

Idle-Free Campaign Kit – Windsor/Essex

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Clean Air Partnership



Idle-Free Campaign Kit

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About the Clean Air Partnership

The Clean Air Partnership (CAP) is a registered charity that works in partnership to promote and coordinate actions to improve local air quality and reduce greenhouse gases for healthy communities. Our applied research on municipal policies strives to broaden and improve access to public policy debate on air pollution and climate change issues. Our social marketing programs focus on energy conservation activities that motivate individuals, government, schools, utilities, businesses and communities to take action to clean the air.



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We hope that the entire school community will participate, but a campaign can also be run by a single class, or a group such as an after-school environment club. You can pick and choose the steps and/or activities for which your school/class has time, or those most relevant to your objectives.

Good luck and congratulations on your decision to make the air you breathe cleaner.



Introducing the Idle-Free Campaign Kit

An Idle-Free school assures students and parents that the air they breathe will not be polluted by vehicles idling on school property. Children are more vulnerable to vehicle emissions than adults because they breathe faster and they inhale more air per kilogram. Clean Air Partnership has created this kit with the ultimate goal of making all schools Idle-Free. The kit is designed as a one-stop resource for an Idle-Free school campaign. It contains all you need from the moment you decide to make your school Idle-Free, including step-by-step 'how to' instructions and data collection after the campaign. It includes a fund of additional resources such as sample letters to parents, data collection forms, and fact sheets.

PROGRAM GOALS

This kit has a number of goals. The first is to create an Idle-Free school. A second, but no less important goal is to give students the huge educational benefits that come with citizen action, including knowledge and understanding, skills and aptitudes, values and dispositions, and key concepts. All these can help prepare young people for active and informed participation in adult roles, responsibilities and duties. The campaign also provides opportunities to satisfy curriculum expectations in mathematics, science, language arts, media literacy, the arts, social studies, physical education and health.



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HOW TO USE THIS KIT

1. Learn About the Idle-Free Issue
2. Baseline Data Collection
3. Campaign Launch: Informing School Community
4. Awareness Campaign and Post-launch Data Collection
5. Evaluation of Data
6. Idle-Free School Celebration
7. Post-Campaign Data Collection

Learn About the Idle-Free Issue

DEFINITION OF AN IDLE-FREE SCHOOL

An Idle-Free school is one where all non-moving vehicles on school property do not have their engines running. Parents in vehicles waiting for their children will keep their engines off. Buses and other service vehicles will also have their engines off when they are stopped.

Why be Idle-Free?

HEALTH

Studies by Health Canada and community health departments and agencies show a direct, significant link between air pollution and respiratory health. These studies conclude that poor air quality and smog – caused in part by vehicle exhaust – result in increased hospital admissions, respiratory

illnesses and premature deaths, particularly in urban areas.

In fact, the Canadian Medical Association estimates that in 2008, 21,000 Canadians will die from the effects of air pollution, and that over 620,000 doctor's office visits will be due to air pollution.¹

The Ontario Medical Association – estimated in Essex County (Including Windsor) there were 260 premature deaths, 900 hospital admissions and 2750 emergency room visits associated with poor air quality.² Children are particularly vulnerable to air pollution because they breathe faster than adults and inhale more air per kilogram of body weight.

CLIMATE CHANGE

When a vehicle is idling, it releases more carbon dioxide (CO₂) than when it is moving. CO₂ is known as a greenhouse gas (GHG) because it contributes to the Earth's greenhouse effect, which occurs when greenhouse gases both natural and artificial radiate the sun's heat back to the Earth's surface. Like a greenhouse, this heats up the Earth. Excessive GHG emissions are believed to have caused an increase in global mean temperature. One possible catastrophic effect of a continued rise in global temperature would be the melting of

¹ *No Breathing Room: National Illness Costs of Air Pollution.*

<http://www.healthyenvironmentforkids.ca/resources/no-breathing-room-costs-of-air-pollution>

² *Ontario Medical Association: The Illness cost of Air Pollution.*

<https://www.oma.org/Resources/Documents/e2005HealthAndEconomicDamageEstimates.pdf>



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the polar ice caps and flooding of major coastal cities.³

SAVE MONEY

If health and climate change are not enough to convince you to go idle-free perhaps the fact that idling costs will. “Idling gives you zero miles per gallon”.⁴ In addition idling will increase your maintenance costs of your vehicle since:

Excessive idling can actually damage your engine's components, including cylinders, spark plugs and the exhaust system. That's because an idling engine is not operating at its peak temperature, which means that fuel combustion is incomplete. This leaves fuel residues that can condense on cylinder walls, where they can contaminate oil and damage engine components.⁵

Why Hold an Idle-Free Campaign at Your School?

Vehicle idling directly affects children. Parents and children benefit by understanding the problem as it relates to their health and the health of the environment, and they should be included in the solutions. Children are one of the best channels to educate parents and

³ *Climate Change North*
http://www.climatechangenorth.ca/section-bg/BG_HS_02_O_E.html

⁴ Natural Resources Canada, *FleetSmart Program: Idling Gets You Nowhere*.
<http://www.fleetsmart.nrcan.gc.ca/documents/PDF/idling-booklet-e.pdf>

⁵ <http://vancouver.ca/oneday/takeaction/idlefree.htm>

community members, but a school-based campaign is only the beginning. This campaign will help spread the message throughout the community that idling is no longer socially acceptable – in school zones or anywhere else. Vehicle idling is a “gateway behaviour”. Raising public consciousness of a relatively minor, easy-to-change action (idling in a school zone) can open the door to more meaningful behaviour changes relating to energy efficiency, air pollution and climate change.⁶

Idle-Free Campaign Resources: Appendices

In the Appendices we have included all the resources you need for your campaign.

Appendix A includes the templates and scripts you will need to inform school community members of your campaign. In addition data collection forms are available:

APPENDIX A: CAMPAIGN MATERIALS

- Sample letters to parents
- Data collection forms
- Student activities such as trivia quizzes, skits and games
- A resource guide of useful web links

Appendix B equips you with the facts behind the need for an Idle-Free school. It provides you with a backgrounder, fact sheets and a calculator for determining fuel use and CO₂ emissions.

⁶ Clean Air Partnership, *Idle-Free Campaign*.



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APPENDIX B: FACT SHEETS

- Idle-Free Campaign Backgrounder
- Health Impacts of Vehicle Idling
- Vehicle Idling Facts
- Environment Impacts of Drive-through Establishments

Appendix C supplies classroom activities such as the Idle-Free Game and Quiz, and a sample skit. It includes web resources, as well as links to the Ontario Grade 5 curriculum.

Baseline Data Collection

Before beginning a campaign to make your school Idle-Free, you need to collect baseline data on the current situation. Later, you will compare the baseline data with the data collected after you launch the campaign.

If you are a teacher coordinating a school-wide campaign, you may want to recruit your own students to collect data. This activity is ideal for grades 4, 5 or 6 as it can fulfill the data management strand in mathematics. Baseline data collection can take one to six weeks, depending on the amount of time you've set aside for your campaign and the number of students involved.

How to Organize It

Organize baseline data collection, by setting up a schedule so that participating students/observers each take data for 30 minutes. Students can work individually or in small groups. Depending on the pattern



of vehicle arrivals at your school, you might schedule students/observers 30 minutes prior to the start of school in the morning, and 30 minutes after school.

SEE APPENDIX A FOR:

- Student Observer's Instructions for Baseline Data Collection
- Bus Idling Observation Form
- General Idling Observation Form



Campaign Launch: Informing the School Community

After collecting baseline data, you will officially launch your school's Idle-Free campaign. The campaign itself can range from a single afternoon to a number of weeks.

INFORMING SCHOOL ADMINISTRATION AND STAFF

To minimize disruptions, consult the school administration before choosing the official campaign start date. The school administration will also be able to inform you of any board procedures that must be followed during such a campaign. Depending on the size of your campaign you will need to notify⁷:

- School administration and staff
- Parents
- Students
- Bus companies
- Delivery trucks
- Couriers
- Postal truck

INFORMING STUDENTS

Inform the student body about the Idle-Free campaign during morning announcements. To capture attention, several students can put together catchy raps, and/or skits about your school's mission to become Idle-Free. If you plan to

hold a school assembly, announce the date and time of the assembly. Students can also make signs and billboards to put around the school as reminders of the assembly and the Idle-Free campaign.

A school assembly is a great opportunity to make a strong impression on students, and impassion them with the Idle-Free message. At the assembly, explain in fun and creative ways why the school should become Idle-Free.

Here are some ideas:

- Perform skits (An example of an Idle-Free skit is included in Appendix C)
- Perform raps or songs
- Show DVD performance by students
- Invite an environmental champion
- Invite a local politician
- Invite the local media



⁷ The Lung Association Newfoundland and Labrador's *Idle-Free School Program*.
<http://www.nf.lung.ca/main.html>



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Informing Parents, Bus Companies, Delivery Trucks and Postal Truck

Send a letter home to parents informing them that the school is now Idle-Free and that they must turn off their vehicle's engine when they wait for their children. If you plan to hold a school assembly, you can invite parents to attend.

Depending on your school's relationship with bus companies, delivery trucks and the

postal service you can inform them by letter, phone, or direct contact when they arrive at your school.

You can create the letters, or use/adapt the letters in Appendix A.

SEE APPENDIX A FOR THE FOLLOWING:

- Sample Letter to Parents
- Sample Letter to Bus Company





Awareness Campaign and Post-Launch Data Collection

The Awareness Campaign will be very similar to the Baseline Data Collection with the exception that students/volunteers now approach drivers and ask for a verbal commitment to be Idle-Free. See Appendix A for students' Idling Observation Forms, as well as a sample dialogue for students to use when they make direct contact with drivers.

You may also want students to design their own school's Idle-Free Information Card. Have a contest for the best design, or you can download one off Natural Resources Canada's *Ready to Use Materials* website: <http://oee.nrcan.gc.ca/transportation/idling/material/campaign-resources.cfm?attr=28>.

Here are some suggestions to motivate student participation:

- Have students make creative billboards proclaiming their school is Idle-Free
- Give out participation certificates to all students involved
- Hold a prize draw for participants, perhaps offering environmentally-friendly donated products

- Hold a contest for best Idle-Free information card, poster, song, poem, or skit.
- Offer a pizza lunch to the class with the most participants.

INSTRUCTIONS FOR AWARENESS CAMPAIGN

1. Students approach cars in school parking areas in groups of two or more before and/or after school. If a large number of students are involved in the campaign, you may want some classes to approach drivers while others march near parking zones wearing placards displaying their Idle-Free artwork.
2. Students will inform drivers that the school is now an Idle-Free zone. They will ask for a verbal commitment from drivers to not idle their vehicles. They will offer them an information card if you have planned to include one in the campaign.
3. Students will fill in the Commitment Intervention Form to be Idle-Free.





Evaluating the Data

Students' grade level will determine the depth of data evaluation. The simplest evaluation is to compare the number of vehicles idling before your campaign and the number of vehicles idling after the campaign. A slightly more difficult evaluation involves calculating the average number of vehicles idling before and after

your campaign. Upper level students can apply the collected data to the formula below to show the actual reduction in greenhouse gas (GHG) emissions. Be sure to publish the data in captivating ways so the entire school community knows about the success of the campaign.

CONVERSION FORMULA

This conversion calculates the amount of wasted fuel and the amount of GHG emissions released during 10 minutes of idling for a bus and a car. You can simply multiply these amounts by the number of cars you observe idling. You can then subtract the amount observed after the campaign begins from the amount observed during your baseline data collection.

FOR CAR ENGINES:

*If 10 min of idling = 0.1 litres of wasted fuel then
100 min of idling = 1litre of fuel and
1 litre of fuel = 2.4 kg of GHG therefore
10 min of idling = 0.24 kg of GHG or
1 min of idling = 0.02 of GHG*

SO IF 10 CARS WERE OBSERVED TO BE IDLING THEN:

$10 \times .1 = 1$ litre of fuel was wasted in ten minutes
 $10 \times .24 = 2.4$ kg of ghg were emitted

IF BUSSES ARE OBSERVED TO BE IDLING, YOU CAN DO THE SAME FOR THEM USING THE FOLLOWING DATA:

*If 4 litres of fuel is wasted per hour of idling and
Each litre = 2.8 kgs of GHG** then
one hour of idling = 11.2kg of GHG or
60 min of idling = 11.2 kg of GHG therefore
1min of idling = 0.19 kg of GHG*



Idle-Free School Celebration

CELEBRATE YOUR ACHIEVEMENT

An Idle-Free school, cleaner air and reduction of greenhouse gas emissions! Publish your results to all members of the school community that you informed at the onset of the campaign.

Here are some suggestions:

- ✓ Send a letter home to parents congratulating them for a job well done and to encourage them to keep up the good work by continuing to not idle vehicles.
- ✓ Send a letter of thanks to bus companies and delivery trucks informing them of your results and to remind them that the school is permanently an Idle-Free zone.
- ✓ Announce the results during the morning announcements.
- ✓ Make colourful graphs showing your campaign results and display them throughout the school.
- ✓ Have a school assembly and invite environmental champions, local politicians, and/or media, if you have not already done so in your campaign launch assembly.





Post-Campaign Data Collection

If possible collect data approximately three months after the campaign to determine its effectiveness. The purpose is to find out how many drivers remember the campaign conducted three months before. This can be done with the same form used for the other data collections.

Here are some suggestions about what you may want to do after collecting post-campaign data:

- ✓ Send a letter home congratulating parents on their continued commitment to an Idle-Free school. Or, if the results were less encouraging, you can send a letter home reminding parents that the school is still an Idle-Free zone.
- ✓ Depending on the results send thank you letters, or gentle reminder letters to bus and delivery truck companies.
- ✓ Inform students of the 3 months post-campaign data results during morning announcements.
- ✓ Have a school assembly celebrating your results, which can be used as a springboard for other environmental initiatives at your school, for example walk-to-school days, litter-less lunches, energy conservation, etc.



Appendix A

Campaign Materials: Forms, Letters and Scripts⁸



⁸ The sample letters and dialogue are revised versions from earlier Idle-Free Campaigns by the Clean Air Partnership. We thank the Newfoundland Lung Association for the use of their Data Collection forms as models for our own.



Sample Letter to Parents

<DATE>

RE: <SCHOOL> IS NOW IDLE-FREE

Dear Parents and Guardians,

On <DATE, at TIME> we will be launching our Idle-Free Campaign. Please join us and offer your support. As of this date no vehicle should idle outside of the school.

Studies by Health Canada and community health departments and agencies have shown a direct link between air pollution and significant respiratory health effects. These studies have concluded that poor air quality and smog – caused in part by vehicle exhaust – are resulting in increased hospital admissions, respiratory illnesses and premature deaths, particularly in urban areas.

In fact, the Canadian Medical Association estimates that in 2008, 21,000 Canadians will die from the effects of air pollution, and that there will be over 620,000 doctor's office visits because of air pollution. The Ontario Medical Association estimated that in Essex County (including Windsor) there were 260 premature deaths, 900 hospital admissions and 2750 emergency room visits associated with poor air quality.

Children are particularly vulnerable to air pollution because they breathe faster than adults and inhale more air per kilogram of body weight. For these reasons and the fact that vehicle exhaust contains greenhouse gas emissions which contribute to climate change <SCHOOL> will, as of <DATE>, be an Idle-Free school.

In the coming weeks you will notice students attempting to communicate the message of an Idle-Free <SCHOOL> to drivers waiting to pick up students. Please keep a look-out and take the time to hear their message for cleaner air.

Sincerely,

<YOUR NAME>

Note:

- If you are located in a jurisdiction that has an anti-idling by-law you may want to consider adding the following sentence. "In addition, (jurisdiction's name here) has an anti-idling bylaw in place that makes idling a finable offense, much like illegal parking."
- As of 2008 the following are some of the municipalities in Ontario that had idling control by-laws. They include: Burlington, Collingwood, Guelph, Gravenhurst, Huntsville, Kingston, London, Markham, Newmarket, Niagara Falls, Oakville, Orillia, Oshawa, Pickering, St. Catharines, Stratford, Toronto, Vaughan, Whitchurch/Stouffville, Wasaga Beach, Windsor and Woodstock. More and more jurisdictions are adopting anti-idling by-laws so be sure to check if your municipality has done so.



Sample Letter to Bus Company

<DATE>

RE: <SCHOOL> IS NOW IDLE-FREE

Dear <BUS COMPANY CONTACT>,

On <DATE, at TIME> we will be launching our Idle-Free Campaign. Please join us and offer your support. As of this date no vehicle should idle outside of the school.

Studies by Health Canada and community health departments and agencies have shown a direct link between air pollution and significant respiratory health effects. These studies have concluded that poor air quality and smog – caused in part by vehicle exhaust – are resulting in increased hospital admissions, respiratory illnesses and premature deaths, particularly in urban areas.

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Student Observer's Instructions for Baseline Data Collection

1. Bring: a watch, a copy of the General Observation Form, a clipboard, and pens.
2. Be outside and ready to collect data before buses and cars arrive at the school. Continue to observe for approximately 30 minutes. If you need to leave a class before it ends, please do so quietly as to not disrupt the classroom.
3. On the form, fill in your name, date and time of observation, and weather conditions. Examples of weather conditions include: sunny, rain, overcast, hot, cold, snow.
4. If you are collecting data on buses fill in the BUS IDLING OBSERVATION form. For all other vehicles use the GENERAL IDLING OBSERVATION form. When filling out the form, follow these guidelines:

Description of vehicle – Anything you notice such as: type make, model, color of the vehicle (for example SUV Ford Expedition red).

Idling engine? Put Y or N in this column. If the driver turns off the engine immediately put N. Otherwise, place Y here.

Minutes idling – For vehicles that are idling, write the time in minutes. Put the amount of idling time in this column.

If more than one person is collecting data you can divide the school driveway and parking lot into sections. Assign each student or group of students to a section. Students can work together if there are a number of vehicles idling.

5. How to identify an idling vehicle?

Look for exhaust fumes.

Listen for the engine.

Look for vibration of the vehicle.

Smell for exhaust fumes.

Look for headlights on.

6. **Driver Behaviour.** Note what the driver is doing, for example, looking around, reading, listening to music, eating.



Sample Dialogues with Drivers

SAMPLE DIALOGUE FOR IDLING DRIVERS

Hi, my name is _____ and <SCHOOL> is now Idle-Free. Would you like to hear about the benefits of reducing vehicle idling?

If NO – Say thank you, and move to another vehicle.

If YES – Did you know that by idling your vehicle you are emitting toxic gases into the air that contribute to climate change and air pollution? Children are more vulnerable to air pollution because they breathe faster than adults and inhale more air per kilogram of body weight. Would you be willing to commit to being an Idle-Free driver especially in our school parking lot? Would you like to take this fact sheet on vehicle idling?

Thank you very much and have a great day.

SAMPLE DIALOGUE FOR DRIVERS NOT IDLING

Hi, my name is _____ and <SCHOOL> is now Idle-Free. We appreciate you turning off your engine while you wait for your children. Would you like to take this fact sheet on vehicle idling?

Thanks again for not idling and have a great day.



Appendix B: Fact Sheets





Idle-Free Campaign Backgrounder

Natural Resources Canada research indicates that vehicles on average idle six to eight minutes per day.⁹

Why do drivers idle their vehicles?¹⁰

- Warming up or cooling down a vehicle is the most common reason
- Waiting for passengers
- Stopping at railway crossings
- Waiting to park
- Running quick errands
- Sitting in drive-through lanes
- Waiting to refuel or to have the car washed
- Stopping to talk to an acquaintance or friend
- Preparing to leave the house
- Personal comfort
- Listening to the radio
- Parking illegally
- Convenience

Idling creates unnecessary pollution. A vehicle idling for five minutes produces more than a quarter kilogram (271.4grams) of the greenhouse gases that are destabilizing our planet's climate patterns. According to Natural Resources Canada, if every driver in Canada avoided idling for

⁹ Natural Resources Canada: *Idling Wastes Fuel and Money*

<http://www.nrcan.gc.ca/energy/efficiency/communities-infrastructure/transportation/idling/4459>

¹⁰ Natural Resources Canada: *Office of Energy Efficiency*.

<http://www.oee.nrcan.gc.ca/transportation/idling/why-idle.cfm?attr=16>

five minutes a day, we would prevent 1.6 million tonnes of carbon dioxide (the principle greenhouse gas) from entering the atmosphere.

Many drivers mistakenly believe it is more harmful to turn off their engine and re-start it than to idle.

Here are some other myths about idling:¹¹

IDLING WASTES FUEL

Idling for more than 10 seconds uses more fuel than turning off the engine and restarting it, according to Natural Resources Canada. One vehicle idling for five minutes burns just over one-tenth of a litre, or about eight cents worth of gasoline. Idling is an enormous waste of money because it burns fuel but does not get you anywhere.

RESTARTING A CAR MANY TIMES HAS LITTLE IMPACT ON ENGINE COMPONENTS

Studies have shown that restarting the engine numerous times have little impact on components like the battery and starter motor. The wear on parts that restarting the engine causes adds only about \$10 a year to the cost of driving – money likely recovered several times over in fuel savings enjoyed by motorists who don't idle, Natural Resources Canada reports.

¹¹ Clean Air Partnership, Idle-Free Campaign.



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IDLING IS A POOR WAY TO “WARM UP THE CAR” IN WINTER

You don't need to idle for more than 30 seconds to warm up your car. The best way to warm up your car in the winter is to drive it. Many components of the vehicle, including the wheel bearings, tires and suspension system will only warm up when the vehicle is moving. No more than 30 seconds of idling is needed to get the oil circulating through the engine.

IDLING CAN DAMAGE YOUR CAR'S ENGINE

Since an idling engine is not operating at its peak operating temperature, the fuel is not completely burned. This leaves fuel residue that can damage engine parts, including cylinders, spark plugs and exhaust systems. It can also contaminate engine oil.

DIESEL ENGINES STAY WARMER WHEN TURNED OFF INSTEAD OF IDLING

Idling a diesel-powered vehicle actually lowers the coolant temperature faster than shutting off the engine. So turning off the engine keeps it warmer longer than idling does.

THE DAILY ENVIRONMENTAL AND ECONOMIC COSTS OF IDLING

If vehicle in Windsor avoided idling for 3 minutes a day, the city could prevent 35.6 tonnes of carbon dioxide from entering the atmosphere each day. That's 12,995.5 tonne(s) per year! By avoiding idling for five minutes a day, motorists in Windsor could

collectively avoid wasting 15,480 litres of fuel each day, worth \$15,480.

On an annual basis, this translates into savings of 5,650,200 litres worth \$5,650,200 (based on \$1.00 per litre).

PROFILE OF AN IDLER

Research shows that the amount of idling a driver does tend to increase with the number of people in their household. A driver living with children is more likely to idle. The frequency of idling decreases as a person ages, with retirees least likely to idle. People in rural areas are more likely to idle than urban drivers.

Regionally, our B.C. cousins are least likely to idle, according to Natural Resources Canada.

IDLING HAS SEASONAL PEAKS AND VALLEYS

Idling is a problem year-round. A recent study revealed that in the peak of winter, Canadians idle their vehicles for a combined total of more than 75 million minutes a day – equal to one vehicle idling for 144 years. In summer, Canadians idle about 46 million minutes a day – the same as one vehicle idling for 89 years, according to Natural Resources Canada. The problem is worse in the winter, but there's never a good time to waste fuel and generate unnecessary pollution.



Health Impacts of Vehicle Idling¹²

- In 2008, 21,000 Canadians will die from the effects of air pollution, a figure projected to rise to 710,000 by 2031 according to the Canadian Medical Association.
- Studies by Health Canada and community health departments and agencies have shown a direct link between contaminants in vehicle emissions and significant respiratory health effects. These studies have concluded that poor air quality and smog – caused in part by vehicle exhaust – are resulting in increased hospital admissions, respiratory illnesses and premature deaths, particularly in urban areas.
- Children are particularly vulnerable to air pollution because they breathe faster than adults and inhale more air per kilogram of body weight.
- The incidence of asthma in children has doubled over the past 10 years. Recent studies suggest that pollutants such as diesel fuel can adversely affect lung function in asthmatics.
- Vehicle exhaust also contains air toxics such as formaldehyde and trace metals that have been linked to cancer and other chronic illnesses.
- Studies show that the levels of vehicle-related pollutants are higher in places

where idling is common, such as rest stops, bus stops, and near schools. These emissions affect both the driver and people exposed to emissions. Idling is also a source of greenhouse gases, which contribute to climate change. Climate change is expected to increase the frequency of very hot days in Windsor, leading to more heat-related illness and mortality, and worsening the effects of air pollution.

- Air pollution also causes unnecessary difficulty for elderly people and those with respiratory problems, such as asthma, emphysema and chronic bronchitis.
- Over 20 million minor illnesses will be attributed to air pollution in 2008 and that number will climb to over 26 million by 2031. Approximately 45% of minor illnesses will require restricted activity or asthma symptom days potentially resulting in absenteeism from work or school.



¹² *No Breathing Room: National Illness Costs of Air Pollution Summary Report.*

<http://www.healthyenvironmentforkids.ca/resources/no-breathing-room-costs-of-air-pollution>



Vehicle Idling Facts¹³

1. Idling gets you nowhere – and it can be costly. Excessive idling wastes a significant amount of fuel and money and generates needless greenhouse gas (GHG) emissions. If drivers of light-duty vehicles avoided idling by just three minutes a day, over the year Canadians would collectively save 630 million litres of fuel and 1.4 million tonnes of carbon dioxide (CO₂) emissions, and \$630 million in fuel costs (assuming a fuel cost of \$1.00/L).
2. Contrary to public belief, excessive idling is not an effective way to warm up your vehicle. Warming up the vehicle means more than warming the engine. The tires, transmission, wheel bearings and other moving parts also need to be warmed up for the vehicle to perform well. Most of these parts don't begin to warm up until you drive the vehicle. So the best way to warm up a vehicle is to drive it. In fact, with today's computer-controlled engines, even on cold winter days, no more than two to three minutes of idling is usually enough warm-up time before starting to drive.
3. Any more than ten seconds of idling uses more fuel than is required to restart the engine. However, the break-even time to offset any potential incremental maintenance costs to the starter or battery is under 60 seconds. So, as a guideline, if you're stopped for more than 60 seconds – except in traffic – turn off the engine.
4. For the average vehicle with a 3-litre engine, every 10 minutes of idling costs over one quarter of a litre (over 1 cup) in wasted fuel. Keep in mind that every litre of gasoline you use produces about 2.3 kilograms of carbon dioxide.
5. If you're going to be stopped for more than 60 seconds – except in traffic – turn the engine off. Unnecessary idling wastes money and fuel, and produces greenhouse gases that contribute to climate change.
6. You can help reduce the impact of cold starts – and reduce idling times – by using a block heater on cold winter days. This device warms the coolant, which in turn warms the engine block and lubricants. The engine will start more easily and reach its proper operating temperature faster.
7. You don't need to leave a block heater plugged in overnight to warm the engine – two hours is more than enough. In fact, you can use an automatic timer to switch on the block heater two hours before you leave. At -20°C, block heaters can improve overall fuel economy by as much as 10 percent. For a single short trip at -25°C your fuel savings could be in the order of 25 percent.
8. A poorly-tuned engine uses up to 15 percent more energy when idling than a well-tuned engine. Keeping your vehicle properly maintained according to the manufacturer's suggested maintenance schedule is a key to fuel efficiency and reduced GHG emissions.

¹³ Natural Resources Canada Office of Energy Efficiency.
<http://oee.rncan.gc.ca/transportation/idling/facts.cfm?attr=8>



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9. Calculations drawn from a 1998 survey on driving habits suggests that in the peak of winter, Canadians voluntarily idle their vehicles for a combined total of more than 75 million minutes a day – equal to one vehicle idling for 144 years. We idle about 40 percent less in summer, but Canadian motorists still waste a significant amount of fuel and emit unnecessary greenhouse gas emissions.
10. Warming up a vehicle in the winter and cooling it down in the summer are the most common reasons given for idling! Surveys show that Canadians also idle while waiting for passengers, stopping at railroad crossings, waiting to park, running quick errands, sitting in drive-through lanes and when stopping to talk to an acquaintance or friend.

VEHICLE IDLING FACTS:





Calculating fuel use and CO₂ Emissions¹⁴

This is how Natural Resources Canada arrives at the fuel, CO₂ and dollar amounts for three minutes of idling.

PER VEHICLE CALCULATION:

Idle time per day = 3 min per day = 0.050 hours per day

$$\text{IDLE FUEL FLOW (L/HR)} = (\text{IDLE FUEL FLOW FACTOR}_{12}) \times (\text{ENGINE DISPLACEMENT IN LITRES}_{13})$$

$$\begin{aligned} &= (0.6 \text{ litres/hr per litre of engine displacement}) \times (3 \text{ litres}) \\ &= 1.8 \text{ litres per hour} \end{aligned}$$

$$\text{IDLE FUEL USE (L/YEAR)} = (\text{IDLE FUEL FLOW}) \times (\text{IDLE TIME PER DAY}) \times (\text{DAYS IN YEAR})$$

$$\begin{aligned} &= 1.8 \text{ L/hr} \times 0.050 \text{ hr/day} \times 365 \text{ days/year} \\ &= 32.85 \text{ litres per year} \end{aligned}$$

$$\text{IDLE CO}_2 \text{ EMISSIONS (KG/YEAR)} = (\text{IDLE FUEL USE}) \times (\text{CO}_2 \text{ EMISSION FACTOR}_{14})$$

$$\begin{aligned} &= 32.85 \text{ L/yr} \times 2.3 \text{ kg/L} \\ &= 75.56 \text{ kg per year} \end{aligned}$$

$$\text{IDLE FUEL COST (\$/YEAR)} = (\text{IDLE FUEL USE}) \times (\text{COST OF FUEL})$$

$$\begin{aligned} &= 32.85 \text{ L/yr} \times \$1 \text{ per litre (assumed)} \\ &= \$32.85 \text{ per year} \end{aligned}$$

CANADA-WIDE SAVINGS – PER YEAR BASED ON THE YEAR 2007:

$$\text{FUEL SAVINGS (LITRES/YEAR)} = (\text{FUEL USE PER VEHICLE}) \times (\text{NUMBER OF VEHICLES})$$

$$\begin{aligned} &= 32.85 \text{ L/year} \times 19,198,960 \text{ vehicles}_{15} \\ &= 630,685,836 \text{ L/year} \\ &= 630 \text{ million litres per year} \end{aligned}$$

$$\text{CO}_2 \text{ SAVINGS (TONNES)} = (\text{CO}_2 \text{ EMISSIONS PER VEHICLE}) \times (\text{NUMBER OF VEHICLES})$$

$$\begin{aligned} &= 75.56 \text{ kg/year} \times 19,198,960 \text{ vehicles}_{16} \\ &= 1,450,577,423 \text{ kg/year} \\ &= 1,450,577 \text{ tonnes/year} = 1.4 \text{ million tonnes per year} \end{aligned}$$

$$\text{COST SAVINGS (\$/YEAR)} = (\text{FUEL COST PER VEHICLE}) \times (\text{NUMBER OF VEHICLES})$$

$$\begin{aligned} &= \$ 32.85 \times 19,198,960 \text{ vehicles}_{17} \\ &= \$ 630,685,836 \text{ per year} \\ &= \$ 630 \text{ million per year} \end{aligned}$$

$$\text{NUMBER OF VEHICLES OFF ROAD} = (\text{FUEL SAVINGS}) \div (\text{ANNUAL FUEL USE PER VEHICLE})$$

$$\begin{aligned} &= 630,685,836 \text{ l/year} \div 1,950 \text{ L/year} \\ &= 323,429 \text{ vehicles} \\ &= 320,000 \text{ vehicles} \end{aligned}$$

¹⁴ Natural Resources Canada Office of Energy Efficiency:
<http://oee.rncan.gc.ca/transportation/idling/calculations.cfm?attr=8>



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Canada-Wide Savings – Per Day:

The following values were calculated using the Canada-wide savings per year and dividing by 365 days:

Daily fuel savings: 1.7 million litres per day

Daily CO₂ savings: 3,974 tonnes per day

Daily cost savings: \$1.7 million per day

Annual fuel use and CO₂ emissions for various vehicle engine sizes and idle times.

IDLE TIME (Minutes per day)	FUEL USE (LITRES PER YEAR)			CO ₂ EMISSIONS (KG PER YEAR)		
	1 litre Engine	3 litre Engine	5 litre Engine	1 litre Engine	3 litre Engine	5 litre Engine
1	4	11	18	9	25	41
2	7	22	37	16	51	85
3	11	33	55	25	76	126
4	15	44	73	34	101	168
5	18	55	91	41	126	209
6	22	66	110	51	152	253
7	26	77	128	60	177	294
8	29	88	146	67	202	336
9	33	99	164	76	228	377
10	37	110	183	85	253	421

How can a vehicle produce about three times its own weight in CO₂ each year?

Ratio = (annual fuel use per vehicle × CO₂ emission factor) ÷ (average vehicle weight)

$$\begin{aligned} &= (1,950 \text{ L} \times 2.3 \text{ kg CO}_2/\text{l}) \div 1,450 \text{ kg} \\ &= 4,485 \text{ kg} \div 1,450 \text{ kg} \\ &= 3.093 \\ &= 3 \text{ times its own weight} \end{aligned}$$



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How does idling for just 10 minutes use over 1 cup of fuel for a vehicle with a 3 litre engine and over 2 cups of fuel for a vehicle with a 5 litre engine?

Idle time = 10 minutes = 0.166 hours

For a 3 litre engine:

Fuel use = (idle time) × (idle fuel flow factor 18) × (engine displacement)

$$\begin{aligned} &= (0.166 \text{ hr}) \times (0.6 \text{ L/hr per litre of engine displacement}) \times (3.0 \text{ litres}) \\ &= (0.166 \text{ hr}) \times (1.8 \text{ L/hour}) \\ &= 300 \text{ ml} \\ &= 300 \text{ ml} \div 236 \text{ ml per cup} \\ &= 1.3 \text{ cups} \end{aligned}$$

For a 5 litre engine

Fuel use = (idle time) × (idle fuel flow factor 19) × (engine displacement)

$$\begin{aligned} &= (0.166 \text{ hr}) \times (0.6 \text{ L/hr per litre of engine displacement}) \times (5.0 \text{ litres}) \\ &= (0.166 \text{ hr}) \times (3.0 \text{ L/hour}) \\ &= 500 \text{ ml} \\ &= 500 \text{ ml} \div 236 \text{ ml per cup} \\ &= 2.1 \text{ cups} \end{aligned}$$

Note: 1 cup = 8 fluid ounces = 236 millilitres

FACT: Every Litre of gasoline burnt produces 2.7 kg of CO₂. Compact cars average about 10L/100km in the city.

Full size and minivans average about 13.5 L/100k. SUV average about 16 Litres/100k

12 Review of the Incidence, Energy Use and Costs of Passenger Vehicle Idling; Gordon W. Taylor, P.Eng. Prepared for the Office of Energy Efficiency, Natural Resources Canada, 2003

13 In 2005 the average engine displacement for light-duty vehicles was 3.0 litres

14 Actual value: 2.289 kg CO₂/L – National Inventory Report 1990-2006, Table A12-7, April 2008

15 For the year 2007 from Statistics Canada

<http://www40.statcan.ca/l01/cst01/trade14a.htm>

16 Ibid.

17 Ibid.

18 Review of the Incidence, Energy Use and Costs of Passenger Vehicle Idling; Gordon W. Taylor, P.Eng. Prepared for the Office of Energy Efficiency, Natural Resources Canada, 2003

19 Ibid.



Environment Impacts of Drive-through Establishments¹⁵

- Carbon dioxide emissions double when speeds drop from 55 to 30 km/hr, and hydrocarbon emissions triple at speeds less than 60km/hr compared to a constant speed of 80 km/hr" (Central Ontario Smart Growth Panel Final Report 2003, p. 63).
- A study carried out by Clark University in Massachusetts determined that during an average day at a McDonald's drive-through, 272 cars and 131 trucks passed through the takeout lane. Cars spent 1,539 minutes idling, while trucks spent 698 minutes idling. The average daily release of emissions at that particular restaurant was determined to be 10,704.4 grams, and the total annual emissions was determined to be 3,906.7 kilograms using EPA idling data.
- A vehicle idling for five minutes (or an average visit through a drive through) burns just over one-tenth of a litre of fuel, or about eight cents worth of gasoline. This produces more than a quarter kilogram (271.4 grams) of GHG per drive-through visit!
- If a drive-through receives 300 customers per day (averaging 5 minute visits) this results in per year:
 - over 30 litres wasted per day and 10,950 litres/year per establishment
 - at \$1.00/litre = \$10,950/year in wasted fuel costs
 -
- 29,718 kilograms (almost 30 tonnes) of GHG produced per restaurant per year
- If every vehicle in Windsor avoided idling for 3 minutes a day, the city could prevent per day:
 - 35.6 tonnes of carbon dioxide from entering the atmosphere
 - 15,480 litres of wasted fuel
 - \$15,480 (that's over 5.7 million dollars each year!)

¹⁵ Clean Air Partnership, Idle-Free Campaign



Health Risks Associated with Drive-through Establishments

- Studies by Health Canada and community health departments and agencies have shown a direct link between contaminants in vehicle emissions and significant respiratory health effects. These studies have concluded that poor air quality and smog – caused in part by vehicle exhaust – are resulting in increased hospital admissions, respiratory illnesses and premature deaths, particularly in urban areas.

Natural Resources Canada, Idle-Free Zone, on-line at:

<http://oee.nrcan.gc.ca/transportation/personal/idling.cfm>

- Each year, an estimated 1,700 in Toronto people die prematurely due to short- and long-term exposure to polluted air.
- The Ontario Medical Association estimates that there were 9,500 premature deaths in Ontario in 2008 and 317 smog related deaths in Essex County.
(<https://www.oma.org/Resources/Documents/2008LocalPrematureSmogDeaths.pdf>)

- Health Canada estimates that more than 5000 Canadians die prematurely each year because of air pollution, and thousands more become unnecessarily ill.

Natural Resources Canada, Idle-Free Zone, on-line at:

<http://www.nrcan.gc.ca/energy/efficiency/communities-infrastructure/transportation/idling/4397>

DRIVE-THROUGH STATS

- In 1996, drive-throughs accounted for less than one in 10 meal occasions. Today, it accounts for more than one in five. If current trends continue, drive-throughs are expected to account for more than one in four restaurant meal occasions by 2010.

(Canadian Restaurant and Food Services Association, on-line at:

<http://www.crfa.ca>)

- 21 per cent of American consumers who frequent drive-through windows pull into the parking lot and consume their meals in their – running – cars.

(MacLeans Magazine On-Line, February 27, 2006, on-line at:

http://www.macleans.ca/topstories/business/article.jsp?content=20060227_122314_122314)

Appendix C: Resources and Links





Idle-Free Game¹⁶

INSTRUCTIONS:

This is a True or False game. Divide players into two teams. Line up so that the teams face each other in two lines. One team is the TRUE team; the other team is the FALSE team.

If the answer is true, then the TRUE team chases the FALSE team who try to run to the safety zone. If the answer is FALSE, then the FALSE team chases the TRUE team to the safety zone. If you are tagged, you join the other team. The biggest team wins.

QUESTIONS:

- 1) Coal and Oil come from clean and renewable sources. FALSE
- 2) Idling for more than ten seconds uses more fuel than just turning your car off TRUE
- 3) A car only needs 30 seconds to warm up before driving TRUE
- 4) If you can't see what comes out of a tailpipe, that means that a car isn't polluting FALSE
- 5) On average people idle their cars for 5-10 minutes a day- TRUE
- 6) Smog days occur naturally and there are just as many as there has ever been FALSE
- 7) There are more plants than people, and that means that there are enough to absorb all of our carbon dioxide FALSE
- 8) If all drivers in Canada avoided idling for five minutes a day we would save more than 1.8 million dollars TRUE
- 9) It takes 500 years for new coal to form FALSE
- 10) Greenhouse gasses act as a blanket around the world TRUE
- 11) 10% of all kids have asthma TRUE
- 12) Idling your car for more than 30 seconds is good for the engine FALSE

¹⁶ Clean Air Partnership, Idle-Free Campaign



Idling Quiz¹⁷

1. Idling wastes fuel and money and impacts the environment. True or false?

This is TRUE.

Idling wastes a significant amount of money because it burns fuel but doesn't get you anywhere. It's also impacts the environment because it produces air contaminants and greenhouse gas emissions from the vehicle.

2. With the advanced emissions technology used in today's vehicles, carbon dioxide (CO₂) emissions from an idling vehicle are greatly reduced. True or false?

This is FALSE.

While it's true that advanced emission control technologies have helped in reducing emissions of CACs such as volatile organic compounds (VOCs), carbon monoxide (CO) and oxides of nitrogen (NOX) – which can contribute to air quality problems – emission control systems do not reduce carbon dioxide (CO₂). This is an unavoidable by-product of burning gasoline or diesel fuel. But we can avoid burning fuel and producing CO₂ emissions by eliminating unnecessary vehicle idling.

3. Idling contributes to the climate change problem. True or false?

This is TRUE.

Carbon dioxide (CO₂) – the principle greenhouse gas that contributes to climate change – is classified as a greenhouse gas because it increases the earth's natural "greenhouse effect" and in doing so is altering the world's climate. CO₂ is an unavoidable by-product of burning gasoline. Each litre of gasoline that is used produces about 2.3 kg of CO₂. Therefore, every time you start the engine, you're contributing to climate change.

4. In the winter, the best way to warm up a vehicle is to drive it. True or false?

This is TRUE.

The best way to warm a vehicle up is to drive it. With today's computer-controlled engines, even on cold winter days no more than two to three minutes of idling is

¹⁷ Natural Resources Canada Office of Energy Efficiency.
<http://oee.nrcan.gc.ca/transportation/idling/quiz.cfm?attr=8>



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usually enough warm-up time before starting to drive. Also many parts of the vehicle – including the wheel bearings, tires and suspension system – will warm up only when the vehicle is moving. Until the engine temperature begins to rise, it's a good idea to avoid high speeds and rapid acceleration until all parts are warmed up. It's also important to ensure that windows are free from snow and properly defrosted before driving away!

5. Using a block heater helps an engine warm up quickly, which means less fuel consumption. True or false?

This is TRUE.

You can help reduce the impact of cold starts – and reduce idling times – by using a block heater on cold winter days. This device warms the coolant, which in turn warms the engine block and lubricants. The engine will start more easily and reach its proper operating temperature faster. At -20°C, block heaters can improve overall fuel economy by as much as 10 percent. For a single short trip at -25°C, your fuel savings could be in the order of 25 percent.

6. Idling warms up the entire vehicle: True or false?

This is FALSE.

Many parts of the vehicle – including the wheel bearings, tires and suspension system – will warm up only when the vehicle is moving. Actually, the best way to warm it up is to drive it. In fact, with today's computer-controlled engines, even on cold winter days two to three minutes of idling is usually enough warm-up time before starting to drive.

7. It's a good practice to shut off the engine when your vehicle is going to be stopped for more than:
- a. 60 seconds
 - b. 10 minutes
 - c. 30 minutes

The answer is a.

Believe it or not, idling for over 10 seconds uses more fuel (and produces more CO₂) than restarting your engine. However, as a guideline, if you're going to stop for 60 seconds or more – except in traffic – turn the engine off. You'll save money on fuel that should more than offset any potential increased maintenance costs from any extra wear and tear on your starter or battery. And your vehicle won't produce emissions of



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carbon dioxide, the principle greenhouse gas contributing to climate change.

8. I should turn my vehicle off when I'm caught either in stop-and-go traffic or at a long stoplight. True or false?

The answer is FALSE.

The 60-second rule is a good one; however, remember, you can't avoid some idling. Turning off your vehicle in these situations is a safety hazard. The engine should be left running in case of an emergency situation.

9. Idling is a problem only in winter. True or false?

The answer is FALSE.

Idling is a problem year-round. Calculations drawn from a Canadian study on driving habits and behaviours found that on any given day in August, Canadians idle their vehicles for a combined total of more than 46 million minutes per day – equal to one vehicle idling for 89 years. The problem is worse in winter, but there's never a good time to waste fuel and generate greenhouse gas emissions by idling your vehicle.

10. Which of the following are reported in a cross-Canada survey for the most common reasons why Canadians idle?
- a. warming up a vehicle
 - b. sitting in drive-through lanes
 - c. stopping to talk to a friend
 - d. waiting for someone
 - e. all of the above

The answer is e.

These are all "reasons" for idling according to a Canadian study on driving habits and behaviour.

11. Making sure it's safe to drive the vehicle away is more important than reducing idling time. True or false?

The answer is TRUE.

Safety should always be your first consideration. Make sure that the vehicle's windows are clear of ice and snow and are defrosted before you pull away. To prevent your car



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windows from fogging up, clear snow from the air intake on top of the hood and open a window as soon as you enter the vehicle.

- 12.** If you are going to be stopped for more than 60 seconds, turning the engine off saves money.

The answer is TRUE.

If you turn the engine off for more than 60 seconds you should be saving money. The break-even point to offset any potential incremental maintenance costs due to wear and tear on the starter and battery is under 60 seconds.

- 13.** A poorly tuned engine, whether you're driving a vehicle down the road or letting it idle, uses up to 15 percent more fuel than a well-tuned vehicle. True or false?

The answer is TRUE.

Whether you're driving a vehicle down the road or letting it idle in your driveway, a poorly tuned engine will consume more fuel – and generate more greenhouse gas emissions – than one that you properly maintain.



Sample Skit

A FAMILY DRIVE: MOM LEARNS THE TRUTH ABOUT IDLING

Mom: You kids get dressed I'm going to warm-up the car for everyone. I wish I had a remote starter like the Smiths next door.

Child: Mom, you don't need to start the car for us. We're dressed properly for the weather.

Child 2: A remote starter would produce unnecessary idling. Using a block heater is a more efficient and effective way to warm the engine than idling. A block heater warms the engine-block and lubricants, which make the engine, start more easily and reach its peak operating temperature faster.

Mom: It's better for the car, dear. We could damage the engine if we start driving when the engine is not warm.

Child 2: Well, actually Mom. It's not. Modern vehicle engines do not need to be warmed in the winter before they are driven. Most of the engine's parts only warm up when the engine is moving. Don't you realize that by idling the vehicle you are emitting twice as much air pollution compared to when it is moving?

Mom: No I didn't. Next thing you'll be telling me is that we should trade our Hummer in for a Smart Car.

Child: Better yet. How about some bicycles?

Mom: Come on. Let's just get in the car.

FAMILY GETS IN CAR. START DRIVING AROUND.

Mom: I need a coffee. Do you kids want doughnuts for breakfast?

Child 2: I'd prefer a yoghurt and fruit.

Child: I want a bran muffin actually. Hey look how long the drive-thru is.

Mom: That's okay. As long as I keep the engine running we'll be warm and cozy in here.

DRIVE UP TO DRIVE-THRU

Child: Why don't we turn off the engine since the line isn't moving?



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Mom: If we keep starting and stopping the car it might hurt the engine, plus it's a huge waste of gas, Honey.

Child 2: Actually Mom restarting a car many times has little impact on engine components such as the battery and the starter motor. The wear on parts that restarting the engine causes adds about \$10 a year to the cost of driving – money that you'll likely recover several times over in fuel savings.

Child: If you are going to be idling for longer than 10 seconds you will be using more gas than if you stop and re-start your engine.

Mom: Why don't you we just go in to the doughnut shop and turn off the engine?

Child 2: That's a great idea, Mom.

Mom: After all the lessons you've taught me today, I don't think I'll ever idle again.

Child and **Child 2:** Not with us around you won't.



Helpful Websites

ACER

The City of Mississauga's Idle-Free Campaign

http://www.mississauga.ca/portal/residents/idlefree?paf_gear_id=9700018&itemId=42200031

CLEAN AIR PARTNERSHIP

Idle-Free in the GTA

<http://www.cleanairpartnership.org/idle/>

ONTARIO LUNG ASSOCIATION

<http://www.on.lung.ca/airquality>

NATURAL RESOURCES CANADA OFFICE OF ENERGY EFFICIENCY

Welcome to the Idle-Free Zone

<http://www.nrcan.gc.ca/energy/efficiency/communities-infrastructure/transportation/idling/4397>

MUNICIPALITIES AND SCHOOLS

- **City of Windsor – Environmental Master Plan Goal A – Improving our Air and Water Quality**
<http://www.citywindsor.ca/residents/environment/Environmental-Master-Plan/Goal-A-Improve-Our-Air-and-Water-Quality/Pages/Goal-A-Improve-Our-Air-and-Water-Quality.aspx>
- **Toronto Public Health Air Quality**
<http://www.toronto.ca/health/airquality/smog/index.htm>
- **Ontario Ecoschools**
<http://www.ontarioecoschools.org/>



Grade 5 Curriculum Links¹⁸

SCIENCE AND TECHNOLOGY

OVERALL EXPECTATION

- Evaluate the reasons for conserving natural resources and identify possible ways of conserving energy.

SPECIFIC EXPECTATIONS

- Formulate questions about and identify needs and problems related to protection of the natural environment, and explore possible answers and solutions (e.g., investigate how local recycling efforts help conserve energy and natural resources);
- Plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- Compile data gathered through investigation in order to record and present results, using tally charts, tables, and labeled graphs produced by hand or with a computer communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings, and charts (e.g., use a word processor and graphics program to create a booklet about the design, construction, and effectiveness of a product that meets a specific need; debate the environmental implications of using various sources of energy).

MATHEMATICS – DATA MANAGEMENT

OVERALL EXPECTATIONS

- Collect and organize discrete or continuous primary data and secondary data and display the data using charts and graphs, including broken-line graphs.

SPECIFIC EXPECTATIONS

- Collect data by conducting a survey or an experiment (e.g., gather and record air temperature over a two-week period) to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements;
- Calculate the mean for a small set of data and use it to describe the shape of the data set across its range of values, using charts, tables, and graphs (e.g. “The data values fall mainly into two groups on both sides of the mean.”; “The set of data is not spread out evenly around the mean.”); – compare similarities and differences between two related sets of data, using a variety of strategies (e.g., by representing the data using tally charts, stem-and-leaf plots, double bar graphs, or broken-line graphs; by determining measures of central tendency [i.e., mean, median, and mode]; by describing the shape of a data set across its range of values);
- Design surveys, collect data and record the results on given spreadsheets or tally charts, display data on graphs.

¹⁸ Excerpts from Ontario Curriculum Guides, <http://www.edu.gov.on.ca/eng/curriculum/elementary/subjects.html>



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LANGUAGE - MEDIA LITERACY

SPECIFIC EXPECTATIONS

CREATING MEDIA TEXTS

- Describe in detail the topic, purpose, and audience for media texts they plan to create (*e.g., an advertising campaign to encourage students to participate in a charity drive*)
Teacher prompt: "What do you want to say? Who is your audience? How do you want to influence your audience?"

FORM

- Identify an appropriate form to suit the specific purpose and audience for a media text they plan to create, and explain why it is an appropriate choice (*e.g., a pamphlet or newsletter to inform parents, teachers, and students about environmental initiatives taken or planned by members of the school community*)
Teacher prompt: "Why would a pamphlet or a newsletter be better than a poster to communicate this message?"

CONVENTIONS AND TECHNIQUES

- Identify conventions and techniques appropriate to the form chosen for a media text they plan to create, and
- Explain how they will use the conventions and techniques to help communicate their message.

PRODUCING MEDIA TEXTS

- Produce a variety of media texts for specific purposes and audiences, using appropriate forms, conventions, and techniques.

THE ARTS - DRAMA AND DANCE

SPECIFIC EXPECTATIONS

- Create characters and portray their motives and decisions through speech (*e.g., vocabulary, volume*) and movement (*e.g., hand gestures, facial expressions, pace*); – rehearse and perform small-group drama and dance presentations drawn from novels, poems, stories, plays, and other source materials;
- Select words, visual images, and sounds from other subjects in the curriculum for interpretation and dramatization.