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Climate Change Learning & Action in Ontario's Certified EcoSchools

Table of Contents

Acknowledgements	i
Executive Summary	ii
1.0 Introduction	
1.1 Climate change: a matter for education	01
1.2 Ontario EcoSchools and the Climate Change Leadership project	02
2.0 Methodology	03
3.0 Activities and Findings	
3.1 The theme year at a glance	03
3.2 Building leadership capacity for climate change learning and action	04
3.3 Engaging whole school communities in climate change learning	07
3.4 Taking action on climate change within and beyond school walls	09
4.0 Conclusions and Recommendations	11
5.0 Endnotes	12
6.0 References	15
Appendix 1 Climate Leadership Project – Performance Indicators, Targets, and Results	16

Acknowledgements

Author

Hayley Goodchild
Josh Padolsky
Tania Cheng

Editors and contributors

Theresa Ramirez
Sarah Bradley
Elanor Waslander
Monika Kilic

Design and Layout

Kirushanth Sriranjjan
Melissa Benner

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EcoSchools Canada is a registered charity that aims to nurture environmental leadership, reduce the ecological impact of schools, and build environmentally responsible school communities. EcoSchools Canada administers the Ontario EcoSchools program.

Charitable No. 72582 7729 RR0001

720 Bathurst Street, Toronto, ON M5S 2R4
info@ontarioecoschools.org or 416-642-5774
www.ontarioecoschools.org

About this report

This report summarizes and evaluates the findings from the Climate Leadership project conducted by Ontario EcoSchools during the 2016-17 academic year and is funded, or funded in part, by proceeds from the Government of Ontario's carbon market, as part of Ontario's Climate Change Action Plan. The action plan and carbon market work together to support innovative initiatives that provide residents and businesses with more choices to reduce greenhouse gas pollution and save money.

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Executive Summary

This report marks the end of a multiyear Climate Leadership project carried out by Ontario EcoSchools and funded by the provincial Ministry of the Environment and Climate Change (MOECC). The goals of the project were to provide baseline information on climate change learning and action currently practiced at certified EcoSchools in Ontario, and increase climate awareness and leadership capacity amongst educators and students by designating July 2016–June 2017 a climate change ‘theme year.’

This report finds that the Ontario EcoSchools program is well-positioned to facilitate the integration of climate change learning and action throughout school communities. Results from the theme year show that climate change education (CCE) is happening at all grade levels and in a variety of subject areas at certified EcoSchools. Moreover, EcoTeams organized hundreds of school wide campaigns and activi-

ties to increase climate change learning and action. Schools reported impacts on awareness, EcoTeam participation, and school performance on energy and waste indicators. Surveyed teachers reported that Ontario EcoSchools’ workshops and resources improved their capacity to understand and teach climate change material. They also identified barriers to accessing resources and increasing climate change learning and action at their schools, such as lack of time and the challenge of incorporating extra material into an already demanding curriculum.

Where to go from here? This report makes six recommendations for moving forward on CCE:

Recommendations

1. That the provincial **Ministry of Environment and Climate Change** continue to fund programs and partner with organizations that use CCE as a tool to help Ontarians adopt low-carbon everyday behaviours - a strategy identified in *Ontario’s Five Year Climate Change Action Plan, 2016-2020*.
2. That the provincial **Ministry of Education and Ministry of Environment and Climate Change** collaborate to embed climate change material more explicitly into the existing curriculum, particularly in the primary division and in subjects beyond science and technology.
3. That **Ontario EcoSchools** revises its certification program to make climate change learning and action a key priority, either by establishing a new program section or by adapting existing sections and questions to include climate change-related requirements.
4. That **Ontario EcoSchools** continues to measure and assess trends in climate change learning, action, and attitudes at participating schools over time. The organization should also consider commissioning or supporting a study that compares climate change learning and action at certified and non-certified schools.
5. That **school boards** support the work of individual EcoTeams by providing them with access to energy and waste data and incorporating CCE as a priority in board policies.
6. That **EcoSchools-affiliated teachers** make use of Ontario EcoSchools’ resources, such as EcoSchools in Your Classroom and A Toolkit for Schools: Climate Leadership, to increase the amount of climate change learning and action taking place at their schools.



1.0 Introduction

1.1 Climate change: a matter for education

Climate change reports frequently begin by reciting facts about how and why the Earth's climate is being transformed, as though the existence of climate change and its underlying mechanisms were still a matter of debate. The problem is clear. The global scientific community agrees that climate change is a real and measurable phenomenon caused primarily by human activities, such as the burning of fossil fuels. As the Intergovernmental Panel on Climate Change (IPCC) stated in its most recent Assessment Report: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia."¹ The Panel now puts its level of certainty that human activities are the main cause of global warming at 95%.²

Yet recent studies suggest that Canadians' understandings of climate change and its causes differ from accepted scientific opinion. In 2016, researchers at the Université de Montréal analyzed a series of national surveys regarding Canadians' beliefs about climate change and found that an estimated 79% of Ontarians believe the Earth is getting warmer, but only an estimated 46% believe such changes are mostly due to human activities.³ Overall, the study's findings are consistent with others that report gaps between scientists' collective certainty about climate change and the opinions of the general Canadian public.⁴

The discrepancies that exist between global scientific knowledge and general public opinion point to a need for both greater climate change education (CCE) and climate leader-

ship in our schools (see Box 1). In 2015, the Government of Ontario announced an ambitious long-term climate change strategy. Their goals include reducing greenhouse gas emissions by 80% below 1990 levels by 2050 and transitioning to a low-carbon, resilient society.⁵ In order to understand, mitigate, and adapt to the effects of climate change, we need a society of climate-literate citizens who are aware of the magnitude of the challenges we face.⁶ For this to happen, CCE in Ontario requires support at all levels of the education system, from individual classrooms to school boards to the Ministry of Education.⁷

Progress is being made: for instance, Lakehead University now offers its teacher candidates a course dedicated to climate change training,⁸ and school board-wide policies on climate change are being developed.⁹ However, the existing literature on CCE in Ontario suggests that its integration depends largely on the inclinations and capacities of individual teachers and schools that are taking leadership roles on the issue.¹⁰ This report, and the project on which it is based, begins from the belief that climate change is a matter that all educators and educational institutions must take seriously going forward.

Box 1. Climate change education and climate leadership

Climate change education (CCE) is the process of increasing climate change awareness and learning amongst individuals to create climate-responsive societies. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) identifies four main elements of an effective and holistic approach to CCE:

Knowing: understanding climate change and its causes;
Doing: developing skills and capacities for mitigating the effects of climate change;

Living Together: understanding how to live respectfully in the context of climate change;

Being: developing one's capacity to act with autonomy and responsibility in the context of climate change.¹¹

Effective CCE is closely related to **climate leadership**. In this report, climate leadership is defined as the agency of school communities (including individual educators and students) to effect positive change with regard to climate change causes and its widespread impacts.

1.2 Ontario EcoSchools & the Climate Leadership project

Ontario EcoSchools is a registered charity that aims to nurture environmental leadership, reduce the ecological impact of schools, and build environmentally responsible school communities. It administers a certification program that encourages, supports, and celebrates environmental learning and action in K–12 schools across the province. The number of certified schools has grown from 108 in 2005–2006 to 1,839 in 2016–2017, and certified EcoSchools currently participate from 56 school boards in Ontario. The program is divided into six focus areas: Teamwork and Leadership, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship. Climate change is not explicitly integrated into the existing certification framework, although it is inherently related to a number of the program sections. In addition to managing the certification program, Ontario EcoSchools provides educators with professional development and environmental education resources.

In 2015, Ontario EcoSchools received funding from the provincial Ministry of the Environment and Climate Change (MOECC) for a multi-year climate change education and leadership project. The purpose of the project was to assess

climate change learning and action happening in Ontario's certified EcoSchools and to increase climate leadership capacity amongst educators and students by leveraging the organization's existing programming.

To meet these goals, Ontario EcoSchools designated the 2016–2017 academic year a climate change 'theme year.' The project was carried out in three stages. Research and preparation for the theme year took place from January to August 2016. The theme year ran throughout the 2016–2017 academic year. Assessment and reporting is the final stage of the project. Since June 2017, Ontario EcoSchools has been synthesizing and analyzing data for the purpose of this report, which provides a rich, descriptive snapshot of climate change leadership, learning, and action taking place in Ontario's 1,800+ certified EcoSchools. This report also assesses the effectiveness of Ontario EcoSchools' activities during the theme year and makes recommendations regarding CCE going forward.

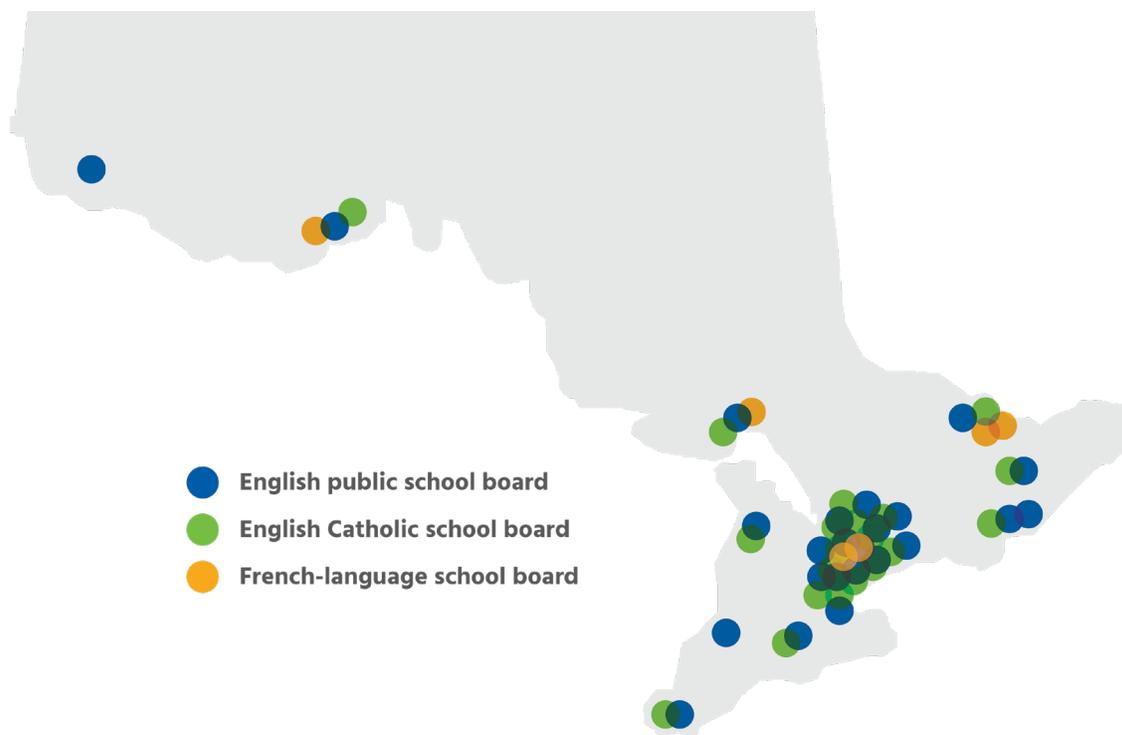


Figure 1: Map of school boards participating in the Ontario EcoSchools program in 2016-17.

2.0 Methodology

Information on climate change learning and action at certified EcoSchools was collected at the end of the 2015–2016 academic year, and again at the end of 2016–2017. No comparison was made between certified EcoSchools and non-certified schools. The majority of quantitative and qualitative data discussed in this report are from:

- Certification applications submitted to Ontario EcoSchools in 2015–2016 (n=1,399) and 2016–2017 (n=1,491), which exclude schools in the Experienced EcoSchools Certification Cycle (EECC), applications from the Toronto District School Board (who oversees their own program) and applications from outdoor environmental education centres, due to differences in how data is collected for those groups;¹²
- Post-certification surveys distributed annually to EcoTeam leads in English and French. 450 responses were received in 2015–2016 (28% response rate) and 517 responses in 2016–2017 (30% response rate).

Additional sources of data include workshop, webinar, and Youth EcoSummit feedback surveys, as well as an e-mail questionnaire about energy conservation and waste minimization practices distributed to nine school board representatives using a convenience sampling technique. It should be noted that data obtained from some of these additional sources have been used sparingly due to low response rates and sample sizes.

Quantitative analysis in this report is limited to descriptive statistics. Percentages do not always equal one hundred due to rounding. Absolute values are typically included in parentheses since the total number of responses vary by question. Open-ended survey questions and other qualitative data—such as long-form questions on the certification application—have been thematically coded and counted. Further methodological details are included in the endnotes as necessary.

3.0 Activities and Findings

3.1 The Climate Leadership theme year

The climate change project shaped every part of Ontario EcoSchools' regular programming during the 2016–2017 theme year. Below is a summary of activities and achievements. See Appendix 1 for the theme year's outputs in relation to the initial performance targets.

Workshops and webinars

Ontario EcoSchools delivered 15 full-day in-person climate change education workshops to 449 educators (participating from 42 public, Catholic and French-language school boards) during the fall of 2016. In 2017, Ontario EcoSchools hosted 18 webinars to deepen educators' learning about specific topics related to climate change, including green career development, sustainable transportation, agriculture and climate change, and the work of the Environmental Commissioner of Ontario. More than 400 educators from 37 school boards attended the webinars.

A Toolkit for Schools: Climate Leadership

In 2016, Ontario EcoSchools published *A Toolkit for Schools: Climate Leadership*, an accessible guide that introduces anthropogenic climate change and its causes, outlines the MOECC's Climate Change Action Plan, and provides lesson plan and campaign ideas that educators can use to engage students in climate change learning and action. The Toolkit is publicly available on Ontario EcoSchools' website.

Youth EcoSummit

Ontario EcoSchools partnered with the Region of Peel, Toronto and Region Conservation Authority, and two school boards (Peel District School Board & Dufferin-Peel Catholic District School Board) to host its 2nd annual provincial Youth EcoSummit on March 7, 2017. The focus of the summit was climate leadership. A total of 179 students and educators from 32 schools and 15 public, Catholic, and French-language school boards across Ontario attended.

Climate Leadership Contest

From November 7 to November 18, 2016, Ontario EcoSchools hosted a Climate Leadership Contest that coincided with the COP 22 meeting in Marrakesh, Morocco. EcoTeams were asked to undertake climate-related actions connected to their learning about global climate change. Participating schools submitted entries via social media and each school was entered into a draw for the chance to win \$500 to put toward future climate change programming.

In total, 122 schools from 32 school boards registered for the contest; 36 schools from 19 school boards undertook the challenge. Their actions—which ranged from active transportation to ‘eco-swap’ campaigns—were shared via Twitter. Contest tweets received a total of 271 likes and were retweeted 100 times, with the most popular tweet receiving 27 likes and 13 retweets.

Communications campaign

Ontario EcoSchools authored 19 blog posts and more than 100 climate change-related tweets and retweets during the theme year to engage its network of more than 5,000 Twitter followers, 600 Facebook followers, and 6,750 newsletter subscribers.

Certification

Each year, participating EcoSchools are certified on the basis of their performance in six key areas: Teamwork and Leadership, Energy Conservation, Waste Minimization, School Ground Greening, Curriculum, and Environmental Stewardship. During the theme year, Ontario EcoSchools encouraged schools to make climate change learning and action a key part of their certification activities. In 2016–2017 Ontario EcoSchools certified a record 1,839 schools from 56 school boards across the province.



3.2 Building leadership capacity for climate change learning & action

Integrating climate change learning and action into the classrooms and day-to-day activities of a school depends on strong climate leadership. Climate leadership is defined as the ability and willingness of school communities (including individual students, administrators, support staff, and teachers) to effect positive change with regard to climate change issues. A key goal of this project was to gauge existing attitudes to climate change and leadership in the Ontario EcoSchools community and increase climate leadership and teaching capacity through professional development.

EcoSchools-affiliated teachers are concerned about climate change—they are not content with the status quo. In 2016 and 2017, Ontario EcoSchools surveyed classroom teachers about their attitudes toward climate change, leadership, and education as part of the annual post-certification surveys.¹³ The results—presented in Figure 2 below—were fairly consistent between 2016 and 2017. On the whole, EcoTeam teacher-leads expressed high levels of concern about climate change and disagreed that climate change is primarily a natural phenomenon. In terms of climate leadership, respondents agreed that they can set examples for their students and others through

their actions. They believe their students want to learn about climate change, and they did not agree that the amount of CCE currently offered is sufficient. Although respondents generally agreed they were comfortable teaching students about climate change, in both years a sizable minority of teachers agreed or strongly agreed with the statement, ‘I am overwhelmed by climate change and don’t know where to start.’¹⁴



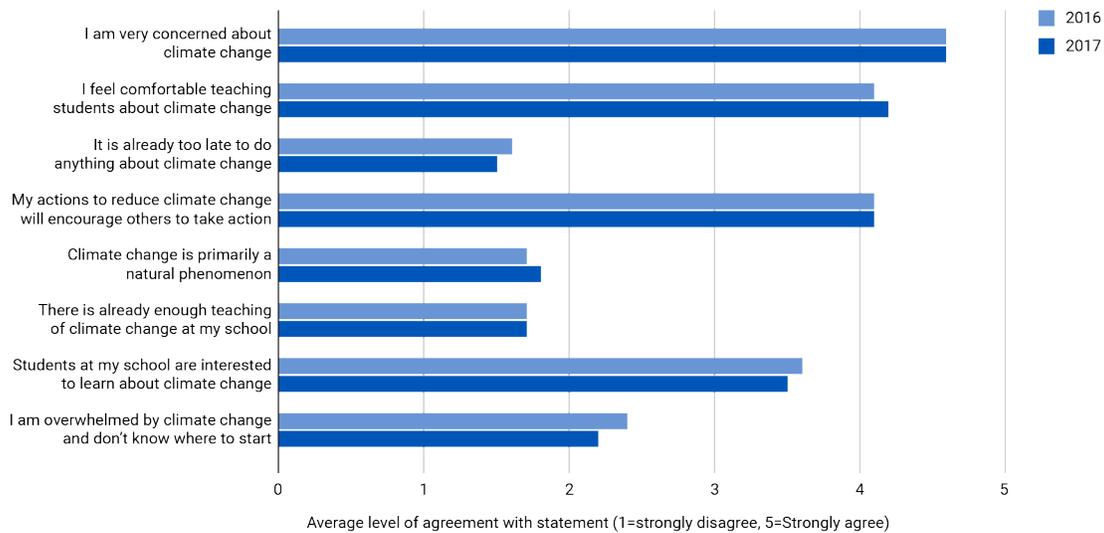


Figure 2. Attitudes toward climate change, leadership, and education amongst EcoTeam Leads who are teachers

Ontario EcoSchools provided numerous opportunities to increase climate knowledge and build climate leadership capacity during the theme year. Ontario EcoSchools’ workshops, webinars, and Toolkit were all designed with the goal of increasing teachers’ knowledge of climate change and their capacity to incorporate it into instructional time and EcoTeam campaigns—a definite mark of climate leadership. For instance, the Toolkit provides teachers with a brief synthesis of the scientific literature on climate change and examples of lesson plans and whole-school campaigns that they can use. More than 300 copies were distributed at the full-day workshops and many more were downloaded through the Ontario EcoSchools website. 53% of all respondents to the 2017 post-certification survey reported that they accessed the Toolkit during the year (n=249).

Overall, survey respondents reported that Ontario EcoSchools’ workshops and resources improved their capacity to understand and teach climate change topics. Highlights from the feedback received about the full-day workshops include:

- 69% of respondents agreed or strongly agreed that they felt “more equipped to teach about climate change in the classroom” after the workshop (n=168);
- 62% of respondents agreed or strongly agreed that the workshop increased their knowledge and awareness of climate change (n=151);

- 74% of respondents described the *Toolkit*, which they received during the workshop, as useful or very useful (n=176).

More resources, please. 78% of respondents to the 2017 post-certification survey reported they would benefit from additional training and/or resources for incorporating climate change learning into daily instruction. When asked to comment on what sorts of resources would be most useful, one of the most frequent requests was for lesson plans and worksheets appropriate for a variety of grades and subject levels, especially primary grades. Respondents also identified lack of time as a key barrier to accessing resources and increasing climate change learning and action at their schools. This is unsurprising, since pressure on teachers to manage a growing number of requirements with limited time and resources has intensified in recent years.¹⁵ As one respondent explained:

“It is difficult to ask teachers to add yet another topic to teach on their already full plate[s]. If it does not easily connect with the curriculum and if it is not easy to implement and simple to learn about, teachers will not use the resources.”

Ontario EcoSchools has responded to this feedback by developing a curriculum-connected resource called EcoSchools in Your Classroom. This online interactive platform outlines a wide range of resources to assist teachers to incorporate environmental education into their teaching practice and EcoSchools programming. Each specific resource identifies links to relevant sections of the Ontario curriculum and the specific certification questions that the activity might fulfill. Many of these resources are focused on climate change.

Did the Climate Leadership theme year contribute to more climate change learning and action at certified EcoSchools? The 2017 post-certification feedback survey asked EcoTeam leads to assess the amount of climate change related learning and action that took place at their schools in 2016–2017

relative to the previous academic year. The results of the 444 respondents are presented in Figure 3 below (N/As were excluded). Most EcoTeam leads reported about the same amount of climate change-related learning and action at their schools compared with the previous year, and 31% reported an increase in learning and action. Of note is the finding that **100% of the survey respondents whose schools certified for the first time in 2016–2017 reported about the same or more climate change related learning and action compared with the previous year**, which suggests that the certification program is a particularly effective vehicle for introducing CCE in whole school communities.

Note: results not disaggregated by length of time in the EcoSchools program

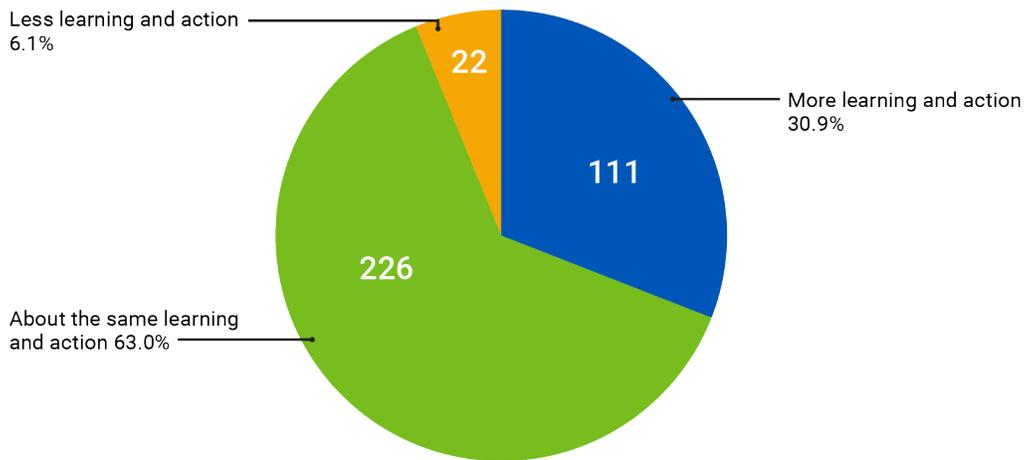


Figure 3. Amount of climate change-related learning and action at certified EcoSchools in 2016-2017 compared to 2015-2016

Box 2. Student leadership capacity

Increasing *student* environmental leadership is another of Ontario EcoSchools’ core objectives. The structure of the certification program ensures that environmental learning and action is student centered and encourages students to take initiative. During the theme year, Ontario EcoSchools provided further support for student leadership development through the Youth EcoSummit. One student from the District School Board of Niagara (DSBN) called this year’s EcoSummit on climate change “a great experience to learn more about the issues facing our world and an amazing opportunity to meet others with the same beliefs and opinions as me.”

Annual certification visits are another opportunity for Ontario EcoSchools staff to hear directly from students about the leadership roles they take on at home and at school. As one student from Peel District School Board (PDSB) explained:

The waste audit impacted the way I recycle and even the things I do at home with my parents.



3.3 Engaging whole school communities in climate change learning

The next two sections take a closer look at climate change learning and action undertaken at Ontario's certified EcoSchools during the theme year.

Certified EcoSchools are incorporating CCE into the classroom. Curriculum (in-class learning) is one of Ontario EcoSchools' six certification sections. Schools are invited to submit up to seven samples of environmental lessons in their applications. During the theme year, 333 of the 7,611 environmental lessons submitted by participating EcoSchools were related to climate change.¹⁶ (Note that submissions

are self-selected by EcoTeam leads, and thus may not reflect all the climate change learning taking place in schools.) The curriculum submissions received were quite diverse. Some focused on developing students' knowledge of the underlying science of climate change processes, while others focused on the effects of climate change and the technological, social, economic, and political challenges of mitigation. Many of the submissions linked climate change to personal responsibility and stewardship. See Box 3 for examples of climate change-related submissions.

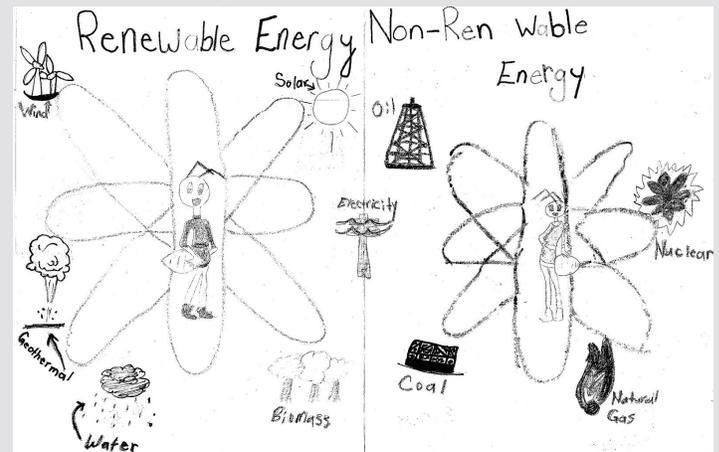
Box 3. Examples of climate change-related curriculum submissions

St. Augustine Catholic Elementary School (Niagara Catholic District School Board)
Grade 5 – Science & Technology

We looked at pictures and videos explaining each type of energy source we use everyday. We then talked about the non-renewable and renewable energy sources. We discussed the positives and negatives of each source, and completed a chart for solar, wind, hydroelectric, coal, and nuclear energies. The students then completed a diagram with each source labelled under renewable or non-renewable.

Sir William Stephenson Public School (Durham District School Board)
Grade 7/8 – Mathematics

In preparation for Earth Hour, students were exploring areas of mathematics that can help communicate issues revolving [around] Climate Change and Environmental Sustainability. Measurement and Number Sense were used to calculate Carbon Dioxide emissions, the equivalency to the cars on



the road and the amount of trees that need to be planted. Data Management was used to look at strong correlations between human activity and Climate Change, and discussions took place over ways we can make changes.

Climate change learning is taking place in all grades. Every grade level, from Kindergarten to Grade 12, was represented amongst the climate change-related curriculum submissions from certified EcoSchools. Nearly half of the submissions were delivered in the junior/intermediate division, followed by secondary, and then primary (see Table 2). Interestingly, climate change-related submissions constituted a higher proportion of overall environmental lessons at the secondary level (11% of all secondary environmental lessons submitted) than both the junior/intermediate division (5%) and the primary division (1%). A high proportion of climate change learning at the secondary level likely reflects the fact

that one of the strands in the mandatory grade 10 science focuses on climate change. In addition, teachers may find it easier to incorporate climate change into parts of the curriculum that already stress themes like energy and sustainability, which are more common in the junior/intermediate and secondary curricula. This interpretation is strengthened by feedback received from the 2017 post-certification survey respondents, who frequently identified a need for 'age-appropriate' climate change resources and worksheets to use at the primary level.

Table 1. Climate change-related curriculum submissions by division

Division	Number	Percentage
Primary (K–3)	46	14%
Junior/Intermediate (4–8)	160	48%
Secondary (9–12)	124	37%
Undetermined	3	1%
Totals	333	100%

Climate change learning is taking place in a variety of subjects. Science is the most common subject area represented in the climate change-related curriculum samples, but submissions were also received from social studies, language, art, mathematics, health and physical education, Catholic expectations, and business, among others (Table 3). A handful of 2017 post-certification survey respondents said they had little reason to incorporate climate change into their teaching practice because they don't teach science, but the broader picture provided by the curriculum submissions suggests that teachers at certified EcoSchools are going beyond the minimum required by the Ontario curriculum. Even though the Ministry of Education has identified environmen-

tal education as a priority that should be integrated using a cross-curricular approach and encourages the teaching of climate change content in multiple subject areas, only one of the strands in the mandatory grade 10 science focuses on climate change.¹⁷ Since climate change is a social, economic, political, and scientific problem, it is important that CCE be interdisciplinary and it is encouraging to see certified EcoSchools moving in this direction. Whether EcoSchools-affiliated teachers are more likely to incorporate climate change into a range of subjects than teachers at non-certified schools is unknown and would be an excellent avenue for future study.

Table 2. Top subject areas with climate change-related curriculum submissions in 2016–2017.

Elementary	Secondary
1. Science & Technology (n=99)	1. Science (n=78)
2. Social Studies (n=41)	2. Canadian & World Studies (n=21)
3. Languages (n=36)	3. Languages (n=9)
4. The Arts (n=14)	4. Social Science (n=8)

Box 4. Energy dashboards and place-based learning

Energy dashboards give place-based learning a whole new meaning! Some school boards have begun installing energy dashboard systems to provide data on energy usage and assist boards with their long term energy planning. However, teachers and EcoTeams can also use this information to deepen their understanding of energy use patterns and greenhouse gas emissions (GHGs), set their own targets, and augment classroom lessons. At one elementary school in the Halton Catholic District School Board, the EcoTeam uses the daily energy consumption data displayed on their dashboard monitor to track how they are doing with their energy conservation goals. While not all schools have access to data in real-time, boards often allow teachers and EcoTeams to request access to it for the purposes of learning and action.



3.4 Taking action on climate change within and beyond school walls

To what extent are EcoTeams taking action on climate change? What impacts are they having within and “beyond school walls?”¹⁸ These are important questions to ask if the purpose of CCE is not simply to *understand* climate change, but to develop ways of mitigating and responding to it.

Certified EcoSchools organized hundreds of school-wide campaigns related to climate change during the theme year.

As part of the certification process, schools are invited to submit up to four campaigns each year that engage the entire school in learning and action around a specific environmental issue. During the theme year, schools submitted 451 examples of climate change-related campaigns (10.7% of all qualifying submissions), compared to 406 climate-change related campaigns identified in 2015–2016 (9.9%).¹⁹ The three most popular subtypes of climate-focused campaigns were:

- **Earth Hour or Power Hour:** EcoTeams invite everyone in the school to turn off lights, computers, and other non-essential appliances for an hour (or more), and use the opportunity to teach students about the links between energy consumption and climate change. At some schools, this one-time event has become a regular practice.
- **Sweater Day/Turn Down the Heat:** In these campaigns, facilities staff turn down the temperature in the school for a whole day and EcoTeams invite everyone to wear sweaters so they can stay warm. These events often take place on WWF’s ‘National Sweater Day,’ which hap-

pens each February. They raise awareness about how schools’ overall energy consumption is connected to climate change.

- **Active Transportation & Anti-Idling:** This category includes all types of transportation-related campaigns connected to climate change, ranging from campaigns that encourage students to walk or take public transit to school, to initiatives that reduce the number of vehicles idling in school parking lots. (See Box 5 below.)

Events like Earth Hour, Sweater Day, and active transportation campaigns encourage students to make connections between climate change awareness and mitigation by reducing their daily energy use.

Events like Earth Hour, Sweater Day, and active transportation campaigns encourage students to make connections between climate change awareness and mitigation by reducing their daily energy use.

Evidence also suggests that climate change-focused campaigns can facilitate longer-term changes at individual schools when combined with the program’s energy conservation and waste minimization activities. Here are some of the energy conservation and waste minimization impacts that certified Platinum EcoSchools shared with Ontario EcoSchools during the theme year:²⁰

Our school's [energy] consumption has gone down from 275,874 KW(2013–2014) to 255,933 KW(2015–2016). This year there was increased participation in Earth Hour and [we] extended our partnerships with our local school community and church parish.

—EcoTeam lead, Ottawa Catholic School Board



We have students formally requesting solar panels be put on our school.

—EcoTeam lead, Waterloo Region District School Board



This area [waste minimization] requires consistent effort. We've noted that by the end of the year we reduce contamination, but with each new year we have some setbacks. Overall, we have improved our waste diversion rate since 2012. In 2014 it was 47% [and] this year it is 84%.

—EcoTeam lead, Dufferin-Peel Catholic District School Board



It is difficult to systematically measure the impact of climate campaigns and other areas of the Ontario EcoSchools program on schools' overall energy performance and/or carbon footprints. However, a third-party study commissioned by Ontario EcoSchools in 2016 found, based on facilities' energy use data from the 2013–2014 academic year, that "EcoSchools-certified facilities are slightly better energy performers than non-certified facilities."²¹ Moreover, the least energy efficient schools were found in the group of schools that do not participate in the EcoSchools program. These differences suggest that student-led behavioural changes do have an impact on the energy performance of schools, a finding that is all the more impressive when one considers that students typically have limited ability to influence board-level energy practices.

Climate change campaigns go beyond school walls, too. While many climate change campaigns undertaken by EcoTeams focus on improving the energy performance of their schools and inspiring community members to make individual changes, some students are taking action beyond school walls. For instance, EcoTeams frequently organized school-wide fundraisers to donate money to organizations like the World Wildlife Fund (WWF), while others collected signatures for climate change-focused petitions that they forwarded to the Prime Minister's office. These kinds of campaigns suggest that EcoSchools are connecting the local and global when it comes to climate change learning and action.

Box 5. Mitigating GHG emissions & developing student leadership in the wider community

Active transportation and anti-idling campaigns represented 11.5% (n=52) of all climate change-related environmental stewardship campaigns undertaken during the theme year. These campaigns are a great way for EcoTeam members to develop their leadership skills and see the impacts of their actions on the wider community! One of the winning entries in the Climate Leadership Contest was an anti-idling campaign. Learn how Gordon Graydon PS connected anti-idling to climate change awareness on the Ontario EcoSchools blog.



4.0 Conclusions and recommendations

It is the responsibility of Ontario's education system to help today's youth learn to be responsive, climate literate citizens. This task needs to be addressed quickly and systematically by engaging multiple stakeholders if we are to meet the Government of Ontario's climate change goals as outlined in *Ontario's Climate Change Strategy and Ontario's Five Year Climate Change Action Plan, 2016–2020*.

Ontario EcoSchools has taken up the challenge of increasing CCE in Ontario and developing the next generation of climate leaders. This report marks the end of a multi-year Climate Leadership project carried out by Ontario EcoSchools and funded by the provincial Ministry of the Environment and Climate Change (MOECC). The goals of the project were to provide baseline information of climate change learning and action currently practiced at certified EcoSchools in Ontario, and to increase climate awareness and leadership capacity amongst educators and students by designating July 2016–June 2017 a climate change 'theme year.'

The evidence shows that Ontario EcoSchools is well-positioned to support climate change learning, action, and leadership at Ontario's schools because of its student-centered and holistic approach to environmental education and stewardship, as well as its capacity to provide professional development to teachers. Surveyed EcoTeam teachers reported that Ontario EcoSchools' workshops and resources improved their capacity to understand and teach climate change material. They also identified barriers to increasing climate change learning and action at their schools, such as lack of time and the need for more resources that are

integrated with the Ontario curriculum. Ontario EcoSchools is continually adapting its resources in response to the feedback it receives from participating EcoSchools.

The findings from the Climate Leadership project theme year are promising. Climate change education (CCE) is happening at all grade levels and in a variety of subject areas at certified EcoSchools. Moreover, certified EcoSchools organized hundreds of school wide campaigns and activities to increase climate change learning and action during the theme year. Schools reported impacts on awareness, EcoTeam participation, and energy consumption indicators. Of survey respondents whose schools certified for the first time in 2016–2017, 100% reported that there was the same or more climate change learning and action compared to the previous year. The question now is how to sustain and expand these efforts.

In light of the results described above, this report makes six recommendations:

1. That the provincial **Ministry of Environment and Climate Change** continue to fund programs and partner with organizations that use CCE as a tool to help Ontarians adopt low-carbon everyday behaviours - a strategy identified in *Ontario's Five Year Climate Change Action Plan, 2016-2020*.

2. That the provincial **Ministry of Education** and **Ministry of Environment and Climate Change** collaborate to embed climate change material more explicitly into the existing curriculum, particularly in the primary division and in subjects beyond science and technology.
3. That **Ontario EcoSchools** revises its certification program to make climate change learning and action a key priority, either by establishing a new program section or by adapting existing sections and questions to include climate change-related requirements.
4. That **Ontario EcoSchools** continues to measure and assess trends in climate change learning, action, and attitudes at participating schools over time. The organization should also consider commissioning or supporting a study that compares climate change learning and action at certified and non-certified schools.
5. That **school boards** support the work of individual EcoTeams by providing them with access to energy and waste data and incorporating CCE as a priority in board policies.
6. That **EcoSchools-affiliated teachers** make use of Ontario EcoSchools' resources, such as EcoSchools in Your Classroom and A Toolkit for Schools: Climate Leadership, to increase the amount of climate change learning and action taking place at their schools.

Endnotes

1. Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014: Synthesis Report...* [Core Writing team, R.K. Pachauri and L.A. Meyer (eds.)] (Geneva, Switzerland: IPCC, 2014), 2.
2. IPCC, *Climate Change 2014: Synthesis Report*, v.
3. Mildenerger, M., P.D. Howe, E. Lachapelle, L.C. Stokes, J. Marlon and T. Gravelle, National Climate Change Project map data, Université de Montréal (2016), <http://www.umontreal.ca/climat/engl/index.html>. The estimates for Ontario were very close to national estimates. For provincial level estimates, researchers identified a margin of error of ± 6 percentage points at a 95% confidence level.
4. For instance, the most recent climate change attitude survey conducted by the Environics Institute found that “[s]ix in ten (61%) Canadians believe the scientific evidence is conclusive and that climate change is primarily caused by human activity.” See Environics Institute, *Focus Canada 2015: Canadian Public Opinion about Climate Change* (Toronto, ON: 2015), 3. <http://www.environicsinstitute.org/uploads/institute-projects/environicsinstitute-dsf%20focus%20canada%202015%20-%20climate%20change%20survey%20-%20final%20report%20-%20english.pdf>.
5. Government of Ontario, *Ontario's Climate Change Strategy* (Toronto, ON: Government of Ontario, 2015): <https://dr6j45jk9xcmk.cloudfront.net/documents/4928/climate-change-strategy-en.pdf>.
6. Camilla Schreiner, Ellen K. Henriksen, and Pål J. Kirkeby Hansen, “Climate Education: Empowering Today's Youth to Meet Tomorrow's Challenges,” *Studies in Science Education* 41, no. 1 (2005): 3–49. Doi: 10.1080/03057260508560213.
7. Steve Alsop, David Greenwood, Philip Vaughtner, and Sabrina Scott, *Climate Change Education: Acting for Change* (Toronto, ON: York University, 2015), 6: <http://edu.yorku.ca/files/2015/12/CCE-ActingForChange.pdf>.

1. Paul Berger, Natalie Gerum, and Martha Moon, "Roll Up Your Sleeves and Get At It! Climate Change Education in Teacher Education," *Canadian Journal of Environmental Education* 20 (2015): 155.
2. In 2010, the Toronto District School Board (TDSB) developed and approved a climate change policy. For details, see TDSB, *Go Green: Climate Change Action Plan* (2010): <http://www.tdsb.on.ca/Portals/0/AboutUs/Innovation/docs/FINAL%20Go%20Green%20WEB%20-%20202.pdf>.
3. Daniel Green, "Teaching about Climate Change: Making global climate change meaningful to K–8 students," Major Research Paper (M.Ed.), OISE, University of Toronto, 2016: <http://edu.yorku.ca/files/2015/12/CCE-ActingForChange.pdf>. Case studies of nine teachers taking on leadership roles in terms of CCE are described in Alsop, Greenwood, Vaughtner, and Scott, *Climate Change Education: Acting for Change*.
4. UNESCO, "Annex 1: CCESD Competencies," *Not Just Hot Air: Putting Climate Change Education into Practice* (Paris: UNESCO, 2015), 74: <http://unesdoc.unesco.org/images/0023/002330/233083e.pdf>.
5. In 2016–2017, Ontario EcoSchools received 1493 applications to its Standard and Platinum certification streams (two of which did not certify). The analysis presented here also excludes applications from schools in the Toronto District School Board, outdoor and environmental education centres (OEECs) and schools who opted for the Experienced EcoSchools Certification Cycle (EECC) in those years, because of differences in the way that data is collected in those categories.
6. Teachers represented 88% of all post-certification survey respondents in 2015–2016 and 2016–2017. The number of respondents to each attitude question ranged from 429 to 440 in 2015–2016, to 437 to 445 in 2016–2017. Note that the attitudes reported here are held by teachers who head EcoTeams at their schools, and thus might not represent attitudes held by teachers at certified EcoSchools as a whole.
7. In 2015–2016, 17% of survey respondents (n=71) either agreed or strongly agreed with the 'overwhelmed' statement. In 2016–2017, 11% of survey respondents (n=50) either agreed or strongly agreed with the 'overwhelmed' statement.
8. For example, People for Education has described the current situation of Ontario schools as one characterized by "competing priorities" that stretch teachers and support staff thin. People for Education, *Competing Priorities: People for Education Annual Report on Ontario's Publicly Funded Schools 2017* (Toronto, ON: People for Education, 2017): <http://www.peopleforeducation.ca/research/annual-report/>. For similar concerns, see, Michael Tan and Erminia Pedretti, "Negotiating the Complexities of Environmental Education: A Study of Ontario Teachers," *Canadian Journal of Science, Mathematics and Technology Education* 10, no. 1 (2010): 72.
9. To determine the number of climate change-related curriculum submissions, keyword searches were conducted using the following terms: *climate change, global warming, réchauffement climatique, changement climatique, greenhouse gas, GHG, and Gaz à effet de serre*. The analysis was limited to curriculum submissions that received a Level 3 or 4 rating during assessment, as a means of controlling for quality. Climate change-related lessons represented 4.4% of the total submissions in 2016–2017, up from 4.1% in 2015–2016. Of course, it is possible that other climate change-related lessons were taught but not submitted as part of the application process.
10. Environmental education has been integrated into the Ontario curriculum through policy documents like *Acting Today, Shaping Tomorrow: A Policy Framework for Environmental Education in Ontario Schools*. On its limits, see Joanne Nazir, Erminia Pedretti, John Wallace, David Montemurro, and Hilary Inwood, "Reflections on the Canadian Experience with Education for Climate Change and Sustainable Development." *Canadian Journal of Science, Mathematics and Technology Education* 11, no. 4 (2011): 373.
11. The use of the phrase 'within and beyond school walls' was inspired by People for Education, *Digital Learning in Ontario Schools: the 'New Normal'* (Toronto, ON: People for Education, 2014), 1: <http://www.peopleforeducation.ca/wp-content/uploads/2014/03/digital-learning-2014-WEB.pdf>.

12. In the Environmental Stewardship section of the certification application, schools select the type of campaign they have organized using a drop-down menu. 'Climate change' was one of those options. Those were designated 'climate change specific' campaigns. A keyword search was then conducted on the remaining campaigns using the following terms: *climate change, global warming, réchauffement climatique, changement climatique, greenhouse gas, GHG, and Gaz à effet de serre*. The analysis was limited to campaign submissions that received a Level 3 or 4 rating during assessment, as a means of controlling for quality. For the purposes of analysis, the climate change specific (drop down menu) campaigns were re-coded into major subtypes to identify overall thematic patterns.
13. Certified EcoSchools receive one of four levels of achievement based on their performance in the six focus areas. Platinum is the highest level a school can achieve, and requires a sustained commitments to environmental learning and action by the whole school community. Platinum-certified schools provide added insight into some of the impacts that the EcoSchools program can have on schools over time, since schools are typically certified for at least five years before applying for Platinum.
14. Enerlife Consulting Inc., "Energy Performance Study: Final Report," 2016, *Ontario EcoSchools* website: <https://www.ontarioecoschools.org/wp-content/uploads/2017/01/Ontario-EcoSchools-Energy-Performance-Study-FINAL-Enerlife-June-29-2016.pdf>.

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Appendix 1

Climate Leadership Project Indicators, Performance Targets, and Results

Indicator	Performance Target	Result
Number of participants (students and teachers) at the Youth EcoSummit	100	179
Number of schools participating in the Youth EcoSummit	20	32
Number of teachers participating in the teacher training workshops	400	449
Number of school boards represented at the teacher training workshops	30	42
Number of Climate Change <i>Toolkit</i> resources distributed to participants at teacher training workshop	300	345
Level of climate change knowledge and awareness after teacher training workshop	50% indicate some increase	62.6% of respondents indicated that they felt 'strongly' or 'very strongly' that their level of climate change knowledge increased as a result of the workshop.
Level of satisfaction with the hands-on learning activities included in the teacher training workshop	50 % indicate that hands-on activities were useful	Slightly different question asked: 69.3% of respondents indicated that they felt 'strongly' or 'very strongly' that they were more equipped to teach about climate change as a result of the workshop.
Level of satisfaction with regards to the usefulness of Climate Change <i>Toolkit</i> resource amongst workshop participants	80%	73.8% of respondents indicated that the kit was 'useful' or 'very useful'.
Number of teachers participating in the teacher training webinars	300	402
Number of school boards represented in the teacher training webinar	30	37

Appendix 1 continued

Indicator	Performance Target	Result
Level of climate change knowledge and awareness after teacher training webinars	50% increased awareness	Data unavailable due to low webinar survey feedback
Number of blogs published about climate change on the Ontario EcoSchools website	8	19
Number of tweets and RTs about climate change from OE	100	127
Number of schools participating in the Climate Leadership Contest	100	128 registered; 37 completed contest submission
Number of students participating in Climate Leadership Contest (Student leaders calculated as # of entrants multiplied by the average EcoTeam size as reported in 2016–2017 application data. Total students calculated as number of entrants multiplied by average school population.)	200	1073 student organizers & 14,800 student participants
Number of climate change related lessons submitted in 2016–2017	10	333
Increase in climate change awareness among participating schools	Increase reported by 50% or more of teachers and students surveyed	94% (n=359) reported that there was about the same level (63%), or more (31%), learning and action about climate change this year (2017) compared to last year (2016).
Increase in climate change awareness among parents	Increase reported by 50% or more of parents surveyed	Unable to survey parents directly. In 94% of the schools we visited this year (n=712), 50% or more of the students informally surveyed agreed that they were able to bring some environmental actions and learning home to their family.
GHG information available for participating schools	Savings estimated for 50 schools	Unable to collect appropriate data for the theme year.

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Charitable No. 72582 7729 RR0001 720 Bathurst Street, Toronto,
ON M5S 2R4 info@ontarioecoschools.org or 416-642-5774
ontarioecoschools.org