

CLIMATE CHANGE EDUCATION IN CANADA AND BEYOND

TRANSLATING KNOWLEDGE INTO ACTION AND SECURING A SUSTAINABLE AND EQUITABLE FUTURE FOR ALL



Andrea J Moreau

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FIRST EDITION

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Library and Archives Canada Cataloguing in Publication

Title: Climate change education in Canada and beyond : translating knowledge into action and securing a sustainable and equitable future for all / author, Andrea J Moreau ; editors, Allison S Lalla, Hayat Sharif.

Names: Moreau, Andrea J., author. | Lalla, Allison S., editor. | Sharif, Hayat, editor.

Description: First edition. | Includes bibliographical references.

Identifiers: Canadiana 20220274797 | ISBN 9781777894429 (PDF) | ISBN 9781777894436 (HTML)

Subjects: LCSH: Climatic changes—Study and teaching (Secondary)—Canada. | LCSH: Environmental education—Canada.

Classification: LCC QC903.2.C3 M67 2022 | DDC 363.738/74071271—dc23

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INTRODUCTION

Climate change is inarguably the most critical and urgent global issue faced by our world today. Characterized by an increase in extreme weather, natural disasters, and other detrimental impacts to environmental, social, and economic strata, it is an issue that requires a coordinated and conscious response. Global projections have shown that current anthropogenic trends are not coherent with Earth's need for significant reductions in carbon dioxide emissions and more sustainable global practices. It is estimated that at our current rate of natural resource exploitation and consumption, we will need the equivalent of three Earths' resources to sustain human life by 2050.¹

The rapid deterioration of many ecological systems has left a large demographic of the global population with “eco-anxiety,” an extreme state of worry caused by observing current impacts of climate change.² It must be noted, however, that this feeling of impending doom is justifiable. As of 2021, only 39 of the globe's 196 countries, including Canada, have issued a climate emergency.³ Although climate change is not confined by geopolitical borders or any one type of human, it disproportionately affects certain groups due to current global systems that contain multiple levels of corruption and injustice. Many of the most vulnerable communities and demographics are heavily aware of the effect that climate change will have on them. Developing countries, marginalized Black and Indigenous communities, and today's youth are just some of the groups that are currently facing this reality.⁴

The people most affected by climate change are among those who are most likely to lobby and advocate for tangible change. This is demonstrated with movements such as the Fairy Creek Blockade, which was aimed at the protection of old growth forests in British Columbia, as well as youth-led climate strikes spanning the globe.⁵

These youth-led climate strikes are a testament to the exceptional determination and ambition that today's youth possess. However, despite continual efforts to lobby for change in various systems and institutions, there are still gaps, most notably in the education system. A global survey on climate literacy conducted in 2015 found that

1 UNESCO, *Learn For Our Planet: A Global Review of How Environmental Issues are Integrated in Education* (Paris, France: United Nations Educational, Scientific and Cultural Organization, 2021), online: <unesdoc.unesco.org/ark:/48223/pf0000377362> [UNESCO, “Learn For Our Planet”].

2 IBERDROLA, “Eco-anxiety: the psychological aftermath of the climate crisis” online: *IBERDROLA* <www.iberdrola.com/social-commitment/what-is-ecoanxiety/>; see also Judy Wu, Gaelen Snell & Hasina Samji, “Climate anxiety in young people: A call to action” (2020) 4:10 *The Lancet Planetary Health* 435.

3 Climate Emergency Declaration, “Climate emergency declarations in 2,106 jurisdictions and local governments cover 1 billion citizens” (8 June 2022) online: *Climate Emergency Declaration* <climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/>.

4 S Nazrul Islam & John Winkel, “Climate Change and Social Inequality” (2017) Department of Economic & Social Affairs Working Paper No 152, online: <www.un.org/esa/desa/papers/2017/wp152_2017.pdf>.

5 Ingrid Waldron, *Environmental Racism in Canada* (Ottawa, Canada: The Canadian Commission for UNESCO's IdeaLab, 2020).

education is the strongest predictor of climate change awareness.⁶ However, the quality and quantity of climate change and mitigation content in current Canadian curricula is suboptimal. This significantly holds back the future of our planet and the youth that will be left trying to save it.

WHAT IS CLIMATE CHANGE?

Defined by long-term shifts in temperatures and weather patterns,⁷ climate changes have occurred for the entirety of the earth's lifespan. However, over the past two centuries, anthropogenic trends have expedited the process, resulting in rising temperatures, more frequent and extreme natural disasters, and more severe weather. In the wake of our rapidly changing environment, many scientists have agreed that we have entered a new epoch – the Anthropocene. Characterized by profound changes in Earth's geology, climate, and ecosystems due to human activities,⁸ the Anthropocene is distinctly unlike any era our world has seen.

As stated, a key indicator of the Anthropocene is human-driven climate change. While two terms are not synonymous, global warming is a major aspect of climate change and is driven largely by industrial activities that result in greenhouse gas emissions.⁹ These high levels of emissions result in amplifying what is known as the greenhouse effect. The greenhouse effect is used to describe the process by which heat is trapped close to Earth's surface by greenhouse gases, resulting in higher surface temperatures.¹⁰



2020 was marked by the highest global temperatures ever recorded.¹¹ Increased global temperatures lead to an increase in adverse effects. Food insecurity, famine, and drought are all directly correlated to a warmer climate. Additionally, warmer climates directly impact permafrost levels and melt sea ice, which are both emitters of CO₂ and contributors to rising sea levels.¹²

Due to the complexities of our global societies and systems, the effects of climate change and global warming do not impact everyone uniformly. The effects of a changing climate have been found to disproportionately affect certain demographics more than others, specifically visible minorities such as Black and Indigenous communities and people living in other underrepresented socioeconomic situations. The term

⁶ Tien Ming Lee et al., “Predictors of public climate change awareness and risk perception around the world” (2015) 5 Nature Climate Change 1014.

⁷ United Nations, “What is Climate Change?” Online: <www.un.org/en/climatechange/what-is-climate-change>.

⁸ Carl Folke et al, “Our future in the Anthropocene biosphere” (2021) 50 Ambio 834.

⁹ *Ibid.*

¹⁰ NASA, “what is the greenhouse effect?” Online: <climate.nasa.gov/faq/19/what-is-the-greenhouse-effect/>.

¹¹ UNESCO, “Learn For Our Planet”, *supra* note 1.

¹² Merritt R Turetsky et al, “Permafrost collapse is accelerating carbon release” (2019) 569 Nature 32 online: <www.nature.com/articles/d41586-019-01313-4>.

environmental racism is used to describe the ways in which climate change exacerbates pre-existing issues such as poverty and acts in conjunction with systems of oppression.¹³

CLIMATE CHANGE AS A GLOBAL ISSUE

The presence and effects of climate change are seen and experienced on a global scale. Due to the far-reaching and interdisciplinary nature of climate change, immediate and collaborative action at an intergovernmental level is needed to mitigate its effects and secure a habitable planet for future generations. Many proactive and efficacious initiatives have occurred through the commitment of international political and economic organizations, such as the United Nations (UN), the Group of Seven (G7), the Organization for Economic Co-operation and Development (OECD), and the Commonwealth of Nations.

1988 marked the creation of the Intergovernmental Panel on Climate Change (IPCC), a body of the UN focused on assessing and responding to the impacts of climate change worldwide.¹⁴ In 1992, the UN's Framework Convention on Climate Change treaty was signed by 154 nations.¹⁵ This treaty recognized the immense variability of individual countries' contributions and capacities to respond to climate change. This led to the implementation of a mandate specifying that developed nations must assist developing nations in efforts to mitigate and adapt to climate change.¹⁶

In 1989, growing recognition of climate change and its global impacts sparked the Langkwai Declaration on the Environment, whereby the Commonwealth countries agreed to pursue collaborative efforts to promote environmental sustainability.¹⁷ Since then, all Commonwealth countries have committed to limiting global warming to 1.5°C above pre-Industrial Revolution levels, as per the 2016 Paris Agreement.¹⁸ Additionally, the Commonwealth Blue Charter promotes the sustainable development of oceans.¹⁹

Similarly, all G7 countries have committed to conserve at least 30 percent of Earth's land and water by 2030.²⁰ G7 countries are also dedicated to achieving net zero emissions by 2050 and limiting warming to 1.5°C above pre-Industrial Revolution levels.²¹

Lastly, the OECD plays an active role in international negotiations pertinent to climate change, in addition to developing climate policies, tracking global climate finances,

¹³ Islam & Winkel, *supra* note 4.

¹⁴ Daniel Bodansky, "The United Nations Framework Convention on Climate Change: A Commentary" (1993) 18 Yale J Intl L 451.

¹⁵ *Ibid.*

¹⁶ *Ibid.*

¹⁷ The Commonwealth, "The Commonwealth and Climate Change" (2018), online: <thecommonwealth.org/sites/default/files/inline/EYSSD_COP24_Booklet.pdf>.

¹⁸ *Ibid.*

¹⁹ *Ibid.*

²⁰ "G7 summit: Leaders pledge climate action but disappoint activists" (13 June 2021), online: *BBC* <www.bbc.com/news/world-57461670>.

²¹ *Ibid.*

supporting transitions to a low-carbon economy, and progressing towards the goals of the Paris Agreement.²²

While the establishment of such agreements is integral to mitigating climate change and associated issues, the degree to which each country adheres to the outlined goals is quite variable, as is the rate of progression towards these objectives.

WHY CLIMATE CHANGE EDUCATION?

The potential education has to play in the high-level systemic changes needed to secure a habitable planet for future generations has been recognized globally. Due to this, over 190 countries have adopted and the United Nations (UN) Sustainable Development Goal (SDGs). These 17 goals were adopted in 2015 as a framework for economic development that simultaneously meets the needs of the present generation and sustains natural resources for future generations.²³ One goal in particular, SDG #4, highlights the need for inclusive and equitable education while promoting lifelong learning opportunities for all.²⁴ The interconnectivity of the UN SDGs means that the implementation of one SDG, such as SDG #4, has a great impact on the progression of the other 16 goals.

A recent study reinforced this notion, finding that if a mere 16 percent of secondary school students from high and middle-income nations received education on climate change, there would be a 19 gigaton reduction in CO₂ emissions within the next 3 decades.²⁵

It is essential that the education being provided is as inclusive and equitable as possible. This ensures that all students are equipped with knowledge and opportunities to be successful in our rapidly changing world. A major component of quality education is ensuring that the education students receive is culturally relevant and intersectional. Additionally, global efforts to improve climate change education should afford girls and boys equal educational opportunities. UNESCO reports that investing to improve gender equity in education could reduce CO₂ emissions by over 50 gigatons by 2050.²⁶



²² OECD, “Tackling the Climate Crisis Together” (last visited 2021) online: *OECD* <www.oecd.org/env/cc/>.

²³ The Global Goals, online: <www.globalgoals.org>.

²⁴ The Commonwealth, *A Curriculum Framework for the Sustainable Development Goals* 1st ed (2017) online: <www.20ccem.gov.fj/images/IPF_TAB/12.-Curriculum-Framework-for-the-Sustainable-Development-Goals-First-Edition.pdf>.

²⁵ Eugene C Cordero, Diana Centeno & Anne Marie Todd, “The role of climate change education on individual lifetime carbon emissions” (2020) 15:2 PLoS One 1.

²⁶ Danielle F Lawson et al, “Children can foster climate change concern among their parents” (2019) 9:6 Nature Climate Change 458; Global Education Monitoring Report Team, *Global Education Monitoring Report 2020: Inclusion and education: All means all*, (Paris, France: UNESCO, 2020).

Lastly, the "quality" aspect of "quality education" is of immense importance: scientific literacy alone is not predictive or constitutive of the significant action needed to mitigate the effects of climate change.²⁷

CHARACTERISTICS OF GOOD CLIMATE CHANGE EDUCATION

Covers climate change in a mandatory course

This ensures that all students have the opportunity to become knowledgeable about climate change, and therefore act to combat it.

Is interdisciplinary

Content on climate change should be integrated across all subjects in order to give students a cohesive picture of the issue and potential solutions. Opportunities for teacher education should be provided to assist with this.

Incorporates Indigenous Traditional Knowledge

Many key concepts of sustainability and environmental stewardship are derived from Indigenous environmental philosophies and are complementary to Western scientific knowledge.

Presents high-level mitigation strategies

Merely knowing that climate change is occurring is not predictive of tangible action to combat climate change. Educators should instill concern in students, but avoid making students feel anxious/helpless about it.

Takes a social justice approach

The curriculum should emphasize that environmental issues often impact marginalized communities the hardest, and discuss issues such as environmental racism. Students should be encouraged to advocate for justice.

Emphasizes that climate change is irrefutably occurring

The curriculum should emphasize that the scientific community has reached overwhelming consensus regarding the existence and severity of anthropogenic climate change, and refute misconceptions about climate change.

Is locally and globally relevant

The curriculum should present a global picture of climate change while also discouraging complacency by exploring personally relevant local impacts.

Encourages action and enables skill building

The curriculum should encourage students to take action to combat climate change and provide skill development opportunities and information about emerging careers to prepare students to transition to a green economy.

²⁷ Dan M Kahan et al, "The polarizing impact of science literacy and numeracy on perceived climate change risks" (2012) 2 Nature Climate Change 732.



SPOTLIGHT ON CANADA

In Canada, each province's Ministry or Department of Education is responsible for their own education system, and the federal government does not play a role in curriculum development.²⁸ As a result, the quality and quantity of climate change education differs significantly across the country. However, this also presents an opportunity for climate change to be presented through a locally-relevant lens, such as a focus on the impacts of rising sea levels in the Maritime provinces or melting permafrost in the territories.

In addition to the variability across curricula, disparities in the capacity of educators to deliver information relevant to climate change also exist. Teachers possess a diverse range of educational backgrounds and lived experiences, and therefore have immensely varied knowledge about climate change. As such, opportunities for professional development should be provided to educators across all disciplines in order to ensure that all teachers possess an appropriate level of climate change knowledge. The incorporation of climate change content across disciplines must also be well coordinated. This need is pronounced in Canada. Canadian educators who responded to a national survey conducted by Lakehead University and Learning for a Sustainable Future (LSF) indicated that a lack of professional knowledge on climate change was a major obstacle to integrating climate change content in their teaching. Only 32 percent of teachers felt that they possessed an adequate level of knowledge of climate change.²⁹

Similarly, 46 percent of students reported being concerned about climate change, but felt that their efforts to combat it would not be enough.³⁰ Additionally, Canadian students score lower than the OECD average on taking action for collective wellbeing and sustainable development.³¹

In summer 2021, the FCSS-FESC performed a comparative analysis of the secondary school curriculum documents available online for each province and territory and provided recommendations for improved climate change education. The following section will provide a pan-Canadian overview of existing climate curricula based on our findings, coupled with existing literature on environmental education in Canada.

It should be noted that at the time of publication, many provincial and territorial Ministries and Departments of Education are working on revisions to their curricula, including the creation of new interdisciplinary climate change content that is aligned with our recommendations.

²⁸ Government of Canada, "Education in Canada" (2020), online: <www.canada.ca/en/immigration-refugees-citizenship/services/new-immigrants/new-life-canada/enrol-school.html>.

²⁹ E Field, P Schwartzberg & P Berger, "Canada, Climate Change and Education: Opportunities for Public and Formal Education (Formal Report for Learning for a Sustainable Future)" (2019), online: <lsf-ist.ca/media/National_Report/National_Climate_Change_Education_FINAL.pdf>.

³⁰ *Ibid.*

³¹ OECD, *Programme for International Student Assessment, PISA 2018 Results (Volume VI): Are Students Ready to Thrive in an Interconnected World?*, (Paris: OECD, 2020), online: <www.oecd-ilibrary.org/education/pisa-2018-results-volume-vi_d5f68679-en;jsessionid=g3lc6X5v3l9gVddXnXlPq6qi.ip-10-240-5-50>.

COMMON AREAS FOR IMPROVEMENT

Across the country, there are a number of re-occurring areas for improvement that were encountered throughout our review of the Canadian curricula. Many of these obstacles to effective climate change education can also be observed globally.

1) Lack of emphasis on scientific consensus regarding climate change

Many curriculum documents across the provinces and territories use language that suggests there is a significant lack of consensus within the scientific community surrounding the existence and severity of anthropogenic climate change.³² However, no such debate currently exists, as a recent meta-analysis found that 97 percent of scientists are certain that human activity is the primary cause of climate change.³³ This fact should be explicitly stated within curricula, since while 85 percent of Canadians are certain that climate change is occurring, only 46 percent know that it is primarily due to human activity.³⁴

2) Coverage limited to non-mandatory courses

The courses that cover climate change in the most detail tend to be non-mandatory for graduation. As a result, not all students are afforded the opportunity to learn about climate change, which significantly narrows the capacity of education to promote climate action to its learners.

3) Lack of integration of Indigenous Traditional Knowledge

There is currently a lack of Indigenous Traditional Knowledge and perspectives on climate change within the science curricula. This is problematic, as UNESCO, the Paris Agreement, and the Intergovernmental Panel on Climate Change have officially recognized the importance of utilizing Indigenous Knowledge to combat climate change.³⁵ Many key concepts of sustainability and environmental stewardship are derived from Indigenous environmental philosophies and are complementary to Western scientific knowledge.

4) Lack of interdisciplinary coverage

Cross-nationally, there is a significant lack of content pertinent to climate change in courses outside of the sciences.³⁶ This is problematic, as the issue of climate change is interdisciplinary in nature, and should be presented as such in order to increase

³² Seth Wynes & Kimberly A Nicholas, "Climate science curricula in Canadian secondary schools focus on human warming, not scientific consensus, impacts or solutions" 4:7 (2019) PLoS ONE.

³³ *Ibid.*

³⁴ Field, Schwartzberg & Berger, *supra* note 30.

³⁵ UNESCO, "Climate Change Policy: United Nations Educational, Scientific and Cultural Organization" (2017), online: <<https://web.archive.org/web/20210714231255/www.unesco.org/new/en/natural-sciences/priority-areas/links/science-policy/projects/climate-change-policy/>>.

³⁶ Andrew Bieler et al, "A national overview of climate change education policy: Policy coherence between subnational climate and education policies in Canada (K-12)" (2018) 11:2 J of Education for Sustainable Development 63.

accessibility and give students a cohesive picture of the issue and potential solutions. Additionally, studies have shown that scientific literacy alone is not predictive of action to mitigate climate change.³⁷

5) Failure to present high-level mitigation strategies

When climate change strategies are presented, they should range from low level (recycling, informed consumerism, lowering one’s carbon footprint by walking/taking public transit, etc.) to high-level (environmental justice activism, political reform, etc.). Currently, when strategies are presented in Canadian curricula, they are overwhelmingly low-level, and thus, low impact.³⁸ In contrast, the survey by Lakehead and LSF found that 79 percent of Canadians believe that climate change must be addressed through systemic changes.³⁹

ALBERTA

Strengths

1. Covers climate change

Upon reviewing Alberta’s secondary school science curriculum, Science 10 was found to cover climate change in exceptional detail, with a good focus on natural climatic cycles, biomes, and how human activity is impacting them.⁴⁰



2. Integrates Indigenous Traditional Knowledge

Science 10 includes reflection questions that examine Indigenous environmental philosophies.⁴¹

3. Explores environmental issues through an interdisciplinary lens

Despite not making explicit reference to climate change, Social Studies 10 examines human impacts on the environment, instills values of global citizenship and collective responsibility to the Earth, and examines how environmental issues disproportionately impact marginalized communities, including Indigenous peoples.⁴²

Limitations

³⁷ Kahan, *supra* note 28.

³⁸ Wynes & Nicholas, *supra* note 33.

³⁹ Field, Schwartzberg & Berger, *supra* note 30.

⁴⁰ Alberta Education, “Science 10 Program of studies 2005 (Updated 2014)” (2014), online: <education.alberta.ca/media/3069384/pos_science_10.pdf>.

⁴¹ *Ibid.*

⁴² Alberta Education, “Social Studies Kindergarten to Grade 12” (2005), online: <education.alberta.ca/media/160209/program-of-study-grade-10.pdf>.

1. Coverage of climate change is limited to non-mandatory courses

Science 10 is a non-mandatory course, and the mandatory science courses (Science 20 and 30) do not cover climate change in considerable detail.⁴³ Similarly, Social Studies 10 is not a mandatory course.⁴⁴

2. Lacks coverage of high-level mitigation strategies

A cross-national study of Canadian secondary school science curricula identified that many provinces and territories, including Alberta, fail to include high-level climate change mitigation strategies within the science curriculum.⁴⁵

3. Lacks emphasis that scientists agree that climate change is occurring

Most provinces and territories, including Alberta, fail to emphasize the fact that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁴⁶

BRITISH COLUMBIA

Strengths

1. Covers climate change and mitigation

Within British Columbia's science curriculum, Grade 11 Earth Science and Grade 11 Environmental Science cover climate change, environmental activism, and mitigation strategies in exceptional detail.⁴⁷



2. Integrates Indigenous Traditional Knowledge

The science curriculum exceptionally integrates Indigenous Knowledge and perspectives on natural resources and cycles, including climate change.

3. Explores environmental issues through an interdisciplinary lens

British Columbia's curricula does well with incorporating content on climate change into courses outside of the sciences, including mandatory courses. For example, Grade 10 Social Studies covers considerable content relevant to climate change, including

⁴³ Alberta Education, "Science 20-30: Program of studies 2007 (updated 2014)" (2014), online: <education.alberta.ca/media/3069385/pos_science_20_30.pdf>.

⁴⁴ Alberta Education, "Alberta High School Diploma: Graduation Requirements (English)" (2016) online: <education.alberta.ca/media/3531736/alberta-high-school-diploma-graduation-requirements.pdf>.

⁴⁵ Wynes & Nicholas, *supra* note 33.

⁴⁶ *Ibid.*

⁴⁷ British Columbia Ministry of Education, "Science 11 Earth Sciences [Provincial core curriculum]" (June 2018), online: <curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_11_earth-sciences_elab.pdf>; British Columbia Ministry of Education, "Science 11 Environmental Science [Provincial core curriculum]" (2018), online: <curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_11_environmental-science_elab.pdf>.

environmental activism, Indigenous stakeholders, and national and international environmental policy.⁴⁸

Limitations

1. Coverage of climate change is limited to non-mandatory science courses

Grade 11 Earth Science and Grade 11 Environmental Science are non-mandatory courses,⁴⁹ and mandatory science courses such as Science 10 make very minimal mention of climate change.⁵⁰

2. Should include more cross-disciplinary content on climate change

There is currently no reference to climate change in some non-science courses where it might be appropriate to do so, such as Grade 12 Contemporary Indigenous Studies and Grade 9 Geography.

3. Lacks emphasis that scientists agree that climate change is occurring

Most provinces and territories, including British Columbia, fail to emphasize the fact that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁵¹

MANITOBA

Strengths

1. Covers climate change in a mandatory science course

Science 10, a mandatory course, covers climate change in considerable detail.⁵²

2. Explores environmental issues through an interdisciplinary lens

Manitoba does a good job of taking an interdisciplinary approach when presenting climate change topics. For example, concepts relevant to climate change are included in



⁴⁸ British Columbia Ministry of Education, “Social Studies 10 [Provincial core curriculum]” (2018), online: <curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/social-studies/en_social-studies_10_core_elab.pdf>.

⁴⁹ Government of British Columbia, “Graduation Requirements” (2018), online: <www2.gov.bc.ca/gov/content/education-training/k-12/administration/legislation-policy/public-schools/graduation-requirements>.

⁵⁰ British Columbia Ministry of Education, “Science 10 [Provincial core curriculum]” (2018), online: <curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_10_core_elab.pdf>.

⁵¹ Wynes & Nicholas, *supra* note 33.

⁵² Manitoba Education and Youth, “Senior 2 Science: A Foundation for Implementation” (2003), online: <www.edu.gov.mb.ca/k12/cur/science/found/s2/s2_fulldoc.pdf>.

non-science courses such as Sustainable Tourism 11 and 12,⁵³ as well as in Grade 9 and 10 Social Studies.⁵⁴

3. Emphasizes scientific consensus that climate change is occurring

Manitoba is one of the only provinces and territories to emphasize the overwhelming scientific consensus on climate change within a curriculum document, with the statement “no scientific debate over the nature and degree of global warming due to the enhanced greenhouse effect is ongoing” in the “notes for instruction” of Grade 10 Science.⁵⁵

LIMITATIONS

1. Lacks coverage of high-level mitigation strategies

A cross-national study of Canadian secondary school science curricula identified that many provinces and territories, including Manitoba, fail to include high-level climate change mitigation strategies within the science curriculum.⁵⁶

2. Should integrate more Indigenous Traditional Knowledge

There is relatively minimal coverage of Indigenous Knowledge and perspectives on environmental issues within the science curriculum, save for some areas such as Grade 11 Biology’s coverage of traditional plant medicine.⁵⁷

3. Should include more content on climate justice in non-mandatory courses

Outside of the sciences, Grade 12 Global Issues is the course to cover climate change in the most detail. It takes an interdisciplinary approach, highlighting climate activism and social justice approaches to climate change mitigation.⁵⁸ However, it is non-mandatory.⁵⁹

⁵³ Manitoba Education and Training, “Grades 11 and 12 Sustainable Tourism: Manitoba Curriculum Framework of Outcomes” (2019), online: <www.edu.gov.mb.ca/k12/cur/tourism/docs/full_doc.pdf>.

⁵⁴ Manitoba Education, Citizenship and Youth, “Senior 2 Social Studies: Manitoba Curriculum Framework of Outcomes and a Foundation for Implementation” (2006), online: <www.edu.gov.mb.ca/k12/cur/socstud/frame_found_sr2/s2_full_doc.pdf>; Manitoba Education, Citizenship and Youth, “Grade 9 Social Studies: A Foundation for Implementation” (2007), online: <www.edu.gov.mb.ca/k12/cur/socstud/foundation_gr9/document.pdf>.

⁵⁵ Manitoba Education and Youth, *supra* note 53.

⁵⁶ Wynes & Nicholas, *supra* note 33.

⁵⁷ Manitoba Education, “Grade 11 Biology: A Foundation for Implementation” (2010), online: <www.edu.gov.mb.ca/k12/cur/science/found/gr11_bio/gr11_biology.pdf>.

⁵⁸ Manitoba Education and Training, “Grade 12 Global Issues: Citizenship and Sustainability” (2017), online: <www.edu.gov.mb.ca/k12/cur/socstud/global_issues/full_doc.pdf>.

⁵⁹ Manitoba Education and Training, “Graduation Requirements for the English Program” (2018), online: <www.edu.gov.mb.ca/k12/policy/gradreq/docs/grad_req_en.pdf>.

NEW BRUNSWICK

Strengths

1. Explores environmental issues through an interdisciplinary lens

Concepts of climate change are included in the curriculum across various disciplines, including Social Studies 9, Political Sci 120, and Indigenous Studies 120. Interdisciplinary competencies including global citizenship, sustainability, advocating for equity, and understanding Indigenous Knowledge are also emphasized in New Brunswick's "Portrait of a Learner."⁶⁰



2. Integrates Indigenous Knowledge

Environmental Science 120 integrates considerable Indigenous Traditional Knowledge.⁶¹ Additionally, Indigenous Studies 120 encourages students to reflect on their responsibilities to the land.⁶²

3. Emphasizes scientific consensus that climate change is occurring

The Environmental Science 120 curriculum states that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁶³

Limitations

1. Should include content on climate change, mitigation, and consensus in additional courses

Currently, Environmental Science 120 is the only science course which covers climate change, scientific consensus, Indigenous Traditional Knowledge, and mitigation strategies in considerable detail. There is very minimal content specific to climate change in other science courses, such as Science 9 and 10,⁶⁴ as well as Biology 111-112 and

⁶⁰ New Brunswick Department of Education and Early Childhood Development, "Portrait of a Learner" (2019), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/General/PortraitOfALearner.pdf>.

⁶¹ New Brunswick Department of Education and Early Childhood Development, "Introduction to Environmental Science 120 Curriculum" (2012), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/EnvironmentalScience120.pdf>.

⁶² New Brunswick Department of Education and Early Childhood Development, "Indigenous Studies 120" (2020), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/SocialStudies/IndigenousStudies120.pdf>.

⁶³ New Brunswick Department of Education and Early Childhood Development, 2012, *supra* note 62.

⁶⁴ New Brunswick Department of Education, "Science 9: Ecosystem Dynamics" (2020), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade9.pdf>; New Brunswick Department of Education, "Science 10: Science for Sustainable Communities" (2020), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade10.pdf>.

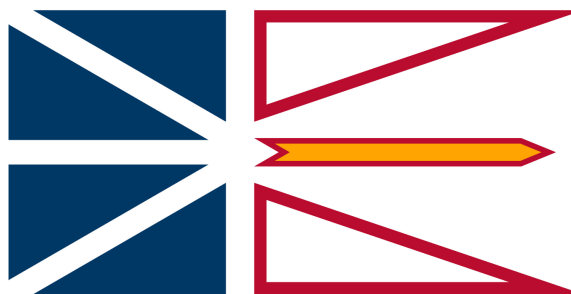
121-122.⁶⁵ As a result, not all students are afforded the opportunity to learn about climate change. Outside of the sciences, there are some courses that cover content relevant to climate change but do not explicitly mention climate change, such as Modern History 112 and Canadian Geography 120.⁶⁶

NEWFOUNDLAND AND LABRADOR

Strengths

1. Covers climate change and mitigation in mandatory science courses

Science 1206 and Science 2200 both cover climate change and mitigation strategies in considerable detail.⁶⁷ 1206 is a mandatory course for students in the Academic stream, and 2200 is mandatory for students in the General stream.⁶⁸



2. Explores locally-relevant impacts

Environmental Science 3205 covers the impacts of climate change on coastal ecosystems.⁶⁹

3. Covers climate change in a non-science course

Social Studies 3201, a course that most students take, covers the social, political and economic dimensions of climate change.⁷⁰

⁶⁵ New Brunswick Department of Education, “Biology 111-112 Curriculum” (2008), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Biology111-112.pdf>; New Brunswick Department of Education, “Biology 121-122 Curriculum” (2008), online: <https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Biology121-122.pdf>

⁶⁶ New Brunswick Department of Education and Early Childhood Development, “Modern History 111-112-113 Curriculum” (2012), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/SocialStudies/ModernHistory111-112-113.pdf>; New Brunswick Department of Education, “Canadian Geography 120: Portraits of the Nation” (1993), online: <www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/SocialStudies/CanadianGeography120.pdf>.

⁶⁷ Newfoundland and Labrador Education, “Science 1206: Curriculum Guide 2018” (2018), online: <www.gov.nl.ca/education/files/k12_curriculum_guides_science_science_1206_curriculum_guide_2018_sept7.pdf>; Newfoundland and Labrador Education, “Science 2200: Curriculum Guide Interim Edition 2004” (2004), online: <www.gov.nl.ca/education/files/k12_curriculum_guides_science_science2200jun04.pdf>.

⁶⁸ Newfoundland and Labrador Education, OnCourse: Handbook for Grade 9 Students and Parents, 14th ed (2022), online: <www.gov.nl.ca/education/files/Fourteenth-Edition-English-2022.pdf>.

⁶⁹ Newfoundland and Labrador Education, “Environmental Science 3205 Draft Curriculum Guide: Unit 5 The Atmosphere And The Environment” (2010), online: <www.gov.nl.ca/education/files/k12_curriculum_guides_science_envsci3205_es3205_unit_5.pdf>.

⁷⁰ Newfoundland and Labrador Education, “Social Studies 3201 Curriculum guide 2020” (2020), online: <www.gov.nl.ca/education/files/Social_Studies_3201_2020_v2.pdf>.

Limitations

1. Should integrate more Indigenous Traditional Knowledge

There is currently very minimal inclusion of Indigenous Traditional Knowledge in courses that cover climate change. However, a 2017 action plan produced by the Premier's Task Force on Improving Educational Outcomes has committed to revising the curriculum to be more inclusive of Indigenous Knowledge and perspectives.⁷¹

2. Should include more cross-disciplinary content on climate change

Social Studies 3201 is the non-science course to most directly cover climate change.⁷² Similar content could be integrated across other courses outside of the sciences to ensure all students are exposed to such material.

3. Lacks emphasis that scientists agree that climate change is occurring

In the Environmental Science 3205 curriculum, climate change is framed as a theory rather than a fact, with the statement: "Not all scientists agree on the science surrounding climate change."⁷³

NOVA SCOTIA

Strengths

1. Explores environmental issues through an interdisciplinary lens

Despite not explicitly referencing climate change, the social, economic and political dimensions of environmental issues are covered in many non-science courses including Law 12, Global Geography 12, and Tourism 11 and 12.⁷⁴



2. Developing a course that covers climate change and mitigation in detail

A new course, Global Environmental Issues 10, is currently being piloted. The course will explore environmental issues, including climate change, through an interdisciplinary lens.

⁷¹ Alice Collins et al, "The Premier's Task Force on Improving Educational Outcomes: Now is the Time" (2017), online: <www.gov.nl.ca/education/files/task_force_report.pdf>.

⁷² Newfoundland and Labrador Education, 2020, *supra* note 71.

⁷³ Newfoundland and Labrador Education, 2010, *supra* note 70.

⁷⁴ Nova Scotia Department of Education and Early Childhood Development, "Law 12" (2009), online: <curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/Law%2012%20Guide%20%282009%29.pdf>; Nova Scotia Department of Education and Early Childhood Development, "Global Geography 12 / Advanced Global Geography outcomes" (2015), online: <curriculum.novascotia.ca/sites/default/files/documents/outcomes-indicators-files/Global%20Geography%2012%20Outcomes%20%282015%29.pdf>; Nova Scotia Department of Education and Early Childhood Development, "Tourism 11" (2000), online: <curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/tourism%2011%20guide%20%282000%29.pdf>; Nova Scotia Department of Education and Early Childhood Development, "Tourism 12" (2007), online: <curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/Tourism%2012%20Guide%20%282007%29.pdf>.

Additionally, it will present mitigation and adaptation strategies and integrate Mi'kmaw teachings about sustainability.

Limitations

1. Lacks emphasis that scientists agree that climate change is occurring

Most provinces and territories, including Nova Scotia, fail to emphasize the fact that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁷⁵

2. Should integrate more Indigenous Traditional Knowledge

There is currently very minimal coverage of Indigenous Traditional Knowledge and perspectives on environmental issues within curriculum documents. However, teachers in Nova Scotia receive support in integrating an Etuaptmuk ("Two-eyed seeing") approach, which emphasizes the complementary nature of Indigenous and Western knowledge systems.

3. Lack of climate change content in the current science curriculum

There is very minimal coverage of climate change within the current curriculum. For example, Science 10, a course that most students will take throughout their academic career, covers weather dynamics and sustainability of ecosystems, but climate change is not mentioned at all; the focus is on short-term natural climatic cycles.⁷⁶

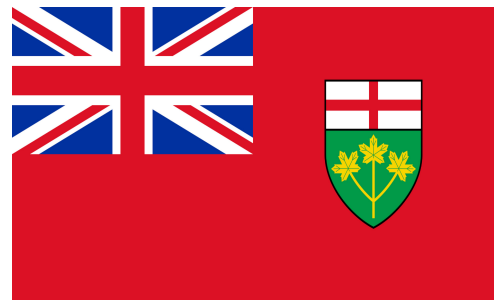
ONTARIO

Strengths

1. Covers climate change in a mandatory science course

Content on climate change is covered in considerable detail in the Earth and Space Sciences strand of Grade 10 Science.⁷⁷

2. Explores environmental issues through an interdisciplinary lens



⁷⁵ Wynes & Nicholas, *supra* note 33.

⁷⁶ Nova Scotia Department of Education and Early Childhood Development, "Sciences: 1re année programme d'études" (2019), online: <curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/Sciences%201%20Guide%20%282019%29.pdf>.

⁷⁷ Ontario, "The Ontario Curriculum, Grades 9 and 10: Science" (2008), online: <www.edu.gov.on.ca/eng/curriculum/secondary/science910_2008.pdf>.

A number of courses in non-scientific disciplines cover significant amounts of content relevant to climate change, including Grade 12 World Issues and Grade 11 Regional Geography.⁷⁸

3. Presents mitigation strategies

Grade 10 Science requires students to critically analyze mitigation strategies that range from international to individual-level.⁷⁹ This encourages both small lifestyle changes and activism for global/national changes.

Limitations

1. Should integrate more Indigenous Traditional Knowledge

There is currently very minimal coverage of Indigenous Knowledge and perspectives on environmental issues, save for a few non-mandatory courses such as Grade 10 First Nations, Métis and Inuit in Canada.⁸⁰

2. Should include more cross-disciplinary content on climate change

The courses that cover climate change in the most detail outside of the sciences are non-mandatory, and climate change is only briefly covered in many mandatory courses outside of the sciences, such as Grade 9 Geography.⁸¹

3. Lacks emphasis that scientists agree that climate change is occurring

Most provinces and territories, including Ontario, fail to emphasize the fact that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁸²

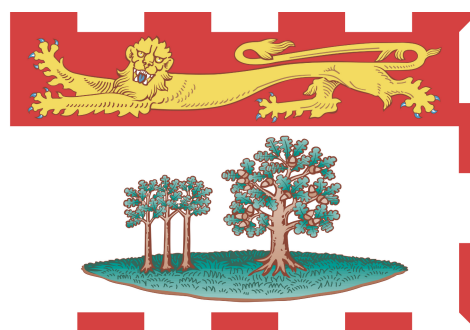
PRINCE EDWARD ISLAND

Strengths

1. Covers climate change

Environmental Science 621A covers climate change and mitigation strategies in considerable detail.⁸³

2. Explores environmental issues through an



⁷⁸ Ontario, “The Ontario Curriculum, Grades 11 and 12: Canadian and World Studies” (2015), online: <www.edu.gov.on.ca/eng/curriculum/secondary/2015cws11and12.pdf>.

⁷⁹ Ontario (2008), *supra* note 77.

⁸⁰ Ontario, “The Ontario Curriculum, Grades 9 to 12: First Nations, Métis, and Inuit Studies” (2019), online: <www.edu.gov.on.ca/eng/curriculum/secondary/First-nations-metis-inuit-studies-grades-9-12.pdf>.

⁸¹ Ontario, “The Ontario Curriculum, Grades 9 and 10: Canadian and World Studies” (2018), online: <www.edu.gov.on.ca/eng/curriculum/secondary/canworld910curr2018.pdf>.

⁸² Wynes & Nicholas, *supra* note 33.

⁸³ Prince Edward Island Education and Early Childhood Development, “Environmental Science 621A” (2011), online: <www.princeedwardisland.ca/sites/default/files/publications/eelc_env621a.pdf>.

interdisciplinary lens

A number of courses in non-scientific disciplines cover significant amounts of content relevant to climate change, including Geography 621A, 631A, and 421A.⁸⁴

Limitations

1. Coverage of climate change is limited to non-mandatory science courses

The only course to cover climate change in considerable detail is Environmental Science 621A, and as a result, not all students are afforded the opportunity to learn about climate change, as only two science credits are required for graduation.⁸⁵

2. Lacks emphasis that scientists agree that climate change is occurring

Some areas of Prince Edward Island's curriculum frame climate change as a theory rather than a fact, with statements such as: "Some scientists believe that climate change is a result of natural changes on Earth, while others blame it on human activity, which can lead to heated debates."⁸⁶

3. Should integrate more Indigenous Traditional Knowledge

There is currently very minimal coverage of Indigenous Knowledge and perspectives on environmental issues in the curriculum, save for one mention of differences in land use patterns between settler Canadians and Indigenous people in Environmental Science 621A.⁸⁷

QUEBEC

Strengths

1. Covers climate change and mitigation strategies

Climate change and mitigation strategies are covered in considerable detail within the Science and Technology and Environmental Science and Technology programs.⁸⁸

⁸⁴ Prince Edward Island Education and Early Childhood Development, "Geography 421A: Geography of Canada" (2011), online: <www.princeedwardisland.ca/sites/default/files/publications/eelc_geo421a.pdf>;

Prince Edward Island Education and Early Childhood Development, "Geography 621A: Global Issues" (2011), online: <www.princeedwardisland.ca/sites/default/files/publications/eelc_geo621a.pdf>; Prince Edward Island Education and Early Childhood Development, "Geography 631A: Global Issues" (2011), online: <www.princeedwardisland.ca/sites/default/files/publications/eelc_geo631a.pdf>.

⁸⁵ Government of Prince Edward Island, "Requirements for High Schools Graduation" (2021), online: <www.princeedwardisland.ca/en/information/education-and-lifelong-learning/requirements-for-high-school-graduation>.

⁸⁶ Prince Edward Island Education and Early Childhood Development, "Geography 421", *supra* note 84.

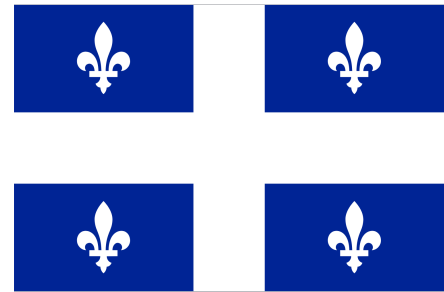
⁸⁷ Prince Edward Island Education and Early Childhood Development, "Environmental Science", *supra* note 83.

⁸⁸ Québec Education Program, "Science and Technology: Cycle Two" (2018), online: <www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_science-technologie-deuxieme-cycle-secondaire_EN.pdf>; Québec Education Program, "Science and Technology (Second Year of Secondary Cycle Two): Environmental Science and Technology" (2018), online: <www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_science-technologie-environnement_EN.pdf>.

2. Explores environmental issues through an interdisciplinary lens

While not making explicit mention of climate change, environmental issues are covered in courses outside of the sciences, such as geography. Additionally, In June 2021, the Ministry of Education published a plan for incorporating themes of sustainable development into education, entitled the “Plan d’accompagnement-conseil du réseau scolaire en matière de développement durable” (PAC). Priorities of the PAC

include the creation of an interdepartmental committee on education for sustainable development and teacher training to implement these themes.⁸⁹



Limitations

1. Lacks emphasis that scientists agree that climate change is occurring

Most provinces and territories, including Quebec, fail to emphasize the fact that scientists have achieved overwhelming consensus regarding the existence and urgency of anthropogenic climate change.⁹⁰

2. Should integrate more Indigenous Traditional Knowledge

There is currently very minimal coverage of Indigenous Traditional Knowledge and perspectives on environmental issues in the curriculum.

3. Lack of climate change content in the applied sciences

Students in Quebec are required to take either Science and Technology or Applied Science and Technology to graduate.⁹¹ However, the Applied stream fails to cover climate change in significant detail.⁹²

⁸⁹ Ministère de l'Éducation, “Plan d’accompagnement-conseil du réseau scolaire en matière de développement durable (2021-2022)” (2021), online: <www.education.gouv.qc.ca/fileadmin/site_web/documents/PSG/politiques_orientations/plan_accompagnement_dd_2021-2022.pdf>.

⁹⁰ Wynes & Nicholas, *supra* note 33.

⁹¹ Ministère de l'Éducation, “Achievement Record” (2020), online: <www.education.gouv.qc.ca/en/students/report-cards-transcripts-diplomas/achievement-record>.

⁹² Québec Education Program, “Applied Science and Technology” (2018), online: <www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_applications-technologiques-scientifiques_EN.pdf>.

SASKATCHEWAN

Strengths

1. Covers climate change in a mandatory science course

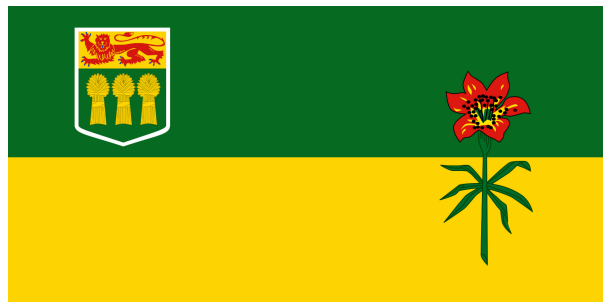
Content on climate change and mitigation strategies is covered in Grade 10 Science, a mandatory course.⁹³

2. Integrates Indigenous Traditional Knowledge

Indigenous Traditional Knowledge is well-integrated across the curriculum, including emphasis on the role of Indigenous Knowledge in mitigating climate change in Environmental Science 20.⁹⁴

3. Emphasizes scientific consensus that climate change is occurring

Saskatchewan is one of the only provinces and territories to emphasize the overwhelming scientific consensus on climate change within a curriculum document, in Environmental Science 20.⁹⁵



Limitations

1. Lacks cross-disciplinary coverage of climate change

There is currently a significant lack of content pertinent to climate change in the curriculum of non-scientific disciplines.

2. Scientific consensus is only mentioned in a non-mandatory course

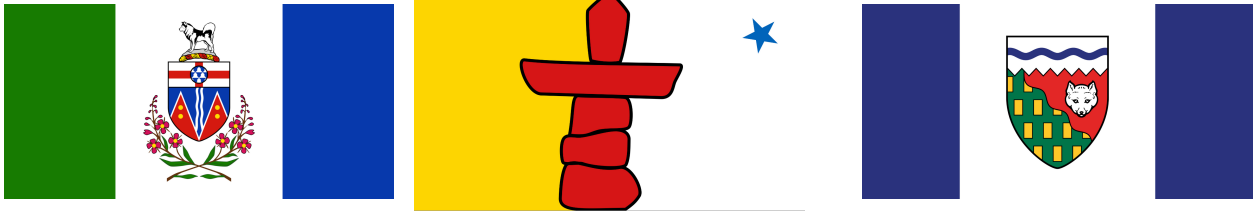
While Saskatchewan's curriculum does mention scientific consensus regarding the existence and severity of anthropogenic climate change, this is only done in a non-mandatory course, Environmental Science 20, and not mentioned in mandatory courses such as Science 10.

⁹³ Saskatchewan Ministry of Education, "Science 10" (2015), online: <<https://tinyurl.com/4f96pn8x>>.

⁹⁴ Saskatchewan Ministry of Education, "Environmental Science 20" (2016), online: <<https://tinyurl.com/kfjt8hks>>.

⁹⁵ *Ibid.*

THE TERRITORIES



The territories use the same curriculum as nearby provinces, with a few notable and locally-relevant exceptions. Specifically, Yukon uses BC's curriculum, and Nunavut and the Northwest Territories use Alberta's curriculum. As such, the strengths and limitations of climate change education in the territories are mostly identical to those of BC and Alberta.

However, the Northwest Territories has developed 2 courses that are directly relevant to climate change: Experiential Science 10 and Northern Studies 10. Northern Studies is mandatory for all students in the Northwest Territories, and while it does not explicitly reference climate change, it introduces students to Creation stories that illustrate humans' relationships and responsibilities to the land.⁹⁶ Experiential Science 10 includes a focus on hands-on learning, and includes first-hand testimonies from Elders in the community who have experienced the effects of climate change within their lifetimes.⁹⁷ The inclusion of this locally relevant and personalized content engages students in active environmental citizenship. Nunavut also uses the Northwest Territories' Experiential Science 10 course, and students in both territories will take either Experiential Science 10 or Alberta's Science 10 course in order to satisfy their requirements for graduation.

While there are many major strengths of these courses, limitations include a lack of content explicitly pertinent to climate change in Northern Studies 10 and language that risks conflating natural climatic processes with human-caused climate change in the Experiential Science 10 curriculum: "students will investigate the natural cyclical nature of climate change."⁹⁸

⁹⁶ Northwest Territories Department of Education, Culture, and Employment, "Northern Studies 10: Northern Homeland" (2015), online: <www.ece.gov.nt.ca/sites/ece/files/resources/northern_studies_10_curriculum.pdf>.

⁹⁷ Northwest Territories Department of Education, Culture, and Employment, "Experiential Science 10-20-30" (2006), online: <www.ece.gov.nt.ca/sites/ece/files/resources/experimental_science_10_-_30.pdf>.

⁹⁸ *Ibid.*

CANADIAN CLIMATE CHANGE CURRICULUM AT A GLANCE

This chart illustrates the extreme variability in which factors are included within climate change curriculum documents across Canada. It should be noted that this chart does not account for variation in the degree to which each province/territory’s curriculum meets each criterion; nor is it intended to rank the efficacy of climate curricula.

	CLIMATE CHANGE IN A MANDATORY COURSE	SCIENTIFIC CONSENSUS	INDIGENOUS TRADITIONAL KNOWLEDGE	MITIGATION STRATEGIES	INTERDISCIPLINARY COVERAGE	GRADE
AB	✗	✗	✓	✗	✓	D
BC	✗	✗	✓	✓	✓	C
MB	✓	✓	✗	✗	✓	C
NB	✗	✗	✓	✓	✓	C
NL	✓	✗	✗	✓	✓	C
NS	✗	✗	✗	✗	✓	F
ON	✓	✗	✗	✓	✓	C
PE	✗	✗	✗	✓	✓	D
QC	✓	✗	✗	✓	✓	C
SK	✓	✓	✓	✓	✗	B
NT	✓	✗	✓	✗	✓	C
NU	✓	✗	✓	✗	✓	C
YT	✗	✗	✓	✓	✓	C

CLIMATE CHANGE EDUCATION ACROSS THE G7 COUNTRIES



The Group of Seven, or G7, is an intergovernmental organization formed in 1975, which consists of seven of the world's most economically advanced countries: Canada, the United States, the United Kingdom, Japan, France, Italy, and Germany.⁹⁹

While representing only ten percent of the world's population, the G7 countries produce nearly a quarter of global CO₂ emissions.¹⁰⁰ Due to this fact, coupled with their status as highly developed nations, G7 countries have immense responsibilities when it comes to climate action.

As signatories of the Paris Agreement, one such responsibility is ensuring that quality climate change education is provided to all students. However, the degree to which these states promote climate change initiatives varies markedly across and within each G7 country.¹⁰¹

UNITED STATES OF AMERICA

Like Canada, climate change curricula in the United States vary from state to state, with each state developing its own curriculum. For example, while New Jersey became the first state to mandate that climate change education



⁹⁹ Council on Foreign Relations, "Where is the G7 Headed?" (Last updated June 14, 2021), online: <www.cfr.org/backgrounder/where-g7-headed>.

¹⁰⁰ Sarah Colenbrander, "Delivering a Successful G7 Summit in the Context of a Climate Emergency" (2021), Online: *ODI* <odi.org/en/insights/delivering-a-successful-g7-summit-in-the-context-of-a-climate-emergency/>.

¹⁰¹ Council on Foreign Relations, *supra* note 99.

be incorporated across every subject in the K-12 curricula in 2020,¹⁰² many states have weaker climate education. As a result of this immense variability, many of the same obstacles to effective climate change education can be noted across both the US and Canada.

A study examining the quality of climate change content in American high school science and social science textbooks found that climate change was only portrayed as human-caused in about half of all textbooks.¹⁰³ Additionally, climate change was not presented as an immediate and locally relevant issue, which results in learners being less likely to understand the breadth of the issue and act to combat it. Coverage of the impacts of climate change was very limited to other areas of the world, namely Arctic regions.¹⁰⁴

Additionally, a survey of American high school teachers found that over one-quarter of teachers presented perspectives that deny the existence of anthropogenic climate change, and gave equal time to these perspectives and scientific data.¹⁰⁵ This was a result of less than half of the teachers being aware of the overwhelming scientific consensus regarding climate change: only one-tenth of teachers had received education specific to climate change, and one-sixth rated their knowledge of climate change as below average.¹⁰⁶

Like the Canadian curricula, one of the main shortcomings of climate change education in the US is a lack of high-level climate change mitigation strategies being presented. 88 percent of teachers report focusing on personal-level actions, with very minimal coverage of higher-level policy-based solutions mentioned.¹⁰⁷ However, two-thirds of teachers report spending considerable time covering career pathways relevant to climate change mitigation, which is integral to ensuring students leave school with the skill set necessary to navigate the emerging low-carbon economy.¹⁰⁸

Next Generation Science Standards present a valuable resource to ensure uniformity in the quality of science education across American states, and similar efforts should be pursued across other countries. Created in 2013, the standards include content on the scientific consensus regarding climate change, mitigation strategies, and intertwined social and political issues.¹⁰⁹ However, the standards have only been officially adopted by

¹⁰² Tonya Mosley, “New Jersey Adopts Climate Change as Part of Core Curriculum in all Public Schools” (2021), online: *wbur* <www.wbur.org/hereandnow/2021/05/07/climate-change-education-nj>.

¹⁰³ Casey R Meehan, Brett LM Levy & Lauren Collet-Gildard, “Global climate change in U.S. high school curricula: Portrayals of the causes, consequences and potential responses” (2018) 102:3 *Science Education* 498.

¹⁰⁴ *Ibid.*

¹⁰⁵ Eric Plutzer et al, “Mixed Messages: How Climate Change is Taught in America’s Public Schools” (2016), online: *National Center for Science Education* <ncse.ngo/files/MixedMessages.pdf>.

¹⁰⁶ *Ibid.*

¹⁰⁷ *Ibid.*

¹⁰⁸ *Ibid.*

¹⁰⁹ National Science Teaching Association, “Matrix of Disciplinary Core Ideas in the Next Generation Science Standards (NGSS) Final Release” (2013), online: <static.nsta.org/ngss/20130509/MatrixOfDisciplinaryCoreIdeasInNGSS-May2013.pdf>.

20 states, comprising 36 percent of students in the country.¹¹⁰ Additionally, there are some areas for improvement within the standards, including a current lack of inclusion of Indigenous Traditional Knowledge.¹¹¹

ITALY

The 2018 Programme for International Student Assessment (PISA) report found that Italy scored lower than the OECD average on taking action for collective wellbeing and sustainable development, along with 3 other G7 countries (Canada, France, and Germany).¹¹² Data was not available for the US and Japan. The only UK data available was for Scotland, which also scored below average.¹¹³



However, in 2019 Italy became the first country in the world to amend education policies to officially make climate change content compulsory. Beginning during the 2020-2021 school year, teachers across all grade levels are required to teach at least 33 hours of content on climate change per academic year.¹¹⁴ The integration of content takes an interdisciplinary approach, with the concept of sustainability being central to all other concepts taught. The curriculum was developed through consultation of environmental experts. Teacher training was provided to assist educators with integrating climate change content into their lessons.¹¹⁵

While there have not been any studies released evaluating the quality of the curriculum

“ I want to make the Italian education system the first education system that puts the environment and society at the core of everything we learn in school. ”
Education Minister Lorenzo Fioramonti, 2019

amendments due to how recently they were implemented, the capacity and willingness of students to take action to combat environmental issues will likely improve as a result of the centralized integration of climate change content.

¹¹⁰ National Science Teaching Association, “About the Next Generation Science Standards” (2021), online: <<https://ngss.nsta.org/About.aspx>>.

¹¹¹ See National Science Teaching Association, “Matrix”, *supra* note 109.

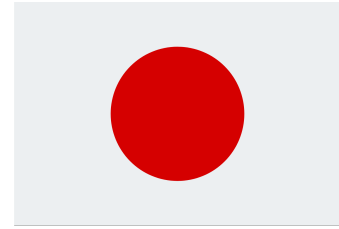
¹¹² OECD, *supra* note 32.

¹¹³ *Ibid.*

¹¹⁴ International Bureau of Education, “Is Italy the First Country to Require Climate Change Education in all Schools?” (26 Aug 2020), online: *UNESCO IBE* <www.ibe.unesco.org/en/news/italy-first-country-require-climate-change-education-all-schools>.

¹¹⁵ *Ibid.*

JAPAN



Environmental issues have been included in Japanese curricula for quite some time. However, the focus tends to be on locally relevant issues such as disaster risk reduction and pollution, rather than explicit climate change education.¹¹⁶ A 2021 study examining the education policy and curriculum documents of 46 UNESCO Member States found that while Japan has mandated environmental education,¹¹⁷ the documents examined contained no explicit focus on climate change, instead focusing broadly on environmental issues and sustainability.¹¹⁸

Environmental issues are primarily learned about within the Life-Environmental Studies program and the Period for Integrated Studies, but concepts of sustainability are included in textbooks across a variety of subjects, including social studies, home economics, and moral education.¹¹⁹ The Period for Integrated Studies (PFIS), introduced in 1998, is designed to allow students to identify and solve problems using an interdisciplinary lens. However, each class is able to choose an issue to focus on, and as such it is not mandatory to examine environmental issues.¹²⁰ Environmental issues are most commonly chosen as a subject for PFIS in UNESCO-associated schools, which arose following Japan's adoption of the UN's National Implementation Plan for the Decade of Education for Sustainable Development in 2005.¹²¹

While education in Japan allows for an interdisciplinary approach to be taken, it has also been criticized for providing a picture of climate change and environmental issues that is relatively surface level. For example, students commonly participate in eco-friendly activities such as recycling and energy conservation for PFIS, but these activities are low-impact.¹²² Studies have also indicated that Japan's curriculum overwhelmingly focuses on individualistic climate change mitigation strategies, as opposed to high level strategies such as climate activism.¹²³ Additionally, while Japanese students are highly knowledgeable about the science behind environmental issues, they lack the skills to translate this awareness into action.¹²⁴

Other obstacles to effective climate change education in Japan include a lack of teacher training and a shortage of time dedicated to environmental education.¹²⁵

¹¹⁶ Toshiya Kodama, "Environmental education in formal education in Japan" (2017) 26:4 Japanese Journal of Environmental Education 21.

¹¹⁷ Earth Day Network, "The State of Global Climate and Environmental Education" (2019), online: <www.earthday.org/wp-content/uploads/2020/07/World-Bank-Environmental-and-Climate-Literacy-Final-Report.pdf>.

¹¹⁸ UNESCO, "Learn For Our Planet", *supra* note 1.

¹¹⁹ Kodama, *supra* note 116.

¹²⁰ *Ibid.*

¹²¹ *Ibid.*

¹²² Imamura Mitsuyuki, "Beyond the limitations of environmental education in Japan" (2017) 11 Educational Studies in Japan: International Yearbook 3.

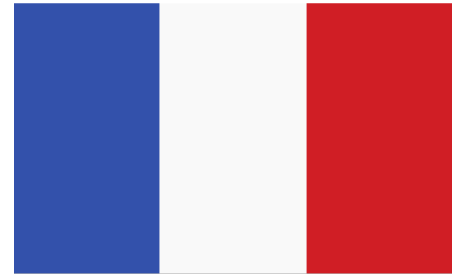
¹²³ Keiko Takahashi et al, "Study on climate change education aimed at fostering regional leaders" (2016) 26:2 Japanese Journal of Environmental Education 29.

¹²⁴ Earth Day Network, *supra* note 117.

¹²⁵ Takahashi, *supra* note 122.

FRANCE

In 2005, France's National Sustainable Development Strategy was developed, which included the integration of an environmental education framework into the curricula and teacher training to assist with its implementation.¹²⁶ Furthermore, France adopted a National Strategy for Biodiversity in 2011 which includes 2 goals relevant to environmental education.¹²⁷



One notable strength of the French secondary education system is its focus on vocational training. For example, in French lycées (schooling that prepares 15-18 year old students for future post-secondary endeavours), students who aspire to work in the agricultural field are taught about relevant environmental issues, including climate change, and how to combat them.¹²⁸

The 2018 PISA report found that, along with Canada, Italy, and Germany, France scored lower than the OECD average on taking action for collective wellbeing and sustainable development.¹²⁹

However, in 2019, the Conseil supérieur des programmes recommended amending the French curricula to integrate content explicitly relevant to climate change across a number of subject areas. These recommendations were implemented in 2020, and highlight humans' role in climate change and the individual and collective attitudes and skills necessary to combat it.¹³⁰

Lastly, beginning in 2019, a student eco-representative from each secondary school class is appointed to raise awareness and promote environmentally conscious behaviours in their community while building leadership skills.¹³¹

GERMANY

Like Canada and the US, there is no universal curriculum used by schools in Germany, and state governments are responsible for education. However, the federal government implemented a set of guidelines in 2007 entitled "Global Development Education: A Cross-Curricular Framework in the Context of Education for Sustainable Development" to

¹²⁶ Global Environmental Education Partnership, "France" (2019), online: *GEEP* <thegeep.org/learn/countries/france>.

¹²⁷ *Ibid.*

¹²⁸ *Ibid.*

¹²⁹ OECD, *supra* note 32.

¹³⁰ European Commission, "France: National Reforms in School Education" (2021), online: <eacea.ec.europa.eu/national-policies/eurydice/content/national-reforms-school-education-23_en>.

¹³¹ Ministère de l'Éducation Nationale, "A school at the forefront of ecological transition" (2020), online: <www.education.gouv.fr/school-forefront-ecological-transition-8288>.

teach concepts of environmental sustainability across all German schools.¹³²

While environmental issues and sustainability have existed within the German curricula for some time, climate change education in Germany faces many of the same obstacles to tangible climate action as other countries. Namely, there is room for improvement in students' capacity to respond to climate change and associated issues.



The 2018 PISA report results found that German students were very knowledgeable about socioeconomic aspects of climate change, but less knowledgeable than the OECD average regarding the contribution of greenhouse gases to climate change.¹³³ Additionally, German students scored lower than the OECD average on taking action for collective wellbeing and sustainable development.¹³⁴

Studies examining the gaps in German students' attitudes and competencies with regards to climate action found that a more holistic approach to climate change education is needed to promote action. Lesson plans that engaged students in collective problem solving and incorporated both scientific and social dimensions were found to be the most predictive of the attitude shifts necessary for changes in behaviour.¹³⁵ Additionally, German teachers have reported a desire for professional development opportunities pertinent to climate change education.¹³⁶

However, progress is being made, with 2021 marking the creation of the Berlin Declaration on Education for Sustainable Development, which was produced by UNESCO in partnership with Germany's Federal Ministry of Education and Research.¹³⁷ The Declaration aims to make climate change education a core element of the curricula across all grade levels and subjects, and will present the issue through an interdisciplinary lens that centres social justice and engages students in proactive problem solving and skill building. The Declaration also includes a commitment to providing professional development for teachers.

¹³² Dieter Appelt & Hannes Siege, "Global Development Education: A Cross-Curricular Framework in the Context of Education for Sustainable Development" (2007) online: *Federal Republic of Germany* <www.schools-at-university.eu/project/conceptual_background/cross_curricular_framework.pdf>.

¹³³ OECD, *supra* note 32.

¹³⁴ *Ibid.*

¹³⁵ Timo Feierabend & Ingo Eilks, "Raising students' perception of the relevance of science teaching and promoting communication and evaluation capabilities using authentic and controversial socio-scientific issues in the Framework of climate change" (2010) 21:3 *Science Education International* 176.

¹³⁶ Julius Grund & Antje Brock, "Education for sustainable development in Germany: Not just desired but also effective for transformative action" (2020) 12:7 *Sustainability* 2838.

¹³⁷ UNESCO, "Berlin Declaration on Education for Sustainable Development" (2021), Online: <en.unesco.org/sites/default/files/esdfor2030-berlin-declaration-en.pdf>.

UNITED KINGDOM



Within the UK's National Curriculum, science and geography are the only subjects to cover climate change in considerable detail.¹³⁸ As such, students are not receiving education that is reflective of the social and political dimensions of climate change. A 2019 survey by Teach the Future, a youth-led campaign for climate action in the UK, found that only four percent of secondary students reported being knowledgeable about climate change, and students felt that they did not know how to translate scientific knowledge into action.¹³⁹ Additionally, climate change education in the UK rarely covers topics of activism or environmental career opportunities.¹⁴⁰

While the National Curriculum does include considerable content on the scientific basis for climate change, including content on how Earth's atmosphere has changed over time and how CO₂ emitted by industrial activities drives global warming, it also implies a lack of scientific consensus regarding climate change, presenting "evidence and uncertainties in evidence for anthropogenic causes of climate change."¹⁴¹ Additionally, there are areas where climate change content could be integrated, such as in history, which covers the Industrial Revolution and colonization of the Americas: both of which are causal factors of climate change.¹⁴²

UK teachers also feel that they lack the capacity to integrate climate change content into their lessons, and many do not understand the value of covering climate change across all subject matters. 70 percent of educators who responded to the Teach the Future survey had not received adequate training on climate change topics, and only five percent felt that topics of climate change were applicable across a wide range of subjects.¹⁴³

These gaps have not gone unnoticed by students in the UK. The Teach the Future campaign is currently pushing for the enactment of the English Climate Emergency Education Bill, the first ever education bill written by students. Goals of the bill include training educators, quelling students' eco-anxiety, increased outdoor education and vocational training, funding for climate activism initiatives, and retrofitting schools to achieve net zero emissions by 2030.¹⁴⁴

¹³⁸ Teach the Future, "Teaching the Future: Research With UK Teachers on the Current State and Future of Climate Education" (2021) online: <www.teachthefuture.uk/research>.

¹³⁹ *Ibid.*

¹⁴⁰ *Ibid.*

¹⁴¹ Department for Education, "National Curriculum in England: Science Programmes of Study" (2015) online: <www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study>.

¹⁴² Department for Education, "National Curriculum in England: History Programmes of Study" (2013) online: <www.gov.uk/government/publications/national-curriculum-in-england-history-programmes-of-study/national-curriculum-in-england-history-programmes-of-study>.

¹⁴³ Teach the Future, *supra* note 138.

¹⁴⁴ Joe Brindle, "What is the Climate Emergency Education Bill?" (20 Jul 2020), online: *Teach the Future* <www.teachthefuture.uk/blog/what-is-the-climate-emergency-education-bill>.

REGIONAL TRENDS IN CLIMATE CHANGE EDUCATION



NORDIC COUNTRIES

The 2021 Climate Change Performance Index report evaluates 57 countries as well as the EU on their progress and performance with regards to combating climate change and achieving the goals of the Paris Agreement.¹⁴⁵ The four dimensions evaluated are greenhouse gas emissions, renewable energy, energy use, and climate policy. While it should be noted that no countries performed well enough to receive the top three spots, on average, Canada and the United States performed among the worst while the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) performed among the best.¹⁴⁶

The success of the Nordic countries with regards to sustainable development is largely due to their strict and specific climate policies, use of innovative sustainable technology, and collaboration with each other. Additionally, the Nordic countries have a long history of including concepts of sustainability in the curriculum across many subjects and grade levels.¹⁴⁷

Generally, sustainability and/or sustainable development is a core pillar of the curricula in Denmark, Finland, Iceland, Norway, and Sweden, and is presented in a way that is holistic and well-aligned with the UN SDG 4.7.¹⁴⁸ This includes a focus on human rights, gender equality, and instilling values of environmental stewardship and collaborative efforts to live sustainably. Students are encouraged to actively participate in the creation and implementation of solutions to global and locally-relevant environmental issues.¹⁴⁹

¹⁴⁵ Climate Change Performance Index, “Results: Climate Mitigation Efforts of 57 Countries Plus the EU” (2021), online: *Germanwatch, NewClimate Institute & Climate Action Network* <ccpi.org/wp-content/uploads/Climate-change-performance-index-2021.pdf>.

¹⁴⁶ *Ibid.*

¹⁴⁷ Nordic Council of Ministers, “Mapping Education for Sustainability in the Nordic Countries” (2021) online: <pub.norden.org/temanord2021-511/#>.

¹⁴⁸ *Ibid.*

¹⁴⁹ *Ibid.*

SMALL ISLAND DEVELOPING STATES (SIDS)



Small Island Developing States (SIDS) are a group of 52 small developing countries, 38 of which are UN Member States, and 25 of which are Commonwealth countries.¹⁵⁰ SIDS are particularly vulnerable to the effects of climate change due to their small size, lack of economic resources to combat climate change, and dependence on natural resources. Rising sea levels are a major threat to these nations, putting some islands at risk of being completely submerged underwater in the near future.¹⁵¹

SIDS are an example of nations that contribute the least to activities that drive climate change but are disproportionately impacted.¹⁵² As such, developed countries that are responsible for large quantities of GHG emissions and/or possess the financial resources to do so should commit to supporting climate change mitigation and adaptation efforts in SIDS.

Citizens of SIDS are highly aware of climate change. However, they often lack accurate knowledge of the scientific processes responsible, and as a result are not prepared to combat climate change.¹⁵³ As such, education initiatives relevant to climate change and sustainable development should be prioritized by intergovernmental organizations assisting SIDS.

Such initiatives have been found to be extremely successful in the past, such as the UN's Climate Change Education for Sustainable Development (CCESD) program, which took place between 2012 and 2013 and included work in Tuvalu, Guyana, Mauritius, and the

¹⁵⁰ The Commonwealth, "Commonwealth Urges International Organisations to Integrate Efforts at UN Forum" (30 Jul 2019), online: <thecommonwealth.org/media/news/commonwealth-urges-international-organisations-integrate-efforts-un-forum>.

¹⁵¹ Leila Mead, "Small Islands, Large Oceans: Voices on the Frontlines of Climate Change" (29 Mar 2021), online: *IISD* <www.iisd.org/articles/small-islands-large-oceans-voices-frontlines-climate-change>.

¹⁵² *Ibid.*

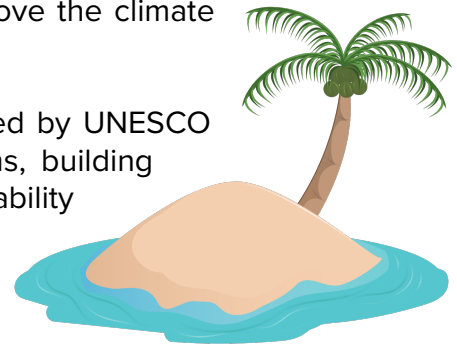
¹⁵³ Adelle Thomas et al, "Climate change and Small Island Developing States" (2020) 45 Annual Review of Environment and Resources 1.

Dominican Republic.¹⁵⁴ CCESD efforts in Mauritius and the Dominican Republic saw a substantial increase in the number of teachers who integrated concepts related to climate change and its mitigation into their lessons. This was achieved through the development of partnerships with national institutes responsible for teacher training.¹⁵⁵ Additionally, their efforts in Tuvalu and Guyana included the development of curricula that integrate concepts of climate change and sustainable development.¹⁵⁶

There are also a number of exemplary collaborative climate change education initiatives taking place in SIDS in the Pacific Islands region. The Pacific Islands Climate Education Partnership (PCEP) works to enable a collaborative response to climate change across the Pacific islands.¹⁵⁷ PCEP has developed an interdisciplinary framework for climate change education and aided in the development of curricula that integrates Traditional Ecological Knowledge.¹⁵⁸

Additionally, the Coping with Climate Change in the Pacific Islands Region (CCCPIR) programme by the German Agency for International Cooperation works to improve the ability of education ministries to develop and deliver education relevant to climate change adaptation across Fiji, Kiribati, Samoa, Tonga, and Vanuatu.¹⁵⁹ In partnership with the Secretariat of the Pacific Community, the CCCPIR produced a series of documents called “Learning about climate change the Pacific way”, which provide resources for primary and secondary teachers to integrate content on climate change across the curriculum in a locally-relevant, hands-on fashion that incorporates Indigenous Traditional Knowledge systems.¹⁶⁰ Additionally, the CCCPIR has also played a role in including emphasis on gender equality in efforts to improve the climate change resilience of the Pacific islands.¹⁶¹

Lastly, Sandwatch is an educational programme supported by UNESCO which engages students in caring for beach ecosystems, building climate change adaptation skills and attitudes of sustainability in the process.¹⁶² Many SIDS participate in Sandwatch.



¹⁵⁴ UNESCO, “Not Just Hot Air: Putting Climate Change Education Into Practice” (2015), online: <www.unclearn.org/wp-content/uploads/library/unesco01_0.pdf>.

¹⁵⁵ *Ibid.*

¹⁵⁶ *Ibid.*

¹⁵⁷ UNESCO, “Climate Change Education for Sustainable Development in Small Island Developing States: Report and Recommendations” (2012), online: <unesdoc.unesco.org/ark:/48223/pf0000216473>.

¹⁵⁸ *Ibid.*

¹⁵⁹ Sue Vize, “Using education to bring climate change adaptation to Pacific communities” (2012) 6:2 *Journal of Education for Sustainable Development* (UNESCO Special Section on the ESD Response to the Three Rio Conventions) 219.

¹⁶⁰ OCHA, “Learning About Climate Change the Pacific Way” (2014), online: <reliefweb.int/report/world/learning-about-climate-change-pacific-way>.

¹⁶¹ CCCPIR (Vanuatu Programme), “Annual Report: Coping With Climate Change in the Pacific Island Region” (2016), online: <reliefweb.int/sites/reliefweb.int/files/resources/SPC%20GIZ%20CCCPIR%202016%20Annual%20Report.pdf>.

¹⁶² UNESCO, “Sandwatch: Adapting to Climate Change and Educating for Sustainable Development” (2014), online: <en.unesco.org/sids/sandwatch>.

EAST AFRICA

Africa is the continent that is projected to be the most severely impacted by climate change, with Sub-Saharan Africa being the most vulnerable region.¹⁶³ Climate change has already exacerbated issues of poverty, food and water insecurity, and water and vector-borne diseases across Africa.¹⁶⁴ In East Africa, a region of Sub-Saharan Africa, the livelihood of 80 percent of the population is dependent on agriculture, a sector that is incredibly vulnerable to climatic changes.¹⁶⁵ Additionally, the two countries most impacted by climate change in 2019, Mozambique and Zimbabwe, are located in East Africa.¹⁶⁶ As such, quality education is integral to mitigating and adapting to the impacts of climate change in Africa.

A 2021 review of curriculum documents across East African countries found that despite widespread efforts to integrate climate change content into the curriculum, there is still a lack of content on mitigation and adaptation strategies that students can use to translate into climate action.¹⁶⁷ In Kenya, the general population reported being concerned about the impacts of climate change but lacked knowledge on the causes of climate change and how to combat it.¹⁶⁸ A similar study examining Tanzanian secondary school students' knowledge on climate change had similar findings. Students had adequate knowledge on the impacts of climate change and some knowledge on lower-level mitigation strategies, but limited knowledge about the anthropogenic causes of climate change.¹⁶⁹ Interestingly, however, the students were very eager to learn more about climate change, and adamantly felt that it was not too late to combat climate change. This is in contrast to students in Western countries who are more pessimistic about the possibility of halting climate change, which in turn limits climate action.¹⁷⁰

Additionally, East African curricula generally lacks coverage of the locally relevant challenges posed by climate change, such as how climate change displaces people and creates conflict over land.¹⁷¹ Furthermore, the curriculum centres Western knowledge due to the area's history of colonization, to the exclusion of locally-relevant Indigenous Traditional Knowledge. Farmers in East Africa are heavily reliant on Indigenous

¹⁶³ Claudia ten Have, "Africa and Climate Change" (2008), online: *United Nations University* <ourworld.unu.edu/en/africa-and-climate-change>.

¹⁶⁴ World Meteorological Organization, *State of the Climate in Africa 2019*, (Geneva, Switzerland: World Meteorological Organization, 2020) online: <library.wmo.int/doc_num.php?explnum_id=10421>.

¹⁶⁵ Abigael Apollo & Marcellus Forh Mbah, "Challenges and Opportunities for Climate Change Education (CCE) in East Africa: A Critical Review" (2021) 9:6 *Climate* 93.

¹⁶⁶ David Eckstein, Vera Künzel & Laura Schäfer, *Global Climate Risk Index 2021: Who suffers most from extreme weather events? Weather-related loss events in 2019 and 2000-2019* (Bonn, Germany: Germanwatch, 2021) online: <germanwatch.org/sites/default/files/Global%20Climate%20Risk%20Index%202021_2.pdf>.

¹⁶⁷ Apollo & Mbah, *supra* note 165.

¹⁶⁸ *Ibid.*

¹⁶⁹ Paul Carr, CJ Buggy & g McGlynn, "Climate Change Awareness Amongst Secondary Level Students in a Dar es Salaam University College of Education (DUCE) Affiliated School in Urban Tanzania: Proceedings from the ICSD 2015" (2015), online: <researchrepository.ucd.ie/bitstream/10197/7397/1/Paul_Carr_-_Final_Paper_-_Climate_change_awareness_%26_education_in_Dar_es_Salaam%2c_Tanzania.pdf>.

¹⁷⁰ *Ibid.*

¹⁷¹ Apollo & Mbah, *supra* note 165.

Knowledge to monitor and account for climatic variation, and as such, Indigenous Knowledge systems hold invaluable climate change mitigation and adaptation strategies.¹⁷²

While many countries across East Africa have climate change policies, they generally overlook the potential of education to combat climate change. One notable exception to this is Rwanda, which has an Environmental Education for Sustainable Development strategy that integrates sustainability content in K-12 curricula.¹⁷³ In comparison to other Sub-Saharan African countries, Rwanda includes considerably more content specific to climate change in their curriculum.¹⁷⁴

Lastly, East African teachers reported being unsure about how to cover climate change, and which aspects should be prioritized.¹⁷⁵ This points to a need for professional development opportunities for educators, improved education policy, and amendments to curricula to integrate interdisciplinary and locally relevant content on climate change mitigation and adaptation.

African education policies should also take care not to overlook the importance of achieving gender equity in education, as Sub-Saharan African countries constitute nine of the ten countries in which it is the most difficult for girls to receive an education.¹⁷⁶



¹⁷² *Ibid.*

¹⁷³ *Ibid.*

¹⁷⁴ UNESCO, “Learn For Our Planet”, *supra* note 1.

¹⁷⁵ Apollo & Mbah, *supra* note 165.

¹⁷⁶ Jasmine Owen, “Girls’ Education: Facts and How to Help” (2021), online: *World Vision* <www.worldvision.ca/stories/education/girls-education-facts-and-how-to-help>.

THE WAY FORWARD

Despite immense variability within the presence, form, and content of climate change education globally, a number of common areas for improvement exist. A 2021 study examining the education policy and curriculum documents across 46 UNESCO Member States found that while 92 percent of documents examined contained mentions of environmental themes, over half did not contain any mention of climate change.¹⁷⁷

Of the documents that did, they were predominantly science curriculum documents and thus were largely focused on scientific literacy. They neglected socio-emotional aspects and the development of skills necessary for climate action.¹⁷⁸ Additionally, over a third of teachers reported that environmental themes were not introduced at all within their teacher training.¹⁷⁹

In general, curriculum documents made the most references to climate change across Sub-Saharan African countries, followed by North American and European countries, then Latin American and Caribbean countries.¹⁸⁰ The fewest references to climate change were found in North African and West Asian curriculum documents.¹⁸¹

UNESCO's concluding recommendations for global climate education include further cross-curricular integration of climate change topics, Indigenous Traditional Knowledge, and skill building for climate action.¹⁸² Additionally, increased national and international collaboration for climate change education was cited as a way to reduce obstacles to widespread climate action.¹⁸³

While there are several universal areas for improvement, the ways in which climate change uniquely impacts different geographic areas and demographics should not be overlooked, and climate change education initiatives should be appropriately tailored to local contexts. Studies have shown that while education is the number one predictor of climate change awareness, the factors that predict support for climate action vary markedly across the world.¹⁸⁴

For example, knowing that human activity is the primary cause of climate change is the largest predictor of climate action in Europe and Latin America, but personally perceiving local temperature changes associated with climate change is the most predictive of action in Asian and African developing countries, due to these countries being among the most impacted.¹⁸⁵

¹⁷⁷ UNESCO, "Learn For Our Planet", *supra* note 1.

¹⁷⁸ *Ibid* at 26.

¹⁷⁹ *Ibid* at 27.

¹⁸⁰ *Ibid* at 25.

¹⁸¹ *Ibid*.

¹⁸² *Ibid* at 37–38.

¹⁸³ *Ibid* at 38.

¹⁸⁴ Lee et al, *supra* note 6.

¹⁸⁵ *Ibid*.

Additionally, social inequities that present barriers to educational attainment must be addressed through international effort in order to achieve the Sustainable Development Goal of inclusive and equitable quality education for all. For example, economic disparities limit the educational attainment of students who live in developing countries and/or belong to marginalized groups, as they often cannot afford school supplies or transportation, and schools are unable to provide resources or adequate pay for teachers.

This issue is especially pronounced for girls, as schools may not have access to running water or menstrual products.¹⁸⁶ Girls in low-income families may also be required to remain at home and assist their families with domestic endeavours. Additionally, girls' education is disproportionately impacted in countries facing conflict and in areas where the incidence of gender-based violence is high.¹⁸⁷ A current initiative of the Brookings Institution, the Gender-Equal Green Learning Agenda, provides a framework for global leaders to address gender inequities in education and harness girls' education to combat climate change.¹⁸⁸ The Malala Fund, a non-profit organization advocating for girls' education worldwide, has called for commitments to the goals of the Gender Equal Green Learning Agenda at COP 26.¹⁸⁹

Systemic barriers to educational attainment are also present in developed nations, including Canada. For example, while 92 percent of non-Indigenous youth in Canada complete high school, this number drops to 75 percent for Indigenous youth, and 46 percent for Indigenous youth who receive their education on-reserve.¹⁹⁰ These disparities can largely be attributed to systemic racism, education systems that prioritize Western knowledge over Indigenous ways of knowing, and poor allocation of resources to schools on reserves. There are a number of initiatives to reduce systemic barriers to educational attainment for Indigenous youth, including the Aboriginal Head Start program, a nationally-funded culturally relevant early childhood education program that has proven to substantially improve the academic development of Indigenous children.¹⁹¹ Additionally, a number of universities across Canada provide Indigenous Teacher Education Programs, which serve to increase the number of Indigenous educators and incorporation of Indigenous Traditional Knowledge into classrooms across the country. However, more is needed to afford Indigenous students the same educational opportunities as their non-Indigenous peers, including fully enacting the Truth and Reconciliation Commission's 94 calls for action, including number 62 through 65, which call for improved Indigenous education.¹⁹²

¹⁸⁶ The Malala Fund, "A Greener, Fairer Future: Why Leaders Need to Invest in Climate and Girls' Education" (Mar 2021), online: <assets.ctfassets.net/0oan5gk9rgbh/OFgutQPKIFoi5lfY2iwFC/6b2fffd2c893ebdebee60f93be814299/MalalaFund_GirlsEducation_ClimateReport.pdf>.

¹⁸⁷ *Ibid.*

¹⁸⁸ *Ibid.*

¹⁸⁹ *Ibid.*

¹⁹⁰ Gina Starblanket, David Long & Olive Patricia Dickason, *Visions of the Heart: Issues Involving Indigenous Peoples in Canada* 5th ed (Oxford University Press Canada, 2019).

¹⁹¹ *Ibid.*

¹⁹² *Ibid.*

As an incredibly urgent issue that knows no geographical boundaries, immediate international cooperation is needed to combat climate change. Global parties further committed to climate action at the UN Climate Change Conference (COP26), held from 31 October to 12 November 2021.¹⁹³ The signing of the Glasgow Climate Pact reiterated that extensive and collaborative action must be taken immediately to limit warming to 1.5°C.¹⁹⁴ Additionally, the IPCC’s 6th report, released in 2022, highlights the importance of increasing education to achieve multiple climate goals.¹⁹⁵ Globally, movement towards climate policy action is largely dependent on the support of the public, which in turn is dependent on the accessibility of educational information pertinent to climate change. As such, improved climate education should be recognized as a global priority if tangible action towards climate targets is to be made.



¹⁹³ UNFCCC, “The Glasgow Climate Pact – Key Outcomes from COP26” online: [UNFCCC <unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26>](https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26).

¹⁹⁴ *Ibid.*

¹⁹⁵ IPCC, “Climate change 2022: Impacts, Adaptation and Vulnerability” online: [IPCC <www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_FullReport.pdf>](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_FullReport.pdf).

RESOURCES FOR CONTINUED LEARNING

As a rapidly-evolving issue, it is integral that we as global citizens continue to educate ourselves on climate change as scientific findings continue to be released and as progress towards national and international climate targets occurs. Here are a series of resources you may be interested in for continued learning and climate action:

ORGANIZATIONS

Learning for a Sustainable Future

Learning for a Sustainable Future is a Canadian organization that works alongside the education system to improve sustainability education across the country. Professional development resources and opportunities for educators are available through LSF's Resources for Rethinking project. LSF's website, climatelearning.ca, provides subject guides to incorporate climate change content and foster critical inquiry across various subjects and grades.

EcoSchools

EcoSchools is a Canadian organization that fosters sustainable school communities, engages students in activities, and builds skills to combat environmental issues. It offers an environmental certification program for schools from K-12.

Indigenous Climate Hub

The Indigenous Climate Hub is a Canadian Indigenous-led project for First Nations, Inuit, and Métis climate leaders to share their knowledge and experience. Their website provides information on climate change and its impacts on Indigenous communities, Indigenous led climate activism movements, and how

Indigenous Traditional Knowledge can be harnessed to mitigate and adapt to climate change.

Greenlearning.ca

The Green Learning website provides an online collection of learning resources designed by teachers to engage Canadian youth in environmental action.

Climate Action Network Canada

The Climate Action Network is a coalition of over one hundred Canadian organizations working towards climate justice.

Sustainable Youth Canada

Sustainable Youth Canada is a youth-led organization that aims to create a united, nationwide community of youth taking action for sustainable development. Its regional affiliates engage students on local issues while connecting members to its Canada-wide network.

The Canadian Youth Biodiversity Network

The Canadian Youth Biodiversity Network is a project of the Canadian Environment Network that amplifies the voices of Canadian youth who are concerned about biodiversity conservation.

RESOURCES AND READING

[Climateatlas.ca](https://climateatlas.ca)

The Climate Atlas of Canada provides interactive, science-based tools and videos to learn about climate change in Canada. The Climate Atlas map integrates climate change visualization, highlights Indigenous knowledge, and showcases ongoing projects to inspire climate action.

[Greenpeace Anti-Racism Toolkit for Environmentalists](#)

This toolkit by Greenpeace provides resources for Canadian environmentalists to learn about systemic racism in Canada, its connections to the environment, and to engage in active anti-racism and BIPOC allyship.

[Ecoanxious.ca](https://ecoanxious.ca)

Eco-anxious Stories is a project created to respond to increasing anxiety surrounding the climate crisis. Their website provides resources to combat eco-anxiety and acts as a platform for people who care for the environment to support each other and work towards climate action.

[Tropicsu.org](https://tropicsu.org)

TROP ICSU is a project working towards cross-curricular integration of climate change education worldwide. Their website provides lesson plans and teaching tools.

[Resource Guide to Community Climate Action for Youth](#)

This resource guide by The Community Climate Council and the Youth Council Coalition of Canada provides guidance to Canadian youth on how to become

engaged in climate activism in their communities.

[Native-land.ca](https://native-land.ca)

This interactive map enables Canadians to identify the Indigenous lands that they reside on. Consider taking the opportunity to learn the name of where you live in an Indigenous language, learn about the history of Indigenous communities in your area, and take responsibility to care for the land.

[A Greener, Fairer Future: Why Leaders Need to Invest in Climate and Girls' Education](#)

This report by the Malala Fund explains the importance of achieving global gender equity in education and how girls' education is inextricably tied to climate change mitigation and adaptation.

[Existentialtoolkit.com](https://existentialtoolkit.com)

The Existential Toolkit is an online collection of resources for climate justice education and resiliency.

[A Curriculum Framework for the Sustainable Development Goals](#)

This report by the Commonwealth introduces the Sustainable Development Goals and provides a framework for education that allows the Goals to be met.

[The ENRICH Project](#)

The ENRICH Project investigates and educates citizens on environmental racism in Mi'kmaq and African Nova Scotian communities.

