

INQUIRY CHAPTER FIVE

Human Health: Addressing climate change makes us healthier



EMPOWERING LEARNERS IN A WARMING WORLD

A Climate Change Inquiry Guide for Secondary Educators

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5. Human Health: Addressing climate change makes us healthier

This inquiry explores sensitive material. It explores the connection between climate change and many facets of human health. We have included resources, activities, and knowledge to inform students 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.



Photo by asonwoodhead23

Before you Begin: Background Information for Educators

In order to help you have conversations with your students about how they are feeling about the existential threats of climate change, we recommend several additional resources to consult. Before feeling ready to create a safe space where students can explore issues of climate

change, you should feel supported and informed with the help of expert voices on the subject. Here is a list of both theory and practices from some of the leading voices in this field:

Theory

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

Practices

- Jennifer Atkinson - [Emotional Impact of Climate Change](#)
- Climate Therapy Alliance - [Emotional Resilience Toolkit for Climate Work](#)
- Leslie Davenport - [Climate Psychologist on using guided imagery](#)
- New Zealand Ministry of Education (2020). [Climate Change Wellbeing Guide](#) (second PDF listed)
- Panu Pikhala - [Spectrum of ecological emotions activity](#)
- David Selby and Fumiyo Kagawa - [Unleashing Blessed Unrest](#) - Climate Change Despair and Empowerment
- Dr. Lise Van Susteren's Resources: Climate for Health

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 can affect human health directly and indirectly through changes in the ranges of disease vectors \(e.g., mosquitoes\), water-borne pathogens, water quality, air quality, and food availability and quality"](#) (IPCC, 2001). 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 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](#)



A. Provocations: Impacts on Health

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

1. News Reports

[How climate change can impact your health](#) [CBC]: 6:01 minutes

Changing environmental conditions can change the frequency of illnesses like asthma, allergies, Lyme disease, anxiety, and more. Doctors may not be prepared for these changes.

[Climate Change biggest threat to human health: report](#) [CBC]: 7:05 minutes

A report in the Lancet has found that air pollution from greenhouse gas emissions contributes to the deaths of millions of people worldwide every year. The report posits that fighting climate change may be the most significant thing governments could do to improve people's health.

2. TEDx Talks

[Climate Change is Affecting our Health: Is there a Cure?](#) [TEDx: Johnathon Patz]: 19:07 minutes

Jonathan Patz, MD, MPH, is Professor & Chair in Health and the Environment at the University of Wisconsin-Madison, where he also directs the Global Health Institute. This talk includes recent analyses that show how mitigating global warming provides extensive health opportunities, as well as major savings in healthcare costs.

3. Comics

[Climate Change Comics](#) [Public Health Insider]

CLIMATE CHANGES THE AIR WE BREATHE.

Wildfires are more common with rising temperatures and drought.



The smoke from fires — even from places as far away as China and Siberia — results in more asthma, heart attacks, and other health conditions.

CLIMATE CHANGES THE FOOD WE EAT.

Our local food supply is changing.



Warmer water temperatures reduce the salmon population and also create conditions that make shellfish unsafe to eat.

CLIMATE CHANGES THE LIVEABILITY OF OUR NEIGHBORHOODS.

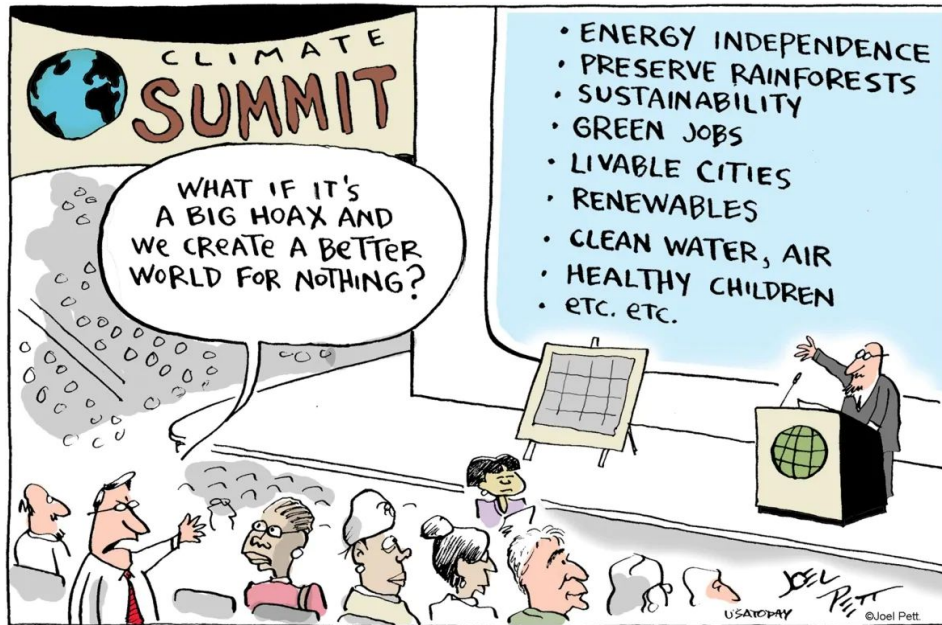
More frequent and severe storms will increase local floodings and power outages. Floods also expose people to water contaminated with sewage and toxins, and also indoor mold.



CLIMATE CHANGES HOW WE FEEL.



Not surprisingly, wildfires, heavy rainfall, flooding, and windstorms increase stress and anxiety. When the weather feels unpredictable and out of control, people's mental health suffers.



Encourage these provocations to spark questions, and for students to document these questions in a journal to refer back to.



B. Question Generation

In order to address student anxiety, it is important to find out what is causing this distress. With this knowledge, misconceptions can be unearthed, lack of knowledge understood, and solutions can subsequently be offered. One questioning technique to delve deeper into student understanding is the [Five-Why's](#), an iterative interrogative technique used to explore the cause of a particular issue. As with any discussion of sensitive issues, the feelings of the student should be considered throughout the activity, and questions appropriately chosen. In the Five-Whys activity, a question is asked and students, often in pairs (to create a safer space than in a whole-class discussion), respond to their classmate's answer to the posed question with "why?" or "Why is that?". The number 5 is simply a suggestion, as the questioning ends when the responses no longer give further insights.

Some sample questions to initiate the Five-Whys activity include:

- How does it make you feel when you hear and see climate change denial communication?
- Is there a *right* way to talk about climate change as it pertains to human health and well-being?
- What concrete actions can we—as individuals and as a community—take to alleviate the

stress/anxiety climate change causes?

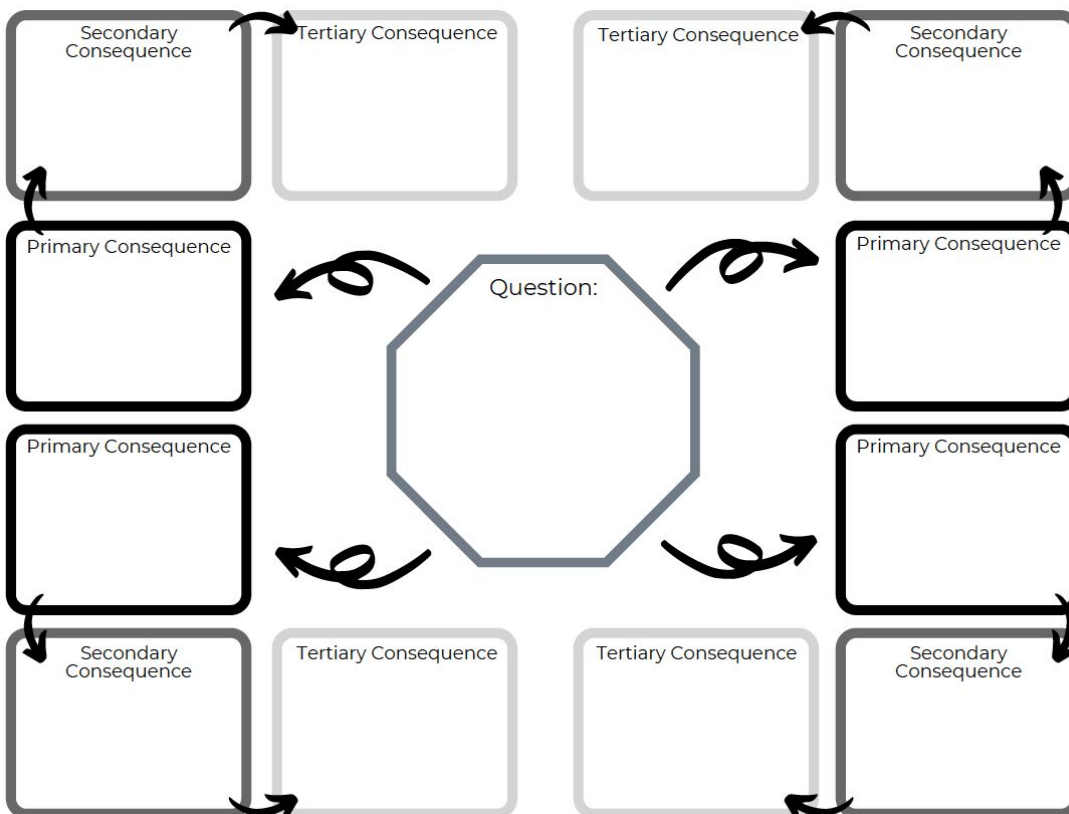


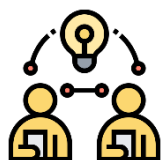
C. Determining Understanding

In order to determine students' understanding of this topic, have students create a consequence map depicting the physical effects of climate change and what the possible implications might be on physical and/or mental health. Students use a template to map several primary (immediate), secondary and tertiary consequences arising from the key question.

As an extension to further allow students to check their own understanding, provide them with different colour markers or sticky notes to add a different layer to the consequence map. Have students suggest mitigation or strategies that could help decrease climate impacts. This layer can help illustrate the co-benefits of addressing climate change and healthier people. For example, active transportation (walking or biking) helps reduce GHG emissions and you get more exercise; shifting to plant-based eating helps reduce GHG emissions and improves many people's diets.

Sample Consequence Map





D. Knowledge Building

Knowledge Building Circle

After using a consequence map to flesh out some initial ideas, engaging in a class [Knowledge Building Circle](#) is a good opportunity to delve deeper into the topic of human health and encourage participation from many students in the classroom. Find your way into a circle where everyone can see one another and if this is your first knowledge building circle, make sure that everyone understands their role in the circle. You could pose some guiding questions to the group and mediate the conversation as required. It is a good idea to take notes throughout the discussion or otherwise record the experience to look back at in order to gauge students' growth in understanding.

Example guiding questions:

- How does addressing climate change also help improve our health?
- What climate solutions are also healthy lifestyle choices?



E. Pursuing Learning: Impacts on Health

Students may choose to continue their own 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.

- Vector-Borne Diseases and Climate Change
- Student Exploration of the Global Impacts of Climate Change on Human Health
- Climate Change & Health: Media investigation
- Despair and Empowerment

Activity 1: Vector-Borne Diseases and Climate Change

In this activity, students learn about vector-borne diseases, in which the disease-causing microbe is transmitted to humans through an animal (e.g. a mosquito) rather than person-to-person. Students will develop hypotheses about how climate change may affect vectors, the pathogens they carry, and the diseases they spread. They perform an experiment

to model the transmission of vector-borne diseases and discuss how climate change may impact the spread of such diseases.

This lesson includes useful background information on vector-borne diseases and the impacts of climate change on rates and transmission of vector-borne disease.

Duration: 60 minutes

You can access the full activity [here](#) or find it in Teacher Aids.

This lesson is from 2010, but it stands the test of time. The modelling activities, discussion questions, and worksheets are extremely valuable. However, if you or your students would like to supplement some of the research with more up-to-date information, here are some resources on this subject from the past few years:

- Global News: [Global warming may facilitate spread of mosquito-borne diseases in Canada: expert](#)
- BC Medical Journal: [Vector Borne Diseases in Canada and BC](#)
- Government of Canada: [Climate change and infectious diseases: The challenges](#)

Activity 2: Student Exploration of the Global Impacts of Climate Change on Human Health

The objective of this activity is to support students' ability to describe the impacts of climate change on human health with a specific emphasis on more vulnerable populations. Through the construction of a visual model, students will delve into the complexities of this relationship and form a deeper understanding.

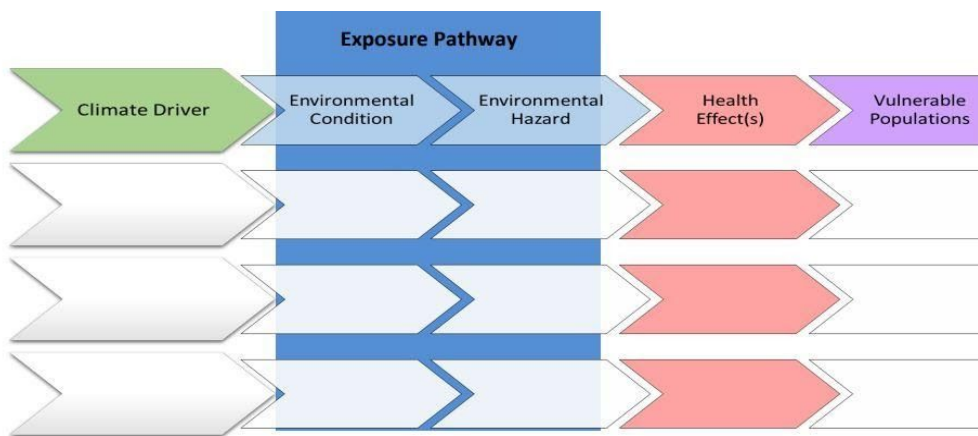
This resource provides detailed background information, setting the stage for students and educators to understand and explore the complex relationship between climate change and human health. The outline also provides educators with options for assessment strategies. Below you will find a simplified version of the concept that we have summarized. You can access the full resource, developed by the National Institute of Environmental Health Science [here](#).

This activity invites students to develop their research and literacy skills by investigating different information sources and synthesizing their research into a graphic organizer to present their findings.

Students will work in groups of 3-4. Each group will focus on a specific area of human health & climate change to research. For instance, if using the IPCC report, a group could focus on Chapter 11. Groups could focus on one of the following areas: 1) Temperature-, storm- and radiation-related impacts (sections 4.1-4.3), vector-borne and other infectious diseases (section 5.1), food- and water-borne diseases (section 5.2), air quality (section 5.3), nutrition and occupational health (6.1-6.2), or mental health and violence/conflict (6.3-6.4).

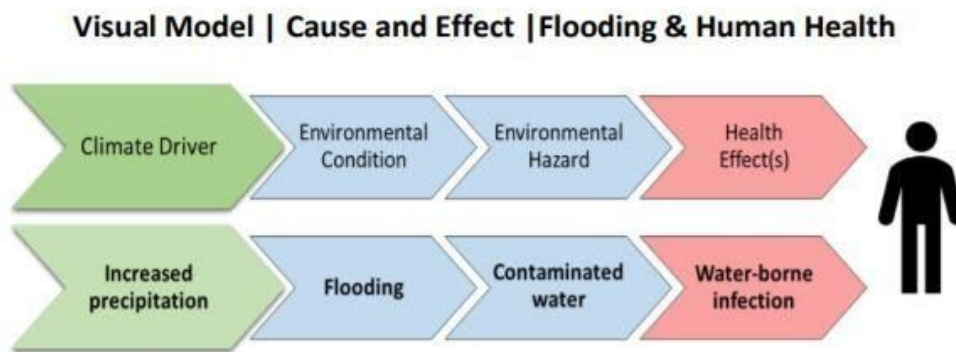
Using this table as a reference point, define key terms like: climate driver, environmental condition, environmental hazard, and health effects.

Use this information to construct a visual model of the "cause-effect mechanism" using the following template:



Encourage students to continue their research and fill out the remaining sections of the cause and effect chart.

For instance:



You can find the online resource [here](#) or downloaded in Teacher Aids.

Activity 3: Climate Change & Health: Media investigation

Phase 1: Ask students to research 3 recent climate change news stories from a major media outlet. Have them read each article and take note of the language used, how the issue is framed, and the image(s) used. Once finished, ask students to engage in a discussion about their perception of how the news and media portrays climate change events. Was the language positively or negatively framed? Are there certain reporting styles that are consistent across articles? If so, what are they? Ask students to reflect on how they felt after reading the articles.

Note: Often news outlets catastrophize events and make readers feel immediately crisis ridden. The purpose of this exercise is to evaluate some of the angles and tactics that exist in the media to grab our attention and create headlines. The following newsletter is compiled of

action-oriented solutionary messaging that will leave students feeling more empowered and give perspective to the media stories.

Phase 2. In this next media analysis, students will read through 3 recent articles from CBC's e-newsletter "What on Earth?" This weekly newsletter is a compilation of all the environmental news stories that highlight trends and solutions of the week (sign up for the newsletter [here](#)). Have students compare the reporting styles of these 3 articles. Ask them to compare the rhetorical reporting style between the CBC e-newsletter and the original analysis from mainstream news articles. (Venn diagrams are a good choice of graphic organizer for this type of compare and contrast activity.) Ask students to then reflect on how they felt after reading the articles on the environmental good news.

Media curriculum connection: This activity could be expanded to a comprehensive review of climate change communication in mainstream media and how reporting affects viewers/readers.



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.

Activity: Despair & Empowerment

Developed by David Selby and Fumiyo Kagawa for 'Teaching Teens about Climate Change.'

The purpose of this activity is to encourage students to share their anxieties about a future impacted by climate change. This exercise will help them to learn that others share the same fears, to feel empowered in the face of these fears, and to foster a disposition that prepares them to act.

This will take students on a journey of powerful emotions, ending in student consideration of their "personal change agency potential, by recalling the power students have been able to find in seemingly disempowering circumstances".

You can find the full lesson [here](#).

Activity: Mental Health Check Activity: Coming Home to Yourself, A Centering Practice

Climate Therapy Alliance - Pacific Northwest. [Emotional Resilience Toolkit for Climate Work](#) (Version 1.0). September 20, 2019.

Take time to support and guide students through a meditative practice. Read the following passage slowly, and pause after each paragraph.

“Close your eyes, or let them have a soft focus, and take three clearing breaths. As you breathe in, infuse your body, heart, and mind with fresh oxygen, feeling and imagining it traveling from head to toe. When you exhale, release the focus on thoughts and invite your body to relax. Let your mind follow the movement of the inhalation and exhalation in your body, inviting each clearing breath to be slow, full, and long.

Let your breath settle into its own rhythm now. Now call into your awareness, one by one, the significant interactions of the day – clients, friends, and strangers. As each one appears, take a moment to honor the interaction and person, and then with a breath of kindness, release them from your focus, sending their energy back to themselves.

When they are all released, turn your awareness toward the direct experience of your own vitality and sense of wellbeing. Sense those qualities in your body. You may recognize your vitality as an image, a color or light, or a physical sensation. However you experience it, take the next few minutes to practice nourishing breaths.

When you breathe in, feel and imagine the oxygen from your breath strengthening your vitality. If you imagine it as a light, it may gradually shine brighter. If it is a color, it may shift and change. Simply breathe in, receiving nourishment; breathe out, simply rest. While the images may or may not change, the practice is simply to breathe in, receiving nourishment; breathe out, simply rest.

After five minutes, notice any changes, however subtle, in your body, mind, and emotions. Feel yourself present and grounded in your body, and when you are ready, open your eyes.

Take the next few minutes to move a little more slowly than you usually do, (as you continue into your day or evening... or... as you open your eyes and bring your focus back to the group.)”

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

The [Choice Board strategy](#) incorporates the principles of Universal Design Learning (UDL) by encouraging multiple means of expression. Students chose a mode from the choice board (see sample below) to present their understanding of their learning. For more information: [LINK](#)

Sample Choice Board

| | | |
|---------------------|--------------------|--|
| Poster Presentation | Act It Out | Rant |
| Draw a Comic | FREE CHOICE | PowerPoint |
| Write a Rap | Sing a Song | Use Recycled Materials to Make a Model |



G. Take Action:

There are endless possibilities for Action Projects that would enable students to enact positive change or action in their local communities when it comes to addressing the physical and mental health effects of climate change. These are just a few examples to provide a starting point or inspiration:

Ideas for Taking Action:

- Talk to friends and family about your feelings. This may help you feel better and it may also help others identify that they feel the same way.
- Get involved: work with others or start your own climate campaign or project
- Start with changing just one thing: walk or bike to school, start a garden, reduce your waste, offer to walk younger children to school safely
- Address eco-anxiety in the student population and community through awareness-raising campaigns, safe spaces and discussion groups
- Raise awareness about the local threat of infectious or other kinds of risky diseases and how to protect yourself or community
- Encourage school leaders to create policies, make space and provide resources to support the many mental health challenges students are experiencing in a warming world

Action Project Examples

- 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.](#)
- Positive Space Room - Duke of Connaught PS - Toronto, ON (2014)
 - Grade 8 students at Duke of Connaught Public School wanted to promote mental health and “to create a space in our school that is reflective of the diversity that comprises it.” To this end, they worked together to design the Positive Space Room, a space for students of all identities to feel supported, accepted, and safe. The class studied and discussed the experiences of many minority and at-risk groups to help inform the design of the room. They made conscious decorating choices, incorporating flags of the world and LGBTQ+ flags and engaging the rest of the student body in positive art projects. They stocked the room with resources for students in need. The group hopes to expand the role of the space by facilitating activities, talk time, and free time for their fellow students to explore issues of identity and mental health. [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.](#)
- Psychological Benefits of Interacting with Nature - Westview Centennial Secondary School, Toronto, ON (2018)
 - Students from Westview Centennial school were really interested in the impact of nature on people’s psychological well-being. Student leaders educated their classmates on the positive effects that caring for plants and being in nature can have on stress and anxiety. To create this positive impact on their community, student leaders purchased planting material and engaged their peers in transplanting and beautifying their school grounds. Now, Westview has a space where students can connect with nature in a meaningful way. [See their project here.](#)