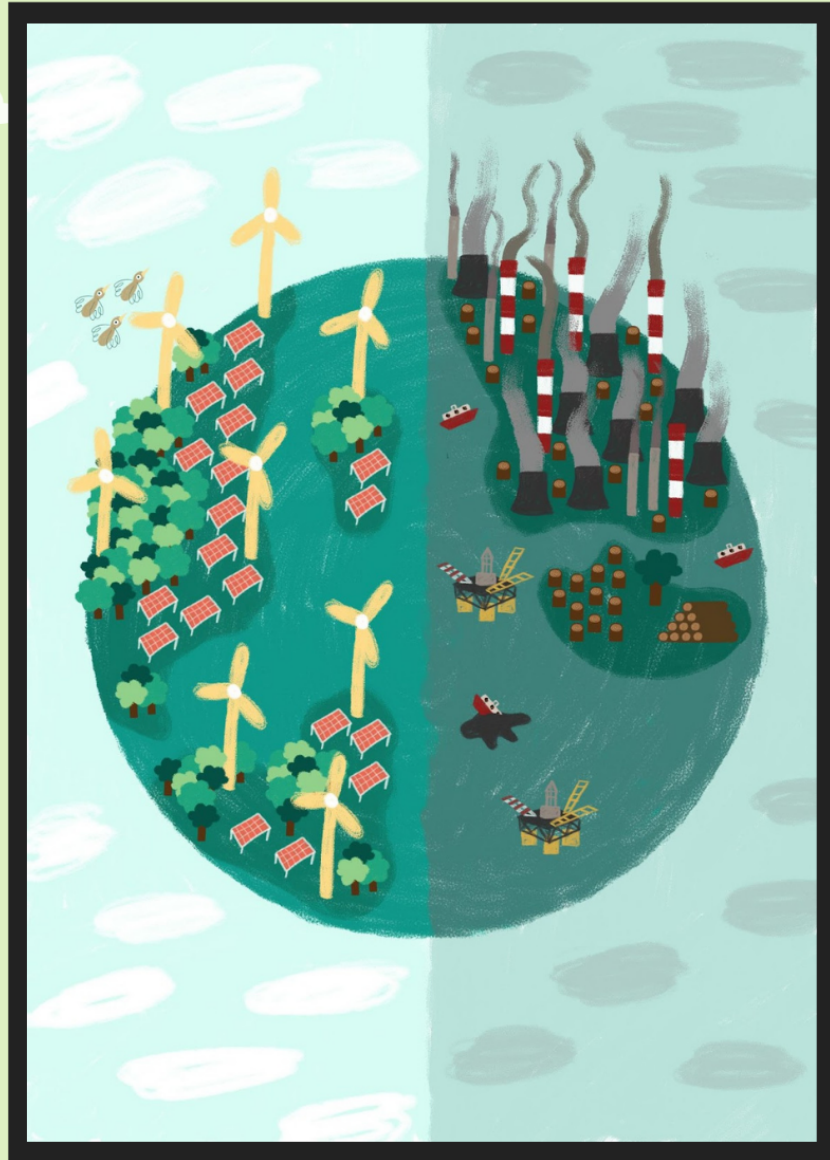




# CHAPTER 1: What is climate change? Why care?

*A Project of Learning for a Sustainable Future  
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Art by Joana  
Campinas for  
ArtistsForClimate.org

A project of



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# Chapter 1. What is Climate Change and Why Care?

In this initial inquiry, students will explore and learn about the differences between weather and climate and understand the basic scientific principles of climate change through books, videos and interpretations of an infographic. You may find there are more activities than a class can complete. 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.

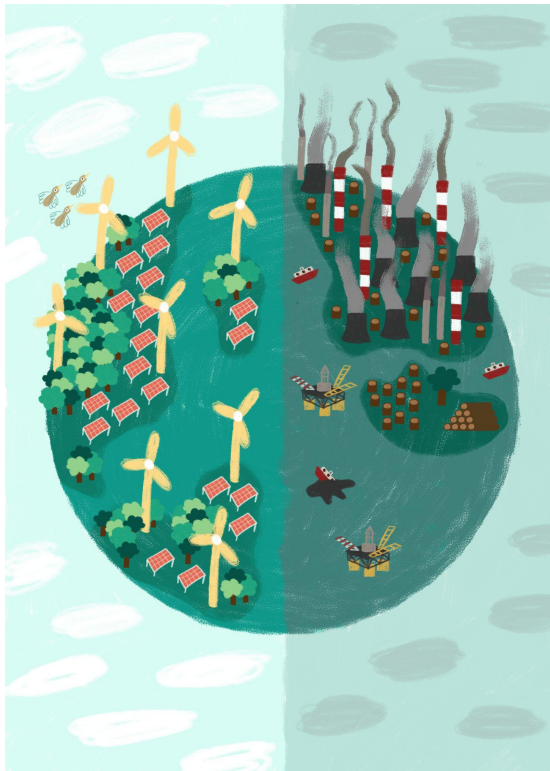


Illustration by Joana Campinas for ArtistsForClimate.org

## 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 the national survey [Canadians' Perspectives on Climate Change & Education](#) (2022) conducted by Learning for a Sustainable Future, 81% 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 54% 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 primarily caused by the human activity of burning fossil fuels, 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.

<b>Curricular connections</b>	<b>Concepts</b>
Science	Sustainability Stewardship Ecosystems

	<ul style="list-style-type: none"> <li>Interdependence</li> <li>Changes</li> <li>Cycles</li> <li>Climate</li> <li>Conservation</li> <li>Action</li> <li>Innovation</li> <li>Characteristics</li> <li>Protection</li> <li>Living things</li> <li>Energy</li> <li>Environment</li> </ul>
Language	<ul style="list-style-type: none"> <li>Media form</li> <li>Retelling</li> <li>Restating</li> <li>Communication</li> <li>Critical Literacy</li> </ul>
Social Studies	<ul style="list-style-type: none"> <li>Location</li> <li>Physical features</li> <li>Community</li> <li>Interactions</li> </ul>
Physical Education and Health	<ul style="list-style-type: none"> <li>Participation</li> <li>Outdoor education</li> <li>Energy</li> <li>Vitality</li> <li>Relationships</li> <li>Self-awareness</li> <li>Appreciation</li> <li>Motivation</li> </ul>
The Arts ( Visual Arts, Drama, Dance)	<ul style="list-style-type: none"> <li>Composition</li> <li>Interpretation</li> <li>Symbolism</li> <li>Form</li> <li>Line</li> <li>Colour</li> <li>Space</li> </ul>
Mathematics	<ul style="list-style-type: none"> <li>Data literacy</li> <li>Quantity</li> <li>Number sense</li> </ul>

### **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**

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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**

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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**

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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](#)