

CLEAN AIR RESPONSIBLE SCHOOLS



Summary Report

Through the 2015-16 school year Inside Education, with the support of the Automotive Recyclers of Canada's *Grants in Gear* program, delivered a highly popular and enormously successful education program for elementary school students in Alberta - *Clean Air Responsible Schools (CARS)*. With a focus on air quality, this education program provided students an opportunity to investigate the role vehicle idling plays. Taking a 21st century approach to learning, the project employed technology alongside a positive message education campaign aimed at reducing the number of vehicles idling around schools.

The program featured the participation of nearly **650** Grade Five students from **25** classrooms in Edmonton and Calgary. Students and teachers had a chance to find out how vehicle emissions can impact local air quality around schools. They were also challenged to devise an education campaign for their parents, other teachers and school bus drivers. Finally, students found creative means to communicate what they learned through the CARS program.



1. Project Overview

Connecting to Inside Education's Climate Change Education Program and the Alberta Program of Studies the Clean Air Responsible Schools (CARS) program developed understanding about air quality, emissions and climate change. With an emphasis on personal action and citizen science this class-based project engaged students in local stewardship action while contributing meaningful data to a nationwide citizen science campaign.



With funding from the Automotive Recyclers of Canada and expertise from local airshed groups (Alberta Capital Airshed in Edmonton and the Calgary Region Airshed Zone in Calgary) Inside Education developed a one-of-kind program that ran from November through April in 24 Alberta classrooms. CARS was a hands-on inquiry that inspired students to think critically about their connections to local air quality and consider global climate change while taking action through a school based stewardship campaign.

2. Approach/Methodology

The CARS Program was designed to introduce air quality science, issues and solutions in an engaging, interactive fashion. As concepts like 'ambient air quality', 'particulates', 'Air Quality Health Index (AQHI)' can be cumbersome for adults *and* children, the program was designed to engage students and teachers in a fashion to which they can easily relate - vehicle idling around the school.

We understood that in order to provide the most effective learning project, teachers needed to be engaged and provided with background information prior to commencing the program, followed by support through the development and delivery of the CARS Project in their classroom/school.

As such, the program was developed with four integrated learning approaches:

- 1) **Teacher Professional Development** - November 2015
 - Teachers participating in the CARS Project were invited to participate in a half-day professional development session that introduced them to the CARS program and provided an overview of local air quality from airshed experts - the Alberta Capital Airshed (Edmonton) and Calgary Region Airshed Zone (Calgary). Teachers were given detailed background information, toured a regional air quality monitoring station, and were introduced to the *Citizen Science* component of the program - the area with which they will work with their students.
- 2) **Classroom Presentation (December)** - Using our award-winning hands-on approach for classroom programming Inside Education's team of professional educators visited each of the 24 classrooms

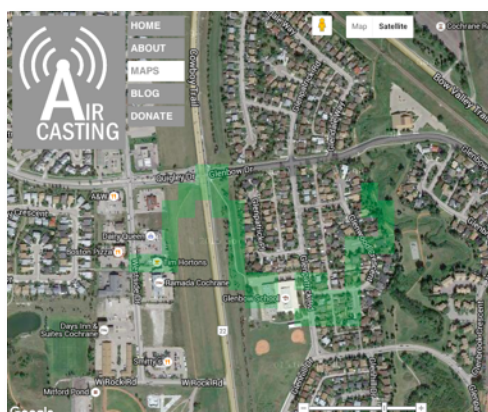


participating in CARS. In addition to introducing concepts like vehicle emissions, AQHI and integrating air quality with weather and climate, educators led students through a series of engaging activities and air quality games. In each case, the program was connected directly to Alberta’s Grade Five Science “Weather Watch” unit.



3) **Citizen Science** - Inside Education has adopted an action-based, *Citizen Science* approach to many of our learning programs. Not only are students ‘recipients’ of information, we work to engage them in the science, technology and issues related to environmental sustainability. For the CARS program, we engaged the students in citizen science through two methods, one ‘low tech’ and the other decidedly more ‘high tech’ - using AirBeam Air Quality Monitoring tools:

- *Classroom-citizen science* - Using ‘kid friendly’ tools, students were introduced to particulates in the air and exhaust coming from various vehicles. Our “Particle Picker-Uppers” were laminated sheets and petroleum jelly, left outside for several days. Airborne particulates would be captured on the sheets, allowing students to understand that invisible particles are in the area. Our “white tube socks test” involved safely attaching white socks to the tail pipe of a variety of vehicles. Depending on the age, condition, fuel source, etc., students studied the level of sock discolouring (see image to the right).
- *AirBeam Technology* - Schools were provided an AirBeam monitoring device and supplemental activities to collect data in the school yard. The data contributed to a North American citizen science air casting app and initiative www.aircasting.org



It is notable that the schools participating in the program were the first to contribute to the air casting website in Canada. Data related to pm2.5 was instantly collected and submitted to an online map. While the intent was to do ‘before and after’ readings, we learned that the technology does a better job giving overall air quality recordings vs. area-specific. Schools were able to use the Airbeams throughout the project - certainly it was seen as a highlight for the students - incorporating 21st century learning into the classroom.

4) **School-based Education Campaigns** (March-April) - As a culminating activity, each school implemented an education campaign to share the knowledge they gained while studying local air quality. Students decided on the audience (parents/teachers/school bus drivers/school bus

companies) and their approach to learning about air quality and the impacts that idling has around their school proper. Projects included:

- Earth Day video PSA - broadcast throughout K-12 school
- Poster campaigns
- Letters to school bus company
- Idling information “protest” to parents idling outside school
- Student presentations to:
 - Parent council
 - Calgary Region Airshed Zone (CRAZ)



3. Results Achieved

School	Number of Classes	Number of Students	Number of Airbeam Samples Taken
<i>Calgary & Area</i>			
Hawkwood	3	83	865
Glenbow School	3	80	448
Chaparral School	4	97	811
Grant MacEwan School	1	27	2211
Banded Peak School	2	70	1326
<i>Edmonton & Area</i>			
Grandin School	2	53	544
Victoria School of the Arts	1	19	724
Our Lady of Mount Carmel School	3	70	566
Kameyosek School	1	28	211
St. Elizabeth Seton School	1	24	512
St. Bonaventure School	4	80	1621
TOTALS	25	631	9839

Inside Education measured the success of the program based on numbers of schools, classrooms, teachers and students engaged in the program. Further, by providing the AirBeam tool, students were able to track measurements of air quality around the school and neighbouring community. In each case



schools were able to measure a low concentration of particulates around the school. This is likely attributed to the fact that the AirBeam is meant to be a longer-term measuring tool, even though it does 'instant' recordings. Noted in the chart above are the number of air quality samples taken throughout the entirety of the program.

Since this was an education and action project, the Citizen Science component, while extremely valuable, was meant to be a kick off for the student personal-action component - the Idling Education Campaign. Each school saw classes participate in creative idling education campaigns. These campaigns aimed learning at parents, teachers and even school bus drivers - helping affect change in the school and community. Qualitative feedback from teachers tells us that there was a substantial change around the school - much discussion at the staff level, notably in Edmonton where an idling bylaw already exists (but is not really enforced at all). While our goal is/was to improve air quality around the schools (and beyond) - it was the educational focus that will have the most long-term results. With over 600 students participating, that means as many as 1500 drivers will be impacted, learning from their children!

Survey Results

100 % of teacher respondents said that the CARS program met or exceeded the following program goals:

- Enhancing air quality and emissions education in Alberta,
- Connecting students to citizen science, Providing resources for inquiry based learning, Offering professionally led education programming,
- Supporting school-based idle free/emission reduction initiatives

4. Lessons Learned

Inside education learned a great deal from the pilot program. While we have a series of ideas as to the learnings, teacher feedback is imperative in education program pilots. The following is a sample of what we learned from teachers and students:

This program provided an authentic reason for our students to study weather. They saw themselves as scientists that were involved in the collection of data for the international community. Giving students a real reason to engage in science is invaluable. They looked at their community, asked important questions and took their ideas home. Students reported changes that their families have made to promote a healthier environment for all.

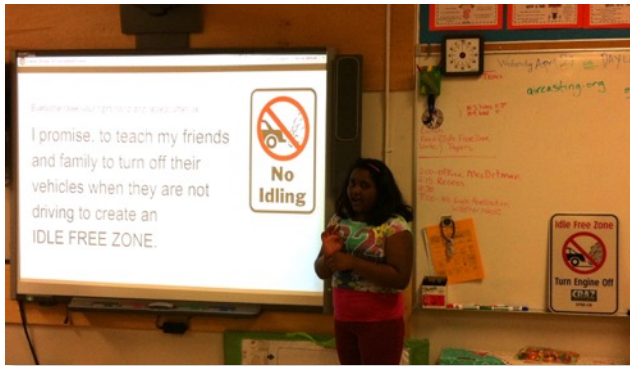
Tammy Wildemann, Victoria Schools for the Arts, Edmonton

Being able to use the Airbeam provided meaningful and timely information on air quality. Students were able to directly see how their air was being affected and motivated them to take action to ensure that adults are taking air quality seriously. The kids loved being able to do "real" science and to be part of a scientific community. They also liked that they were having an impact of positive change for the environment.

Mathew Penner, Victoria Schools for the Arts, Edmonton



Student Feedback - Grant MacEwan School



'Thanks for the sign!'
'It was fun that we learned how to improve the air quality. I liked using the Air Beam.'
'I learned that there are different types of pollution.'
'Thanks for the certificate and telling us about idling.'
'We liked the way you spent time teaching us about air quality.'
'It's a privilege that you joined our project.'
'Thanks for inviting us to do this project and putting our picture in your newsletter.'
'Thank you for giving us this opportunity to learning about idling.'

Specific Learnings:

- a) There is significant appetite for air quality education - including in the context of climate change. Students want to be connected to personal action when it comes to both air quality and climate change. They want to understand what changes can be made *today*, not some undefined "when I grow up". By focusing on their 'habitat' (their school) and affecting change in the behaviour of their parents and teachers - idling was as ideal conduit for this personal action;
- b) Students are extremely interested in employing scientific tools like 'AirBeams' in order to contribute to the decisions being made by adults.
- c) There are numerous organizations and municipalities across Alberta interested in air quality issues, and helping young people learn about their personal connection to air quality. We had many inquiries from members of the Alberta Airshed Council, municipalities across Alberta, the provincial government and others as to the approach and the success of the CARS program.
- d) Reading vehicle idling can be approached in a positive manner - not only/always 'anti-'. Student approaches to help educate their parents and other drivers, taken in a positive manner, were seen as effective means to reduce idling generally and school-based air quality broadly.
- e) Even school bus companies came around! The 'go to' response that diesel engines need to remain running, especially in cold weather was replaced by strategic ideas as to how the concentration of buses around one area might be reduced. Schools come up with ideas (still to be implemented) related to staggering arrival times, moving buses to different areas, etc.
- f) The demand for curriculum-connected, fully supported education programs related to air quality and climate change continues to grow. This is especially true when factoring in the personal action/citizen science connection.
- g) Students are extraordinarily creative! This was not a huge learning, but certainly gratifying to see the level of creativity demonstrated through the various idling education campaigns. Students very much enjoyed the connection of air quality, weather and climate change. This definitely came through in their creative education projects.

5. Next Steps

Inside education has commenced discussions with a number of organizations, including Edmonton Calgary and surrounding area schools to gauge interest in holding another 'season' of the Clean Air Responsible Schools (CARS) Project. Feedback to date has been entirely positive with entire school districts interested in finding out more and possibly participating. Further, as air quality is now a front-of-mind issue in Alberta - notably after the Fort McMurray fires - Alberta Airsheds are interested in participating at both the local and provincial levels.

From a funding point of view Inside Education is pursuing the following avenues:

- Grants-in-Gear Legacy Grant application - currently in development;
- Meeting with the County of Strathcona (municipality outside Edmonton) to discuss working across the Elk Island School Districts to deliver program in 2016/17 school year;
- Applications have been submitted to Alberta Government

From a process point of view, the following actions are taking place:

- Grant MacEwan School to present at CRAZ annual general meeting - mid-June'
- Inside Education re-developing teaching resources in the expectation of program continuation in 2016/17

6. Conclusion

Inside Education is extremely pleased with the pilot season of Clean Air Responsible Schools. Support from Grants in Gear through the Automotive Recyclers of Canada meant that twenty-five classrooms, totalling 631 students across Edmonton and Calgary embarked on engaging, student-directed learning and action related to air quality around their school. We believe that by introducing them to air quality concepts, and by connecting them to personal action they can and will be motivated to make a difference. We fully expect schools, notably those in Calgary (where idling bylaws do not exist), to continue the "Idle Free" commitment created by the Grade Five Students this year.

The project was extraordinarily successful due to a series of factors:

- Generous, visionary support from the Grants in Gear program. We realize an education and action program can sometimes be difficult to quantify long-term - it can be a 'leap of faith' to support such a program. Know that it made a difference in the lives of the students today and into the future;
- Enthusiastic teachers - teachers are not looking for more to do. It takes extra commitment on their part to try something new, particularly when they are piloting a project for the first time and their feedback is essential. We were thrilled with the participation of the teachers - their excitement was infectious through to their students.
- Brilliant learners - The students participating in the program took what we designed and ran with it. They were delighted to participate in the Citizen Science aspects of the program - especially that their research was contributing to knowledge and understanding around the world through the "Air Casting" website. Their creativity, and engagement in the idling education component was what truly



made the difference in the air quality around their school, and likely in the long-term behaviour of their parents and themselves when they become drivers.

- Engagement from the community - we could not have delivered this program without the support and expertise of the Alberta Capital Airshed and the Calgary Region Airshed Zone.

Inside Education is extremely proud of the CARS program. The momentum created, and the engagement from Alberta's air quality community alongside the education system clearly demonstrates the value of this program moving forward. We again extend our appreciation to the Automotive Recyclers of Canada and Scout Environmental for your support and assistance throughout this incredible pilot project.

7. Appendix with photos and materials developed as part of the grant project

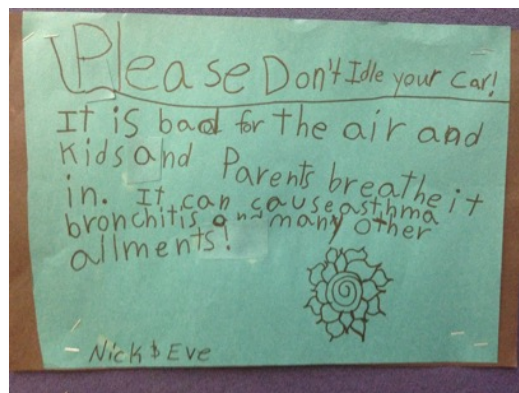
Schools developed poster, photo and video resources as part of their idling education program. The videos can be found here:

Victoria School for the Arts - https://drive.google.com/file/d/0B7hf_WrUYKWgUnZnbWFYcDRUUVe/view

St. Elizabeth Seton School - https://www.youtube.com/watch?v=jixlCP8tp_8

Hawkwood School - <https://youtu.be/fwl9iQwtwFU>

Sample of poster education resources:



Additional resources developed will be attached separately to this document. They include:

Teacher's resource guide

'Particle Picker Upper' sheets