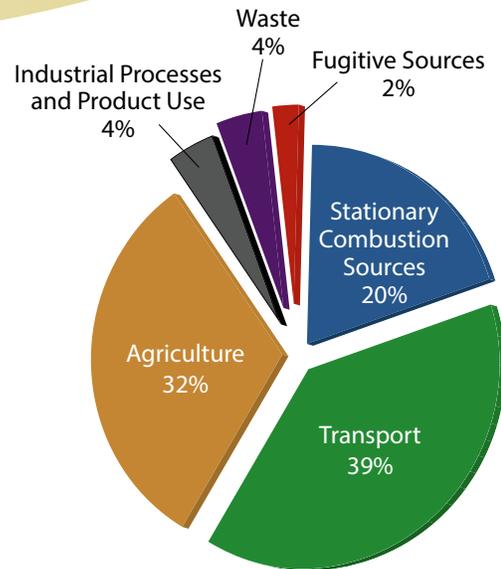


Manitoba Emissions

Backgrounder

The majority of Manitoba's greenhouse gas (GHG) emissions come from two sectors: transportation and agriculture. In 2016, Manitoba's GHG emissions came from these sectors and in these proportions:

- **60%—Fossil fuel burning** for the following purposes (Note: The following numbers do not add up to 60% due to rounding.):
 - 39%—**Transportation**—moving **people and goods**
 - 20%—**Stationary combustion**—energy used for residential and commercial **heating**, in electricity generation, in the oil and gas industry, and in the manufacturing and construction industries
 - 2%—**Fugitive sources**—the release of GHGs from the production, processing, transmission, storage, and use of fossil fuels (e.g., **flaring**)
- **32%—Agriculture**—mostly methane (CH₄) from livestock and nitrous oxide (N₂O) from soils
- **4%—Waste disposal**—mostly methane (CH₄) from landfills and wastewater
- **4%—Industrial processes**



Climate Change Connection:
<https://climatechangeconnection.org/emissions/manitoba-ghg-emissions/>

Manitoba's emissions from the energy (fossil fuel burning) category contributed about 60% of our GHG emissions in 2016. This is a much lower proportion than for Canada as a whole. The key reason for this is that Manitoba's electricity is produced from hydro power. Consequently, we have a higher proportionate GHG contribution from agriculture than any other province. <http://climatechangeconnection.org/emissions/manitoba-ghg-emissions/>

Manitoba is responsible for only a small portion of Canada's total greenhouse gas emissions (2-3%). As Manitobans, we each produce an average of approximately 16 tonnes of GHGs a year. An average Canadian produces, approximately 19.4 tonnes of GHGs per year. Compared to the rest of the world these emissions are among the highest, only to be out-emitted by the United States and Australia.

To access national greenhouse gas emission data, go to: <https://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En>. In order to analyze the numbers, go to: www.conferenceboard.ca/hcp/details/environment/greenhouse-gas-emissions.aspx.

Despite international commitments to drastically reduce GHGs, Canada has not seen a substantial decrease in per capita GHG emissions. As a country, we are falling behind. Further inaction will have severe impacts across the globe.

Suggested Activities

Climate Change Connection has reviewed and recommends the following climate change activities to engage and educate students.

Carbon Footprint

Use this Manitoba-specific worksheet to help students understand how they contribute to climate change. *Recommended for Grades 5–12.* <http://climatechangeconnection.org/wp-content/uploads/2015/04/FootprintClimateChange.pdf>

You Are What You Wear

This Manitoba-made activity sheet gets students to identify where all of their clothes were made and how far they travelled. As Canadians, we tend to consume beyond our basic needs, this is a big contributor to climate change. *Recommended for Grades 5–12.* <http://climatechangeconnection.org/wp-content/uploads/2016/02/ConsumerismClimateChange.pdf>

Online Carbon Footprint Calculator

The best carbon footprint calculator we have found is the zerofootprint calculator. This calculator will give students a good idea of how they contribute to climate change; however, because this resource is not specific to Manitoba, heating and electrical emissions may differ from those in Manitoba. *Recommended for Grades 5–12.* <http://calc.zerofootprint.net/>

Big Emitters?

This Unicef activity encourages students to consider which countries currently emit the most carbon. *Recommended for Grades 7–12.* Page 10. www.unicef.ca/sites/default/files/imce_uploads/UTILITY%20NAV/TEACHERS/DOCS/GC/Heat_up_over_climate_change.pdf

Ranking Climate Change Causes

This activity created by Trocaire in Ireland allows students to discuss what they think are the biggest factors contributing to climate change. They will rank statements for discussion. *Recommended for Grades 5–12.* Page 8. <https://www.trocaire.org/sites/default/files/education/lent2015/climate-primary-resource-trocaire.pdf>

Climate Balloons

This activity created by Development and Peace allows students to analyze their contribution to climate change and investigates initiatives that reduce the negative impacts. *Recommended for Grades 5–12.* <https://www.devp.org/sites/www.devp.org/files/documents/materials/climateballoons.pdf>

Greenhouse Effect Demonstration

Ask students to imagine they are standing outside in winter wearing shorts and a t-shirt. Ask them how they would feel. Then, using coats in the classroom, explain that Earth has a natural coat over it keeping it the perfect temperature for us to live on. This coat is made out of greenhouse gases. If we add more gases to the atmosphere it is like adding another coat. As we add more gases, we add another coat. Ask students what we do in our day-to-day activities that adds more gases, and ask the students with coats how they feel. Explain that this is what is happening to Earth—it is called the greenhouse effect (natural) and the enhanced greenhouse effect (addition of greenhouse gases by humans). *Recommended for Grades 5–7.*

Greenhouse Gas Game

Through interactive play on a life-sized game board, students are introduced to three of the most common greenhouse gases and the role these have in the natural and enhanced greenhouse effect. *Recommended for Grades 5–12.* <http://hctfeducation.ca/lessons/energy-atmosphere-and-climate/>

The Cheeseburger Footprint

The Cheeseburger Footprint takes a look at the amount of carbon dioxide emitted from one single fast-food cheeseburger. *Recommended for Grades 5–12.* <http://resources.tiged.org/tread-lightly-low-carbon-lunch>

Classroom Climate Chat

This Unicef activity gets a classroom of students to ask each other probing questions about climate change. The questions are provided and are at a beginner discussion level. *Recommended for Grades 5–12.* Pages 3, 8, and 9. www.unicef.ca/sites/default/files/imce_uploads/UTILITY%20NAV/TEACHERS/DOCS/GC/get_reel_change_lesson.pdf

Lesson Plans

Climate Change and Fossil Fuels

These Canadian Geographic Lesson Plans focus on Canada's fossil fuel reserves, greenhouse gas emissions, and the impacts resulting from the development of Canada's resources. *Resource for Grades 5–12.* www.cangeoeducation.ca/resources/learning_centre/matrix.asp?currentPage=22&range=21

The Role of CO₂

By role-playing various components of Earth's surface, atmosphere, and incoming solar radiation, students compare the natural and enhanced greenhouse effects. *Resource for Grades 5–10.* http://hctfeducation.ca/wp-content/uploads/2014/09/ClimateChange_TheRoleofCO2_Lesson.pdf

Other Resources (Videos, Websites)

Sustainable Food (Video)

Author and activist Michael Pollan is a passionate advocate for sustainable food. In his compelling PopTech talk, he explores how our industrial food system keeps us overly dependent on fossil fuels, destroys our environment, and makes us sick. 15 min. *Resource for Grades 7–12.* https://youtu.be/6As879M_kCs?t=3

300 Years of Fossil Fuels in 300 Seconds (Video)

This video uses a series of simple graphics to trace our dependence on fossil fuels from coal and the Industrial Revolution to our current (according to the authors) situation, characterized by increasing population and industrialism, leading to increased consumption, increased CO₂ production, and a dangerous deterioration in the natural environment. *Resource for Grades 7–12.* <https://www.youtube.com/watch?v=cJ-J91SwP8w>

Energy Dialogues—Fracturing (Video)

The introductory video outlines the techniques used by natural gas companies to reduce the pollution caused by fracking? It describes the use of steel pipes and cement in the drilling process to protect ground water but does not address the many issues/concerns raised by those who question or oppose fracking. *Resource for Grades 9–12.* <http://resources4rethinking.ca/en/resource/energy-dialogues-fracturing>

Weather, Climate, and Climate Change

This Learning for a Sustainable Future theme document is intended primarily as a resource to support curriculum policy change but is also of relevance to teacher professional development and to the design of learning resources and learning programs. The document provides an outline for basic climate change knowledge at each grade level. www.lsf-lst.ca/media/Weather-Climate-and-Climate-Change-Formatted-FINALUpdatedJuly4.pdf

Agricultural Emissions in Manitoba (Website)

www.gov.mb.ca/agriculture/environment/climate-change/agriculture-and-climate-change.html

Climate Projections for Southern Manitoba: Executive Summary

www.gov.mb.ca/agriculture/environment/climate-change/pubs/climate-change-projections-and-impacts.pdf

Inquiry and Critical Thinking Questions

- Describe the journey followed by one of your pairs of shoes' from the time it was made all the way to the time it was sold to you in Manitoba?
- How can eating less meat help solve the climate crisis?
- How does composting reduce your greenhouse gas emissions?
- What is your carbon footprint and how is it measured?
- What changes in your daily life would result in lower carbon emissions?
- How do our GHG emissions compare to other countries?
- Does driving a small car, an electric car, or taking the bus make a difference?