

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.

Manitoba has seen a 1°C increase in temperature over the last 100 years. This is higher than the global average. This indicates Manitoba will be impacted by climate change sooner and more severely than other places in the world. 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

The following is what the climate models are telling us for Manitoba:

- Manitoba winters are expected to warm more drastically than other seasons, especially in northern areas.
- Winnipeg winters have warmed at the rate of about 1°C per century. This is almost 7x faster than the global trend.
- Precipitation will increase in most of the Prairies in the fall, winter, and spring months and decrease in the summer months.
- Under a business-as-usual emission scenario, 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.
- Under a business-as-usual emission scenario, Manitoba's summer is expected to have a climate similar to that of Northern Texas in the year 2080.

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

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.

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). The following is an example from Oxfam called an issue tree. *Recommended for Grades 5–12.* www.oxfam.org.uk/education/resources/making-the-change
www.trocaire.org/sites/trocaire/files/education/lent2015/climate-primary-resource-trocaire.pdf

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. www.trocaire.org/sites/trocaire/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. www.trocaire.org/sites/trocaire/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. www.trocaire.org/sites/trocaire/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.ca/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=l8gUFtvdA>

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 Real Life Impact Stories (Website)

These are real life stories focused on how climate change is impacting people around the world. Check out Oxfam’s educational materials. *Resources for Grades 5–12.* www.oxfam.org.uk/education/resources/climate-challenge-7-11

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?