

CHAPTER 3:

How does addressing climate change make us healthier?

*A Project of Learning for a Sustainable Future
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Art by Preeti Singh for
ArtistsForClimate.org

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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?

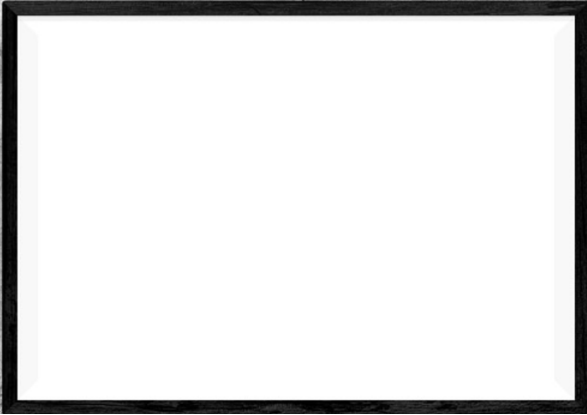


B. Question Generation

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.

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.

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

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

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:

- [A Ready-made Vehicle Idling Campaign](#) NRCAN
- Create their own anti-idling or idle-free posters for their community
- [Catalogue of Potential Idling Reduction Campaigns](#) NRCAN
- Educate the school through different announcements sharing “waste and water facts”
- Post the garbage collection graph on the wall outside the classroom. Do a second schoolyard garbage audit a month later. Put the second graph on the wall. Celebrate successes.
- 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

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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:

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- Create anti-idling posters for the community
- Think about making a commitment to reducing plastic waste [10,000 Changes](#)

Action Project Examples

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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.



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.

While the future is uncertain, there are many examples of positive actions happening all around the world, and too often these stories do not get media coverage (check out [The Happy Broadcast](#) to get some good news for a change!). Finding actions that students can get involved in is paramount and in the subsequent thematic inquiries there are many examples of school projects and activities. As we collectively oscillate between optimism and outrage, stories of the past can also be important for active hope pathways.

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:

- [A Ready-made Vehicle Idling Campaign](#) *NRCAN*
- Create their own anti-idling or idle free posters for their community. [Catalogue of Potential Idling Reduction Campaigns](#) *NRCAN*

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

- 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 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 by Ley 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

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 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.



Take Action:

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

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