / I Help by Caitlin Nicholson (First Nations Cree)
A Walk on the Tundra by Rebecca Hainnu and Anna Ziegler (Inuit), illustrated by Qin Leng

Sila and the Land by Shelby Angalik, Araian Roundpoint and Lindsay Dupré, illustrated by Halie Finney (First Nations, Métis and Inuit)

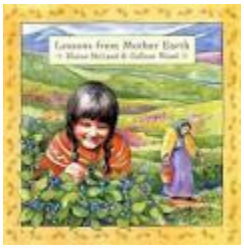
Teaching and discussing controversial and sensitive topics is essential because it helps students think in-depth and fosters critical thinking. Many issues involving First Nation, Métis and Inuit peoples are controversial (land claims, self-government, blockades, hunting and fishing rights) or sensitive (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.

Lessons from Mother Earth by Elaine McLeod and Colleen Wood

This video is a gentle story that shares the Indigenous tradition of taking care of Mother Earth. This video is used as a hook to introduce the topic of environmental sustainability from an Indigenous perspective. Earth is referred to as 'Mother Earth,' honouring the belief that the planet, as in all things, is living and has value.



(*Wood, Colleen. Cover illustration. Lesson from Mother Earth by Elaine McLeod, Groundwood Books Ltd. Front Cover,2002)*

Post Viewing Activities

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.

Discussion questions

- Where is Tess' grandma's garden?
- What are Tess and her grandmother doing?
- Who do you think Mother Earth is?
- What does Mother Earth mean to Indigenous Peoples?
- How do you help Mother Earth?
- Why is it important to pick the right amount from the plants?
- Why do you think it is important to thank Mother Earth for the gifts she provides?
- How does Grandma show thanks to Mother Earth?
- Why does Tess thank the Spirit for a wise grandma?
- Discuss why it is important to respect the land, the garden. Define "respect" to the class.
- Tess's grandmother is sharing Indigenous Knowledge? What does this mean?
- What do Indigenous People teach us about the land? How are these teachings important to help us understand how we interact with Mother Earth?
- In what ways do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
- Do all Indigenous People share the same traditions and knowledge?

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.

Round Table Activity – Divide your students into groups of three or four, and give each group a flipchart paper and markers. Write words on the board that reflect the video, such as Mother Earth, lessons, Tess, grandmother, garden, care, gifts. Have students write questions using diagrams, drawings, words, or anything relevant to the video.

Possible Questions

- What does Tess's grandmother mean by her "garden?"
- How can we take better care of our garden (Mother Earth) together?
- Why and how do we show respect to Mother Earth?
- What kinds of lessons might we learn from Mother Earth?
- What does Mother Earth mean to Indigenous Peoples?
- How do you experience nature in your life?
- What do Indigenous People teach us about the land?
- How do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
- 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?
- What lesson have you learned from a grandparent, an uncle, an aunt, a mentor or another adult?
- 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?

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

- What types of plants are in my area? What plants can I eat or use from nature's garden?
- Why is it important to pick the right amount from the plants?
- What do we need to know about the land to live on it? What do indigenous People teach us about the land?
- Why do Elders know so much about the land?
- What type of knowledge did Elders need to know about their environment and ecosystems to survive on it for thousands of years?
- How do Indigenous peoples continue to pass on traditional knowledge from generation to generation?
- Can you create a list of the different things Indigenous people learned about to survive on the land?
- Research different ways Indigenous people have used their knowledge of living things to meet their own needs.
- How do you show thanks to Mother Earth? Why is it important to take care of our environment?

Knowledge Building Circles – A Knowledge Building Circle is a class discussion activity to work out students' questions and ideas. The circle activity aims to help all students improve their understanding by sharing their learning, ideas, and questions. This communal activity deepens students' knowledge through increased exposure to the diverse perspectives of the class. The KBC aligns with the Indigenous tradition of the Talking Circle, where individuals take turns sharing ideas.

Begin by viewing the book The Sharing Circle by elder and author Theresa "Corky" Larsen-Jonasson. Use a talking stick during your knowledge-building circle, so students listen and share what they have learned 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 practiced during ceremonies, storytelling and sharing experiences with Elders.

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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.

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.

- Write a letter to Tess explaining how you feel about nature and what you have learned from her grandmother. In your letter, share adventures or traditions you have experienced with your grandparent, uncle, aunt, or another special adult in your life.
- 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. This activity can be completed as a group activity or individually.

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.

I used to think...but now I think

- Review how climate change is changing the weather/seasons; how would this affect Grandma's garden?
- Have students brainstorm how local farmers, pilots, mail carriers are affected by climate change?
- How is climate change changing the land and ways of Indigenous People?

Doodle/Sketching - Have students draw a picture explaining how climate change affects their school day. Need for more air conditioning, changing weather patterns, air quality, floods, wildfires, anxiety due to misinformation about climate change, cancelling recess due to heat or cold, increased outdoor air pollution levels.

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 should be used with the whole group rather than as an independent task with the teacher charting ideas. Students share important information they have learned about Indigenous Ways of Knowing and question anything they don't completely understand.

1. Draw a triangle - next to it, write three important points from the video or questions
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

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, Indigenous Ways, 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

Connect with another class/school in the Arctic virtually. Learn how climate change affects their schoolyard and community and how their elders share knowledge with them.

Gather evidence of learning with observations, thumbs up thumbs down, listening to conversations, anecdotal notes and comments, rough drafts

Students could write letters or send emails to pen pals explaining how climate change affects their community.

Have students create a poster or concept web, 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 bulletin board in the school hallway.

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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

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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. Remind students that even when things get hard and seem so big they can always do something by taking an action. Their actions will create an impact.

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- 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.

- Watch Plant for the Planet and Meet Felix Finkbeiner whose organization has helped plant billions of trees, then create a schoolyard planting site that acts as a mini-climate change outdoor classroom/lab. Plant trees to create an urban tree canopy to absorb CO2 and reduce the need for air conditioning by shading your schoolyard

- 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.

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

- A Toolkit for Schools - Climate Leadership by EcoSchools provides many easy to implement action project suggestions

Chapter 5: Indigenous Ways of Knowing
Inquiry 3: Indigenous Perspectives - Connections To The Land

- ***Provocations*** *– Provocation Table*
- ***Question Generation*** *– The answer is... Activity*
- ***Knowledge Building***– *Umbrella Questions, Community Expert*
- ***Determining Understanding*** *– Doodling/Sketching*
- ***Pursuing Learning*** *– Natural Inquirer, Walking Curriculum*
- ***Consolidation*** *– Mapping/Neighbourhood Walk/Think-Pair-Share*
- ***Assessment*** *– Poster/Assessment Suggestions*
- ***Take Action -*** *Ideas for Taking 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 Indigenous groups.

A Day with Yayah by Nicola I. Campbell (Métis, First Nations Salish), illustrated by Julie Flett (Cree-Métis)

Call of the Fiddle by Wilfred Burton and Anne Patton illustrated by Sherry Farrell Racette (Métis)

The Giving Tree: A Retelling of a Traditional Métis Story by Leah Dorion (Métis)

Byron Through the Seasons by Dene Children (First Nations Dene)

The Elders are Watching by David Bouchard and Roy Henry Vickers (Métis, Ojibway, Anishaabeg)

Fishing with Grandma by Maren Vsetula and Susan Avingaq illustrated by Charlene Chua (Inuit)
niwîcihâw / I Help by Caitlin Nicholson (First Nations Cree)
A Walk on the Tundra by Rebecca Hainnu and Anna Ziegler (Inuit), illustrated by Qin Leng

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: Provocation Table

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

Create a provocation table indoors or outdoors – Gather an assortment of Indigenous storybooks about Elders, including the three distinct Indigenous groups in Canada. Add natural objects such as sticks, leaves, feathers, pictures of edible plants, soil samples, photos of Elders, grandparents, uncles, aunts, teachers, fruit such as blueberries, strawberries, photos of the changing seasons, animals and cards with the names of the 3 Indigenous groups, First Nations, Métis and Inuit displayed on the table. Choose items that connect students to the land they can touch and explore.

- Allow students the choice to stay at the table or take what they need and engage in their inquiry. Some students will be more inclined to sit at the table and write, draw, record,

and observe, while others may prefer to walk around, explore, and inspect the items on the table.

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.

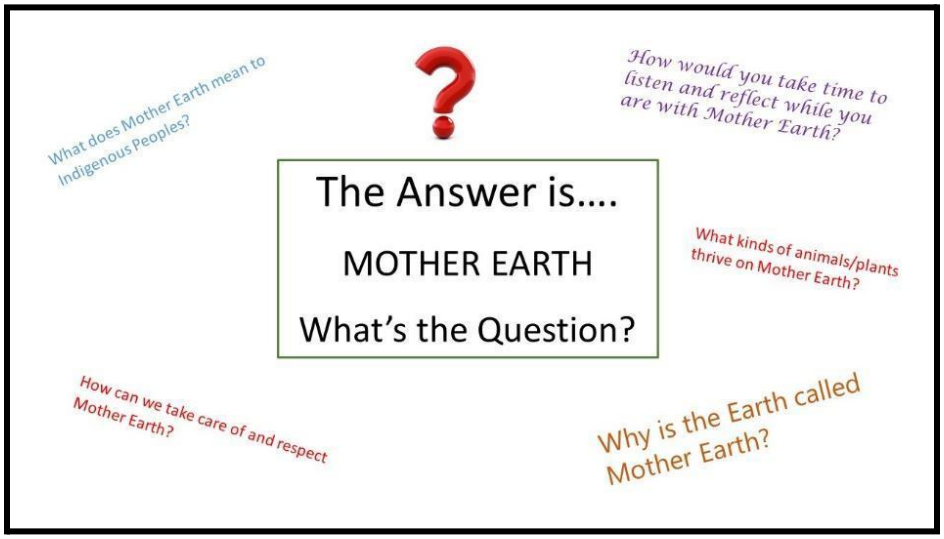
B. Question Generation

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.

Choose one activity – complete with the students as a group activity

1. The Answer is….activity - Write the answer **Mother Earth** on the board and ask students to write a possible question or brainstorm questions together

- Why is the Earth called Mother Earth?
- What kinds of things live on Mother Earth? What kinds of animals/plants thrive on Mother Earth? What kinds of animals/plants are suffering on Mother Earth?
- What kinds of lessons might we learn from the Earth?
- How can we take care of and respect Mother Earth?
- How would you take time to listen and reflect while you are with Mother Earth?
- What does Mother Earth mean to Indigenous Peoples?



2. The Answer is….activity - Write **Indigenous Ways of Knowing** on the board and ask students to write a possible question or brainstorm questions together. If students are having difficulty generating questions about Indigenous Ways of Knowing, read one book about Elders for each Indigenous group.

- What did you notice about all the items on the table? How are they similar?
- Name three distinct Indigenous groups in Canada?
- How do you connect with the items on the table?
- 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?
- 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?

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.

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

- Why are Indigenous peoples known as caretakers of the Earth?
- How can you become a caretaker of the Earth?
- What can you do to take care of the Earth around your home or school?
- What kinds of lessons might we learn from Mother Earth or Indigenous Ways of Knowing?
- How can we as students protect Mother Earth?
- Discuss why it is important to respect the land, the garden. Define "respect" to the class.
- Who do you have in your life that you would consider an Elder?
- What role does your Elder play in your community?

Community Expert

Deepen the learning experience for the students by inviting an Elder or Knowledge Keeper to share indigenous knowledge. Prepare questions to ask the Elder**.**

> 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

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.

Doodling/Sketching strategy.

- Ask students to draw some of the significant people in their lives, including their connection in the community (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?
- What do you know about why it is important to protect the land?
- Why is it important that we all share our knowledge about how we should protect Mother Earth?
- Draw what you have learned about Elders or Indigenous People to protect the land.

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.

Natural Inquirer – Ask students how climate change affects their local environment. Brainstorm with the students the plant's needs such as the sun, water, soil nutrients, pollinators, etc. Discuss how plants are affected by climate change. Discuss how animals and plants are adapting to climate change. Students use interview techniques to research and write about an animal or plant affected by climate change in this activity.

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 interconnectedness. 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.
(*Walking Curriculum by Gillian Judson Indigenous connections are suggestions only – created by Nadine McSpadden & Heidi Wood*)

- Discuss how we receive resources from trees.
- Discuss what will happen to other living creatures if we keep destroying forests.
- How can we protect the forest from the harmful effects of climate change and humans?

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.

Mapping

Walk and explore the neighbourhood and have students use their senses to explore trees and plants. Have students create their own identification system. Draw a map with the students of plants, trees, shrubs in the schoolyard. Have students identify how they can take care of these trees and plants and respect the land.

Think/Pair/Share

Complete a nature scrapbook or collage – have students collect samples from the natural world that remind them of their connection to the land and living things. Do a think/pair/share and allow students to share their scrapbooks and explain why they chose those samples

Include activities to show appreciation when learning from the land. Write a thank-you note to the land, the water, elders, grandparents who teach you things about your culture or nature. Describe how and why you are thankful.

Say a word of thanks. Initiate a quiet moment of gratitude. Students can share individually or as a group.
Write thank-you notes to the Land, the Water, people who teach you things about your culture or nature. Also, take time to be with these plants, by the water, and close to the earth so you can give thanks for the sacrifices they make so we can be here on this earth. (prayers and intentions).

Assessment Ideas

- Poster - 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.
- 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

- 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*)

- Create a collective poster or concept web, depicting what students have learned from the Elders, stories and activities throughout the inquiry
- 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
- 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.

G. 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.Remind students that even when things get hard and seem so big they can always do something by taking an action. Their actions will create an impact.

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.
- 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".
- 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.

- 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.
- Students can collect data on the health and yearly growth of their tree plantings as they explore issues surrounding climate change locally and globally.

- 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.
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- 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.

Other Resources

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