

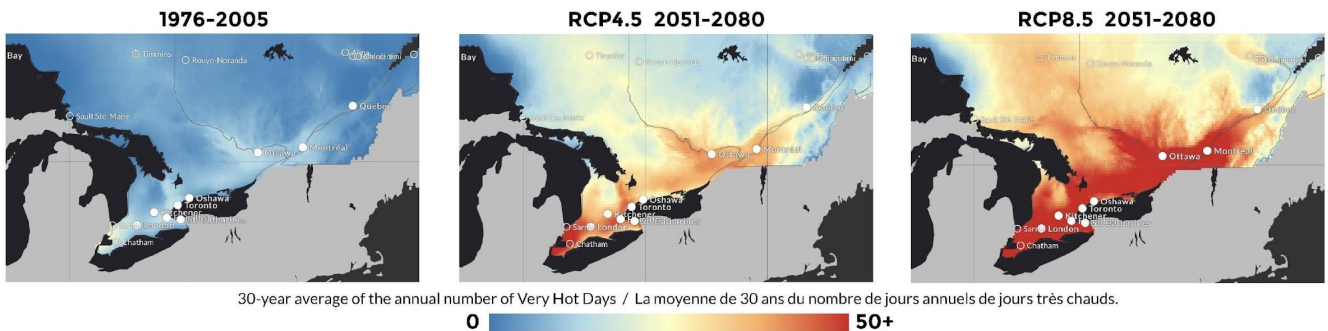
# Lesson 1 – Carbon and Climate Change

## Overview

In this lesson, students will examine the impact of a high carbon scenario or “business as usual” greenhouse gas emissions on climate change variables across Canada and at a local scale. The goal is to understand the connection between increasing carbon in the atmosphere and associated impacts on our environment and wellbeing.

## Background

The Climate Atlas of Canada shows different possible future scenarios based on “high” and “low” carbon scenarios. Future projections are calculated using two possible greenhouse gas emissions scenarios that result in more or less severe levels of climate change. Comparing the two possible scenarios demonstrates the importance of taking climate action. For example, these images show the projections for the number of very hot days in southern Ontario for the recent past and for 2051-2080 under the high carbon (RCP8.5) and low carbon (RCP4.5) scenarios. Only reducing greenhouse gas emissions can make the difference between these possible climate futures. Read more in our [High vs Low Carbon](#) article. The “high” carbon scenario, or “more” climate change, is the projection based on current rates of greenhouse gas emissions.



## Student Learning Targets

- Investigate and evaluate evidence that climate change is influenced by human activities.
- Describe how regions on a national and local level are impacted by climate change and how reducing carbon emission will reduce these impacts.
- Understand the varying effects of climate change across Canada.
- Give examples of the impacts of climate change on the environment, our health, and our livelihoods, to develop an understanding of climate change as more than an environmental issue.

# Lesson 1 – Carbon and Climate Change

Time	Activity	Notes
5- 10 mins	Introduction	
3 mins	Video	<i>One Degree and it's Impacts</i>
5 mins	Video Discussion	
20 mins	Activity	<ul style="list-style-type: none"><li>- Atlas demo video (4 mins)</li><li>- If completing in groups, less time may be needed</li></ul>
10-15 mins	Activity Discussion	<ul style="list-style-type: none"><li>- Reviewing answers</li><li>- Discussion on impacts</li><li>- Room for adaptation based on classroom topics</li></ul>

## Introduction

Start the lesson with a discussion about climate change impacts. This could include current climate emergencies happening in the country (wildfires, flooding, etc.) or personal experiences of seeing the effects of climate change (changing local rivers, species loss, etc.). The goal of this discussion is to get students thinking about climate change on a local and global scale. Suggested questions for the class include:

- *What climate change impacts have we seen across Canada? (wildfires, sea ice loss in arctic, heatwaves, extreme weather events)*
- *What changes have we seen here in [current location] ?*

(tip: prepare articles and media on current Canadian and local climate events)

## Watch

One degree and its impacts (2:49)

<https://climateatlas.ca/video/one-degree-and-its-impacts>

## Video discussion:

After the video, facilitate more conversation on climate change. Example questions:

- *How do we know that climate change is being caused by humans? (temperatures are increasing at a higher rate than ever before)*
- *What are some ways the environment is changing from climate change in Canada? (Video examples: Arctic ice melt, damaged coral reefs, changes in extreme weather events)*

*Note: these questions can be introduced before the video for students to focus on, and answered afterwards.*

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## Activity

This activity explores the changes in climate variables on a national and local level on the Climate Atlas of Canada. This activity can be done individually, in groups, or as a class.

Materials needed:

Device(s) to access the internet and print outs of the *Explore the Map* (see downloads).

Pre-loaded video for activity on how to use the Climate Atlas of Canada map

(<https://youtu.be/QZ3J-MgrFyo?t=592>). The Climate Atlas demo is from 9:52-13:54 in the video linked.

*Tips for remote instruction:* distribute the activity sheet digitally, or go through the activity as a class. *The demo can be assigned to watch in advance, as well as familiarizing themselves with the Climate Atlas, although not necessary.*

## Instructions

There are multiple locations that can be chosen for this activity. Download the activity sheet “*Explore the Map Activity*” for **Edmonton, AB**; **Toronto, ON**; or **Yellowknife, NTW**. If you choose to use your own location, there is an activity sheet with no designated location.

*Note: the answer key for a location other than the three provided will require a map search of your own to find the correct data.*

1. Show the demo video on how to navigate the Climate Atlas map (video can be assigned as homework for the day before).  
<https://youtu.be/QZ3J-MgrFyo?t=592> (play from 9:52-13:54)  
After watching the video, students should have an understanding on how to find the information they need. You can also do a brief example by selecting any location on the map along with any variable (i.e. Number of heatwaves, annual precipitation, etc.) from the icons at the bottom of the screen.
2. Visit <https://climateatlas.ca/map/canada/>
3. Instruct the students to complete the worksheet. If the worksheet is being done individually, more time may be needed than if completing in groups/as a class.

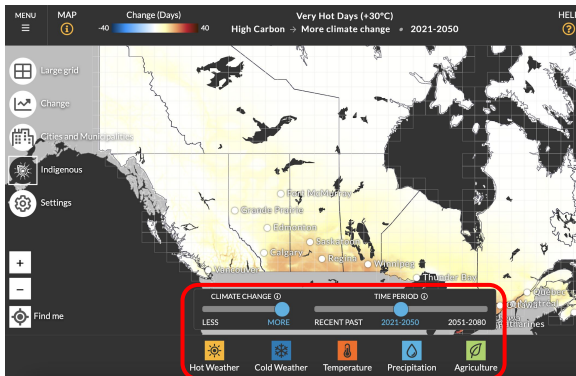
## Key words:

**Climate variable:** these are the meteorological conditions that we can change on the map. Climate variables all have associated climate impacts. (i.e. annual precipitation)

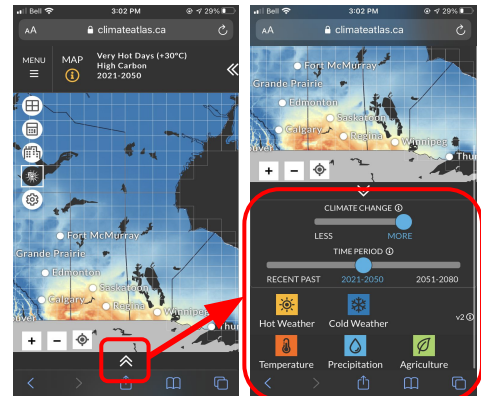
**Climate impact:** these are the effects that come as a result of climate variables (i.e. Decreased annual precipitation can lead to more drought, wildfire, etc.)

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Navigating the climate variables on different devices:  
Computer/laptop:



Smartphone/tablet:



## Discussion

After this activity is done, discuss the findings from the Climate Atlas. If the worksheet was completed in groups, each group can take turns discussing a climate variable. Alternatively, answers to the activity sheet can be discussed one variable at a time on one shared screen for the class to see.

Discussion points can include:

- How do you think changes in these variables affect your life? (*summer/winter hobbies in extreme weather, proximity to wildfires and effects of wildfire smoke, family farm impacts*) – more impacts are explained in the “about this variable” pop-ups. See the map info icon in the upper left of the map.
- How does lowering carbon emissions change these climate impacts? (*consequences of these impacts will also be reduced with reduced climate change*)

Visit our [articles page](#) if you wish to go into more detail on a specific climate change impact to connect to the activity just completed on the map.

## Assessment

By the end of the class, students should understand how climate change, in a business as usual scenario, has an impact on national and local scales. They should demonstrate and understanding of the connection between climate variables and climate impacts, which directly impact us and our environment.

## Extensions

**Activity- Explore your own region-** allow students to navigate the climate atlas looking at a Canada region of their choice or their hometown

**Video- Farming Carbon (5:29)**

<https://climateatlas.ca/video/farming-carbon>