

Manitoba
**Emissions,
Impacts,
and
Solutions**

A Climate Change Resource for
Grades 5 to 12 Teachers

Manitoba Emissions, Impacts, and Solutions:

A Climate Change Resource for
Grades 5 to 12 Teachers

Created in partnership with Manitoba Education and Training and
Climate Change Connection

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Websites are subject to change without notice.

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Introduction

This resource was created to assist Manitoba teachers in engaging their students in the topic of climate change. After consultations with Manitoba teachers, we realized that there was a need for up-to-date information, engaging activities, questions that assist students in critically examining the topic, and ideas on how students can take learning beyond the classroom.

How to Use This Resource

This resource includes the following three sections:

1. Manitoba Emissions
2. Manitoba Impacts
3. Manitoba Solutions

Each section has a backgrounder, suggested activities, links to in-depth lesson plans, other resources (videos, websites), and suggested inquiry questions.

The resource also includes a section on community connections. These are local groups that can assist teachers in climate change education. The final section of this resource contains ideas for a whole-school approach to climate change. These ideas will help get everyone in the school involved and will reduce your school's carbon footprint.

Note: While there are some suggested activities in this resource for early years, this resource focuses on Grades 5 to 12. We do, nonetheless, suggest setting the platform for environmental stewardship in the early years by focusing on activities and discussions related to keeping Earth healthy, without a specific focus on climate change. We encourage early years teachers to model good behaviour in their classrooms (such as composting, litterless lunches, reducing paper consumption, promoting active transportation, energy and water conservation, gardening, etc.) and to help foster a relationship between students and nature.

Climate Change Connection is a non-profit organization working to educate Manitobans about climate change and facilitate climate change solutions.
www.climatechangeconnection.org



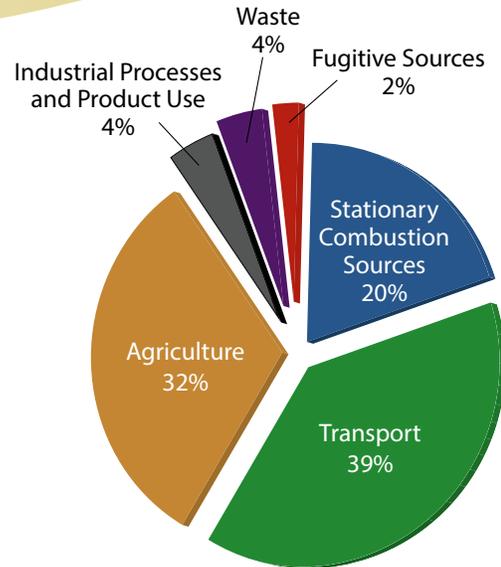
CLIMATE CHANGE
CONNECTION

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?

Manitoba Impacts

Backgrounder*

Overwhelming scientific evidence shows that the average surface temperature of Earth is increasing. The signs are everywhere: sea levels are rising, Arctic sea ice is melting, animal species are shifting their ranges, growing seasons have lengthened, coral reef bleaching is increasing, and the high number of extreme weather events is unprecedented.

In Manitoba, some of the impacts we have already seen include the following:

- Melting permafrost which causes roads, railways, and building foundations to buckle and deteriorate
- Shorter winter road seasons which reduce access to northern communities
- Reduced sea ice cover and thinning ice in the Hudson Bay, which affects polar bears, seals, and traditional indigenous ways of life
- Larger forest fires which affect natural resources and communities
- Increased drought conditions which cause decreased crop yields
- Greater risk of flooding throughout all of Manitoba
- Increased water temperature in Lake Winnipeg which affects the local fishery and tourism
- Increased frequency and severity of extreme weather events which increases economic costs

Under a business-as-usual emission scenario, climate models predict the following effects for Manitoba:

- Manitoba winters are expected to warm more drastically than other seasons, especially in northern areas.
- Precipitation will increase in most of the Prairies in the fall, winter, and spring months and decrease in the summer months.
- A very large increase in the number of hot days/year (>30°C) is projected for the Prairies. For example, Winnipeg is projected, on average, to have 36 more hot days/year in 2051-2080, bringing the average number to 48 hot days/year.
- Manitoba's summer could have a climate similar to that of Northern Texas in the year 2080.

It is important to note that impacts will be more severe if we do not act now. Since most greenhouse gases have a long lifespan in the atmosphere, even if our emissions were to stop, the temperature of the planet will continue to rise. The GHGs we emit today will impact us for decades to come.

* All facts in this section were taken from the Dr. Danny Blair presentation: Climate Change Impacts in Manitoba, 2016.

Suggested Activities

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

Create a Climate Change Tree

As you learn about climate change you can record some of your key findings by displaying them on a tree you will create on your classroom wall. On the trunk of the tree write *Climate Change*, then make roots (causes of climate change), branches (impacts of climate change), and leaves (solutions to climate change). You can also add fruit to the tree (pledges made by students recording what they will do to help stop climate change).

Writer's Corner

This idea is adapted from a Years of Living Dangerously Lesson Plan. Recommended for Grades 5–12. <http://climateclassroom.org/lesson/writers-corner-ms-3/>

- Ask your representatives: Write a letter to your provincial or local representative asking what plans are in place to safeguard your community against extreme weather as our climate continues to warm. Think specifically about flooding, intense rain storms, heat waves, drought, and blizzards. Be sure to provide scientific facts and express your concern.
- Mark Twain and Climate Change: Mark Twain is quoted as saying, “Climate is what we expect, weather is what we get.” Get the students to explain, using their knowledge, what Mark Twain’s words mean.

Rising Tide

This is an activity to highlight the impacts low-lying countries are facing with rising sea levels caused by climate change. Groups of students stand on islands of paper and use their creativity to figure out how to manage with less and less land. Recommended for Grades 7–12. Page 6. www.unicef.ca/sites/default/files/imce_uploads/UTILITY%20NAV/TEACHERS/DOCS/GC/Heat_up_over_climate_change.pdf

Ready to Go?

This activity encourages young people to think about how it would feel to be forced to move from your home because climate change has affected your local environment. You can also add a Manitoba spin to this and use flooding or forest fire as the reason for moving. *Recommended for Grades 7–12.* Pages 7–8. www.unicef.ca/sites/default/files/imce_uploads/UTILITY%20NAV/TEACHERS/DOCS/GC/Heat_up_over_climate_change.pdf

Milk It!

Using an animal such as a cow as an example can get students to understand how linked we all are and to understand how too much or not enough rain will effect both cows and us. *Recommended for K–5.* Page 5. <https://www.trocaire.org/sites/default/files/education/lent2015/climate-primary-resource-trocaire.pdf>

The Impacts of Climate Change Around the World

This Trocaire activity from Ireland gets students to look at pictures from around the world and discuss how they relate to climate change and if there are any connections to their life. *Recommended for Grades 5–12.* Page 13. <https://www.trocaire.org/sites/default/files/education/lent2015/climate-primary-resource-trocaire.pdf>

Walking in Someone Else’s Shoes

This Trocaire activity from Ireland allows students to experience the world as a person from another walk of life. Each student gets a role card and then stands in the middle of the room. Through a series of questions, the students move forward or backward in response. *Recommended for Grades 5–12.* Page 14. <https://www.trocaire.org/sites/default/files/education/lent2015/climate-primary-resource-trocaire.pdf>

Where Has All the Water Gone?

Students simulate a water management meeting based on one that actually occurred in the Okanagan. The role play highlights the environmental, social, and economic challenges associated with climate change and freshwater management, and encourages students to analyse factors that make proposed resource management solutions challenging to implement. *Recommended for Grades 9–12.* http://hctfeducation.ca/wp-content/uploads/2014/09/WhereHasAllTheWater-gone__Activity.pdf

Arctic Survivor

In an active game, students role-play polar bears and the habitat components of food, water, shelter, and space to understand how polar bear populations are affected by changes in their habitat. *Recommended for Grades 7–12.* http://hctfeducation.ca/wp-content/uploads/2014/09/ArcticSurvivor_Lesson.pdf

Lesson Plans

Climate Change Connection reviewed these climate change resource kits that include lesson plans, activities, and educational material.

Climate Change in the Arctic

This Canadian Geographic Lesson Plan uses maps, scientific evidence, and activity sheets to help students understand the Arctic and the sea ice, and the impact climate change is having on both. *Resource for Grades 9–12.* www.canadiangeographic.com/educational_products/activities/polar_imperative/Arctic-lessons-En-lesson5.pdf

Melting Ice Experiment

Students explore the role that ice plays on Earth, the factors causing it to melt, and the consequences of melting ice. *Resource for Grades 6–12.* www.pbslearningmedia.org/resource/ip07.sci.ess.watcyc.lpmeltingice/melting-ice/

Canada’s Forests—A Breath of Fresh Air

This Canadian Forestry Association Teaching Kit provides a variety of lesson plans for early to high school years. The kit discusses different Canadian communities, the greenhouse effect, forest fires, ecological footprints, and the carbon cycle. *Resource for Grades 5–12.* www.canadianforestry.com/kits/english/Vol2_e.pdf/Vol2_e.pdf

Canada’s Forests—Biodiversity in a Changing World

This Canadian Forestry Association Teaching Kit provides a variety of lesson plans for middle to high school years. Page 23, Climate Change and More: The Future of Biodiversity, helps students understand the importance of biodiversity, while learning how climate change will have a significant impact. <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/28960.pdf>

Other Resources (Videos, Websites)

The Implications of Climate Change in Manitoba with professor Danny Blair

This short video highlights the implications of climate change, specifically in Manitoba. <https://www.youtube.com/watch?v=l8gUFetvkdA>

Intergovernmental Panel on Climate Change (Website)

This report provides a clear and up-to-date view of the current state of scientific knowledge relevant to climate change. www.ipcc.ch/ or www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

Years of Living Dangerously (Video)

This Emmy Award-winning documentary series features first-hand accounts from people who have been affected by climate change, with a team of correspondents from the entertainment and news industries traveling around the world and searching for answers. <http://yearsoflivingdangerously.com/>
For classroom resources and lesson plans, visit <http://climateclassroom.org/>.
Resource for Grades 9–12.

- Weather, Climate and Super Storms Lesson Plan—Students will use the stories in the video to better understand weather and climate. <http://climateclassroom.org/course/ms-3/>

This resource can be borrowed from the Manitoba Eco-Network Library. www.mbeconetwork.org/

Chasing Ice (Video)

This 2014 Emmy Award-winning documentary is a story about the changes occurring in the Arctic. It is a story of one man's mission to change the tide of history by gathering evidence of our changing planet. The photographer, Balog, began deploying revolutionary time-lapse cameras across the Arctic to capture a multi-year record of the world's changing glaciers. *Resource for Grades 9–12.* <https://chasingice.com/>

This resource can be borrowed from the Manitoba Eco-Network Library. www.mbeconetwork.org/

Oxfam's Climate Challenge for 7–11 years and 11–14 years

Oxfam's Climate Challenge resources focus on the human impact of climate change: how communities around the world are being affected by climate change and how people are responding and adapting to these challenges.

<https://www.oxfam.org.uk/education/resources/climate-challenge-7-11>
<https://www.oxfam.org.uk/education/resources/climate-challenge-11-14>

Climate Kids: NASA's Eyes on the Earth (Website)

This NASA website has activities related to weather, animals, oceans, and scientific data. This American resource will provide you with fun interactive activities. *Resource for K–8.* <http://climatekids.nasa.gov/menu/weather-and-climate/>

Inquiries Tool—Learning for Sustainable Futures (Website)

This tool provides extensive background information on each issue, as well as a series of questions for students to debate and discuss. Issues covered include Energy: Making Sustainable Choices; The Disappearance of the Northern Cod; The West Coast Salmon Fisheries; Canada's Fresh Water; Sustainable Cities; Agriculture and Agribusiness; Sustaining Canada's Forests; and Sustainable Transportation. *Resource for Grades 5–12.* <http://lsf-1st.ca/en/projects/teacher-resources/additional-resources/inquiries-tool>

Conservation International Films: Nature is Speaking (Video)

A series of short films that examine climate change (and other human impacts) from the perspective of nature. *Resource for Grades 5–12.*

<http://natureisspeaking.org/>

Inquiry and Critical Thinking Questions

- Why are the most vulnerable children more at risk from the effects of climate change?
- What might life be like for a child in Manitoba in 2050? In 2080?
- How will life need to change to meet a 2 degree Celsius target?
- How do you think you will be impacted by climate change?
- Given the consequences of climate change, why have we taken so long to act?

Manitoba Solutions

Backgrounder

We must aim to make our communities resilient. Resilient communities have the ability to meet their basic needs (water, food, shelter, and transportation) themselves without the use of fossil fuels. We have a long way to go in achieving this goal. For instance, while we consider Manitoba to be an agricultural province, we export most of what we produce and a large amount of the food that we put on our tables is imported. To meet our needs without the use of fossil fuels, this must change.

Our personal choices have a large impact on our GHG emissions and carbon footprint.

- **Transportation** accounts for close to 40% of our personal emissions. <http://climatechangeconnection.org/emissions/manitoba-ghg-emissions/> This gives us an opportunity to make significant changes. By choosing a more fuel-efficient vehicle (smaller, electric) and driving less (by walking, biking, carpooling, and busing more) we can reduce our personal footprints significantly. Every litre of gasoline that is burned produces about 2.294 kg of CO₂. <http://climatechangeconnection.org/emissions/tailpipe-emissions/>
- **Our food system** needs to be sustainable and shared equitably. Presently, most Manitobans are unaware of where their food was produced, who produced it, or how many stops it made along the way to get to their table. This is a problem for food security and the climate crisis. The more steps are involved in food production and the longer distances our food travels, the more greenhouse gases will be emitted. We need to eat more local food, grow our food sustainably, eat less meat, and eliminate processed foods.
- **Energy:** Living in Manitoba's extreme climate requires intensive energy use in our homes. This not only empties our wallets but is also costly to the environment. After all, much of the energy used to heat our homes comes from burning fossil fuels. We need to combat this by making our homes smaller and more energy efficient. We can make our homes more energy efficient by eliminating drafts, adding insulation, and installing better doors and windows. We can build greener homes by installing geothermal, district heating systems, and using new green building construction like Passive House. www.passivehouse.ca
- **Consumption:** How much we buy affects the amount of GHG emissions we produce. Whether it is purchasing the latest cell phone or buying your tenth pair of sunglasses, these emissions (from resource extraction, manufacturing, distribution, use, and disposal) result in pollution that increases our carbon footprint. Even driving to and from the stores generates GHG emissions. We must buy less, share more, and become educated shoppers.

To solve the climate crisis, we need to support our community leaders. Our leaders should be acting in our best interest and that means introducing measures to mitigate the climate crisis. Some of these measures, like putting a price on carbon and investing in renewable energy sources or infrastructure for active transportation, may seem like they are adding costs but we should consider them to be an investment in our future.

Suggested Activities

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

Sphere of Influence

This Department of Energy & Climate Change activity from the United Kingdom aims to get students thinking about how much influence they have over people, their community, and the government. *Recommended for Grades 9–12.* Pages 16 and 32. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444252/150610_-_School_engagement_-_My2050_schools_toolkit_version_2.pdf

Tipping Point

This activity is based on a team-building activity, modified to convey the interconnectedness of biodiversity, climate change, human impacts, mitigation, and adaptation. Pages 2–3. *Recommended for Grades 9–12.* <http://biodiversityeducation.ca/wp-content/uploads/2016/10/The-Big-Picture-on-Biodiversity-and-Climate-Change.pdf>

Climate Superhero Auditions

This Unicef activity gets students to think about the power we all have to tackle climate change. *Recommended for Grades 7–12.* Pages 11–12. www.unicef.ca/sites/default/files/imce_uploads/UTILITY%20NAV/TEACHERS/DOCS/GC/Heat_up_over_climate_change.pdf

Nature Walk

Take the class for a nature walk in the local park or school yard. Ask students to find specific things along the way. Younger students can find colours or shapes and things that are natural or man-made, and older students can identify changes they can make in the community or potential impacts they see from climate change. *Recommended for all ages.*

Educational Poster

Get your students to raise awareness on climate change by creating posters for their school. They can be about emissions, impacts, or solutions. *Recommended for Grades 5–12.*

Climate Change T-shirt

Assign students the task of designing a t-shirt that effectively communicates the importance of climate change. The design should include a slogan, and illustrations or icons that reflect the importance of being informed about climate change. The 'winning' design could be transferred to t-shirts and sold as a fundraiser to support a local organization. *Recommended for Grades 5–12.*

Lesson Plans

My 2050 Schools Toolkit

This Department of Energy and Climate Change resource out of the United Kingdom provides a set of activities that can be used in the classroom to engage students in debates about climate change solutions. *Resource for Grades 9–12.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/444252/150610_-_School_engagement_-_My2050_schools_toolkit_version_2.pdf

Other Resources (Videos, Websites)

Manitoba Emissions, Manitoba Solutions with Curt Hull

This short video describes emissions in Manitoba and solutions for reducing them. <https://www.youtube.com/watch?v=4jNyTt1LjIY>

The Story of Stuff (Website and Videos)

The Story of Stuff is a video about the way we make, use, and throw away stuff. Since the success of this video, The Story of Stuff has produced a series of other movies: Story of Cap and Trade, Story of Bottled Water, Story of Cosmetics, Story of Electronics, Story of Change, The Story of Solutions, and Let's Ban Beads! *Resource for Grades 9–12.* <http://storyofstuff.org/>

Sustainable Schools Manual

This resource kit aims to inspire schools and students to be leaders of sustainable development. Youth are encouraged to explore the environmental impacts of their actions and to create practices that support their well-being, as well as that of their schools and the global community. <http://resources4rethinking.ca/media/Sustainable-Schools-manual-shrunk.pdf>

Climate Change, Children and Youth: Local Connections to Global Issues

This UNICEF resource has been created to support secondary school educators in their efforts to work with youth to take action on climate change. Through the thought-provoking activities included, students can nurture their compassion and discover how climate change is affecting children around the world, especially children in developing countries. *Resource for Grades 9–12.* <http://resources4rethinking.ca/media/Local%20Connections%20to%20Global%20Issues.%20Climate%20change,%20children%20and%20youth.pdf>

Tree Canada Foundation

The foundation promotes the planting and care of trees in urban and rural environments and sponsors a “Greening School Grounds” program. <https://treecanada.ca/en/programs/greening-canadas-school-grounds/>

Evergreen

This initiative is dedicated to ‘bringing nature back to our cities’ through education and community action projects. www.evergreen.ca/get-involved/funding-opportunities/school-ground-grants/

Climate Change—Youth Guide to Action

This Taking IT Global resource will help youth get informed and take action on climate change. http://tig.phpwebhosting.com/guidetoaction/Climate_Guide_to_Action_en.pdf

Inquiry and Critical Thinking Questions

- Who has the power to make change?
- What actions can you take that will reduce your carbon footprint?
- What country has reduced their emissions, and how did they do it?
- Does it really matter if you leave the light on?
- What community projects are making a difference?
- What could you do in your community to make a difference?
- Why is eating a cheeseburger bad for the environment?
- What could you make for dinner that would have little impact on the climate?
- What is sustainable farming? What are some best practices?
- What is the 100-mile diet? Is it possible to eat a 100-mile diet in Manitoba?

Community Connections

Assiniboine Park Zoo

The zoo is a great platform for climate change education and offers educational programs on climate change. www.assiniboineparkzoo.ca/zoo

Climate Change Connection (CCC)

CCC is a Manitoba-based non-profit organization that focuses on educating Manitobans about climate change and getting them to take action. Their website will help you answer any questions you have about climate change. Representatives of CCC will come to your school and make a presentation. They will also produce activities and resources for teachers to engage their students in the climate change conversation. Every year, CCC helps Manitoba schools host youth conferences on climate change at their own schools. www.climatechangeconnection.org

Food Matters Manitoba

Sustainable food for Manitobans through capacity building, education, and awareness. www.foodmattersmanitoba.ca

Fort Whyte Alive (FWA)

FortWhyte Alive offers a variety of programming options, resources, and field trips on climate change. Every year FWA hosts an Arctic science day. www.fortwhyte.org

Green Action Centre

The Green Action Centre promotes greener and better living by sharing practical solutions and advocating for change. Some school-based programming provided includes: Active and Safe Routes to School; Composting; and DIY workshops. www.greenactioncentre.ca

International Institute for Sustainable Development (IISD)

IISD is an independent, non-profit organization that provides practical solutions to the challenge of integrating environmental and social priorities with economic development. www.iisd.org

Manitoba Council for International Cooperation (MCIC)

This is a coalition of organizations involved in international development that provides presentations, workshops, and support for youth. www.generatingmomentum.com/about

Manitoba Environmental Youth Network (MEYN)

MEYN is helping to build a capable, knowledgeable, and connected youth community that actively seeks to create positive environmental solutions in Manitoba. Every year MEYN hosts a conference for students to learn more about the environment and gain the skills to take action.

www.mbeconetwork.org/youth/

Manitoba Forestry Association (MFA)

MFA's goal is to inform and educate all Manitobans about wise management of trees and forests; to ensure they will remain healthy and productive not only for today, but for future generations. www.thinktrees.org

Prairie Climate Centre

A joint initiative of the University of Winnipeg and the International Institute for Sustainable Development, the Prairie Climate Centre helps governments, businesses, and community members identify and anticipate risks, take advantage of emerging opportunities, build capacity, and enhance economic and environmental resilience to climate change. www.prairieclimatecentre.ca

Schools on Board (SOB)

Schools on Board is an outreach program of ArcticNet, based out of The Clayton H. Riddell Faculty of Environment, Earth and Resources at the University of Manitoba (Winnipeg, Canada). It was developed to bridge Arctic research with science education in high schools across Canada; to increase awareness of issues related to climate change in Canada, and to educate young Canadians about the challenges and career opportunities of Arctic research. Every two years, ArcticNet hosts a Youth Conference on Climate Change in Winnipeg. www.arcticnet.ulaval.ca/sb/index.php

Whole School Solutions

Education. Everyone should be aware of and understand the impacts of climate change. In order to inform and involve more people, you can

- Plan and hold an assembly.
- Create posters or poems and display them in the hallway.
- Organize and run a school-wide competition.
- Design and distribute leaflets for parents or the community.
- Contribute articles to your school newsletter.
- Hold a fundraising event.
- Make a video, podcast, or radio show.
- Hold a debate.
- Put up a display at a school-wide event.
- Organize a whole-school green day, conference, or Earth week.
- Work with your feeder schools.
- Hold a climate change science fair.
- Start a mailing campaign. Write a letter to a community leader.
- Organize a school group.
- Take an eco-friendly field trip.
- Host a solar cookout.

Reduce emissions from transportation. More and more students are being driven to school rather than walking. We need to get more students to use active transportation.

- Become idle free.
- Organize a walking school bus.
- Encourage students to bus or bike.
- Discourage students from driving to school.
- Install bike racks that are protected and safe.
- Host a bike safety event.
- Create an active transportation plan for your school.
- Set up a teacher carpool.

Reduce waste. Much of our waste in school comes from food and paper.

- Start composting.
- Conduct a school waste audit.
- Go paper free.
- Place recycling bins in every classroom.
- Develop a purchasing policy for the school.
- Put up signs.
- Encourage litterless lunches.
- Host a classroom waste challenge.

- Use biodegradable bags, cups, plates, and utensils.
- Manage e-waste properly.

Tackle food issues. Many schools are changing the way their students and staff eat and drink at school.

- Host a 100-mile fall supper.
- Host meatless Mondays in the cafeteria.
- Plant a garden.
- Remove bottled water and soda pop machines.
- Install water bottle filling stations.
- Eliminate disposable plates and cups from the cafeteria.
- Go fair trade.

Become more energy efficient.

- Conduct an energy audit.
- Put up signs.
- Replace inefficient lighting, appliances, and equipment.
- Develop an energy policy.
- Educate staff and students about policies.

Get Involved. Instilling a sense of connectedness to the community is essential to helping students care about the world around them.

- Host a fundraiser.
- Raise money to support the work of charities (locally or internationally).
- Sign a petition.
- Create a school pledge form.
- Support local campaigns and movements.

Green your school ground. Schools across Canada are changing their school yards to make them more environmentally friendly and create more learning spaces.

- Create an outdoor classroom.
- Plant a garden (butterfly, vegetable, flower).
- Plant trees.
- Remove concrete and install permeable ground.
- Bring nature indoors.

Reduce water usage.

- Conduct a water audit.
- Install water saving devices.
- Put up signs.
- Use rain barrels.



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