

# Climate Change – How will it affect us?

**Objective:** To introduce students to the greenhouse effect, climate change and challenges in the NWT.

**Introduction:** Melting ice and rising temperatures over the past decades suggest that climate change is happening at a noticeable rate in the North. Effects of climate change in the North are more concerning than in other parts of the country due to implications of significant ice melt and permafrost changes. This lesson aims to introduce students to climate change and the greenhouse effect and then to the specific implications for the north.

## Curriculum Connections:

Unit D – SO 1-4

## Supplies / Materials:

- Ecology North Climate Change Resource Materials (see below)
- Student Journals or notebooks
- Flashlights, plastic sheets or bottles and black paper

**Hook:** Show a brief video on Climate Change e.g.

<https://www.youtube.com/watch?v=9GjrS8QbHmY>



## SCIENCE FOCUS

### Lesson Subject

Science 10

### Topic

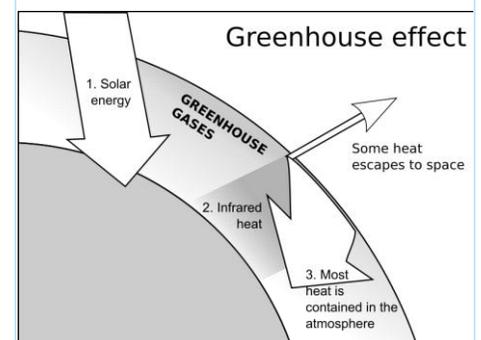
Energy Flow in Global Systems – Climate Change

### Location

Classroom

### Length

100 mins



**Intro Activity:** Have students discuss what they know about climate change. Sample discussion questions can be found below.

**Main Activity:**

1. Have students define the terms found in #2 below using the information found below in "Climate Change What Does it Mean".
2. Do a class demonstration or let students work in small groups to demonstrate the greenhouse effect. Shine the flashlight onto black paper and note the definition of the light. Shine it through the plastic (leaving a few cms between plastic and paper) and notice the distortion – what is happening to the light rays (scattering) and how do they come back through to our eye?. How would changing the translucency influence this? Remind students that it is not just light but heat (energy) that is reflected back to earth.
3. Show students climate change trends in the North from:  
[http://www.enr.gov.nt.ca/sites/default/files/page\\_3\\_nwt-climate-observations\\_06-13-2015\\_vf\\_1\\_0.pdf](http://www.enr.gov.nt.ca/sites/default/files/page_3_nwt-climate-observations_06-13-2015_vf_1_0.pdf) and have them reflect on what this means for the NWT
4. Have students brainstorm how climate change will affect the NWT specifically. See below for some ideas.
5. Have students work in a small group to come up with some recommendations for reducing the impacts of climate change in the North (or specifically your community)

**Independent Student Work:** Record terms in science journal/notebook.

**Conclusion / Review:** Why does climate change matter?

**Homework:** Assess Nature watch data for evidence of climate change in Canada and make Northern predictions. <https://www.naturewatch.ca/plantwatch/view-results/>

**Resources:**

Material from: Integrating Climate Change Measures in Municipal Planning by Ecology North with the help of Pembina Institute.

## 1. Discussion

- a. When you hear the term “climate change” what does it make you think of?
- b. Why is understanding climate change important?
- c. Why is it important to have communities begin to consider the impacts of climate change?
- d. What recent events have told you, you need to learn more about climate change?

## 2. Terminology

- **Weather** is what you see out your window
- **Climate** is the weather of an area over time
- **Climate Change** refers to any significant change in temperature, precipitation, and wind patterns occurring over an extended period of time.
- **Global Warming** is no longer used to refer to climate change as the climate does not warm in all places at all times.
- **Greenhouse Effect** is the gases in the atmosphere acting like the glass in a greenhouse, allowing heat from the sun in but blocking it from leaving.
- **Adaptation** refers to planning for the effects of climate change. How we will adapt to the changes.
- **Mitigation** refers to how we can stop or slow down climate change.

## 3. Climate change –what does it mean?

Climate is the average pattern of weather in a given location over a period of time —from months to thousands of years. Climate change refers to any significant change in temperature, precipitation, and wind patterns occurring over an extended period of time.

Climate change is a natural process, but today's climate change is caused mostly by the increasing amounts of carbon dioxide and other greenhouse gases in the atmosphere.<sup>1</sup> The unprecedented rapid global temperature and climate changes in the past century are primarily the result of burning fossil fuels, as well as the rapid increase in deforestation, industrial processes and some harmful agricultural practices.

Greenhouse gases in the atmosphere act like the glass in a greenhouse (hence the name greenhouse effect), allowing heat from the sun in but blocking it from leaving. Some greenhouse effect is essential for human life, but as the amount of carbon dioxide increases in the atmosphere, the changes we are seeing on earth are speeding up — with enormous impacts on the natural environment and people.

It is important to distinguish between weather (what you see out your window today) and climate, which refers to long-term average weather patterns in a given area. The most common measure of climate is temperature. While the daily temperatures that we experience vary across seasons, even a small change in average annual temperatures can

have important impacts on ecosystems, on landscape features such as permafrost, and on infrastructure. Other important climate measures are precipitation (rain and snow), wind, humidity and air pressure. Seasonal changes in precipitation — like more snow in the winter — can have big impacts too.

Documented climate change varies across regions but globally includes warmer average annual temperatures, changes in the frequency and intensity of extreme weather events such as heavy rain or snowstorms with high winds, and changes in the amount of precipitation and the type of precipitation, such as rain instead of snow.

#### 4. Climate change in the NWT

Below you will find a table of impacts from the perspective of human use / well-being.

#### **Extensions:**

Participate in Nature Watch North! <https://www.naturewatch.ca/plantwatch/northwest-territories/>

Research how much CO<sub>2</sub> could be sequestered by planting an area of native plants such as part of the schoolyard, an empty field etc.

Greenhouse gas pop bottle models:

<http://www.paulding.k12.ga.us/cms/lib010/GA01903603/Centricity/Domain/540/Greenhouse%20Global%20Warming%20LAB.pdf>

Build models of Greenhouse gases using chemistry modeling kits or foam balls (of relative size) and pipe cleaners. Which ones do we think will trap the most gases?

See the government's strategy to mitigate the effects of GHG:

[http://www.enr.gov.nt.ca/sites/default/files/strategies/greenhouse\\_gas\\_strategy\\_final.pdf](http://www.enr.gov.nt.ca/sites/default/files/strategies/greenhouse_gas_strategy_final.pdf)