

Climate Change in My Municipality: an Inquiry (Pilot Version)

...for high school geography, science and environmental studies



1. Initiate and Plan the Inquiry

- **Observe:** Ask the students to *imagine Christmas, Eid, Thanksgiving or Passover, etc. with no electrical power in their house, apartment or condo.*
- **Question:** *What would a holiday celebration be like without electricity? What would be different? How would people feel? What alternative arrangements could be made? How would it be worse in winter? Are municipalities more vulnerable than small towns or rural dwellers?*
- In thinking about a spark for your students think of a situation where climate change has already shown evidence in your municipality. Think of the vulnerability of municipalities (especially large municipalities) where concentrations of people mean depending on infrastructure, being unprepared to live without amenities and being dependent on a functioning economy.
- A municipality faces particular challenges in terms of climate change. As the students prepare for their inquiry plan ask them to think about what challenges a municipality, or their municipality specifically, will face as and/or if climate change persists. Prompt them to think about:
 - the density of the population,
 - general unpreparedness of urban dwellers to be without power and working infrastructure,
 - the industries that operate in your area,
 - the daily life of the people.
- **Plan:** Following the open discussion, students choose and plan their ***Inquiry performance task***. Planning could be initiated in a guided class session and/or by providing students with the *Student Guide to Conducting An Inquiry into Climate Change Where I Live* [to be added June 2014]. Form groups around common Inquiry performance tasks. Students plan:
 - Perform (Investigate) and Record
 - Analyze and Interpret
 - Communicate: At the outset, students plan how they will communicate their Inquiry. Communication could target other students, the school community or the municipality as a whole. Think of events where the vulnerability of the municipality in the face of climate change can be highlighted or where public

Climate Change in My Municipality is one of a series of Inquiries — called **Climate Change Where I Live** — that enable students to examine the impacts of climate change where they live, identify the mitigation and adaptation measures required to address these changes, and take action.

Climate Change in My Municipality was developed by Dick Holland and Gordon Harrison of GreenLearning Canada.

The Inquiry Method: For more on using the Inquiry-method to explore climate change, see

- *A Teacher's Guide to Conducting CCWIL Inquiries* [to be added June 2014];
- *A Student Guide to Investigating Climate Change Where I Live* [to be added June 2014].

Curriculum Fits for **Climate Change in My Municipality: an Inquiry**

- SNC2P1 (Ont)
- SNC2D (Ont)
- CGC1D, Livable Communities Unit, Grade 9 Geography (Ont)
- CGC1P (Ont)
- CGF3M (Ont)
- SVN3E (Ont)
- SVN3M (Ont)

[During the pilot, Curriculum Fits for other provinces will be added].

Assessment Rubrics can be found below.

Collaborating Among Classes and/or Teacher-to-Teacher: Students in the same class or school or in another province can collaborate to plan and conduct an Inquiry (for example, in a Municipal Inquiry, a series of collaborations to cover different parts of the city); OR, meet virtually to share the results of their Inquiries and do peer

awareness can be raised.

- **Evaluate:** plan as a class using the Assessment Rubrics below.
- You will want the students to choose how they structure their inquiry and this will emerge as you listen and help guide their discussions from the side. One way they might structure the inquiry is for small groups to each look at the effects of climate change on a different sector of their municipality. For example:
 - a. changes in recreation
 - b. health (respiratory and other)
 - c. local economy
 - d. agriculture in the surrounding area
 - e. family budget impacts
 - f. infrastructure
- **Hypothesize:** How do you think climate change is/can affect your community or municipality?
- [During this step and throughout the inquiry, students may ask questions or raise comments such as “I’ve heard that climate change is a hoax.” A resource to help you facilitate this side-inquiry — ***Climate Change Is Real?*** — will be added in June 2014.]

2. Perform (Investigate) and Record

- In groups, students read, select, evaluate and integrate information from various sources, including electronic and print resources, to answer the questions chosen.
- Specific resources to support the Municipal Inquiry appropriate for students have been identified and added to the COOL 2.0 Database; **see side bar**.
- Students can use the ask-an-expert feature to gather data and information relevant to their inquiry; **see the side bar** for experts on climate change and municipalities, especially specific municipalities.
- Students can also search the COOL 2.0 Database using such search words as CCWIL, municipality, community, climate change, etc. Keep an eye on the COOL 2.0 Database as new resources are added on an on-going basis.
- They can also search the web for resources to support their Inquiry; if you or students find a resource(s) to support this Inquiry, please add it to the COOL 2.0 Database.
- Students can also seek out reports, data and experts by contacting their local municipality (start with the environment or health office or the local councilor) or a local environmental organization.
- The [Greenhouse Gas Emissions Calculator](#) enables students to identify and track personal actions to reduce their GHG emissions.

review; OR, meet virtually to plan joint presentations or action project. You and another teacher(s) can use the ***Collaborative Space*** in COOL 2.0 to collaborate in developing an Inquiry. Contact GreenLearning at info@greenlearning.ca for help in finding a class to collaborate with or to set up a collaborative project of your own.

Showcase Student Inquiries — and your versions of these Inquiries — in the COOL 2.0 Database: [information to be added June 2104]

Resources to Support a Student Inquiry into *Climate Change in My Municipality*: Primary resource materials, experts ready to work with your students and other resources to support the Inquiry are described below and can be found in the [COOL 2.0 Database](#) (direct links to the COOL 2.0 database). In addition, tips for finding resources are given below. **If you cannot find resources for your municipality,** please contact us at info@greenlearning.ca.

- [Daniel Shipp](#) — has expertise on *climate change and the City of Kingston* — is available through ask-an-expert.
- **Heather Auld** [[to confirm/add link](#)]
- [A CBC Media Panel on climate change and extreme weather](#) (Winnipeg) — although specific to a particular city, this is a good resource to initiate an Inquiry — the link between climate change and taking a shower?
- [Climate Change and Kingston: The Changing Climate, Greenhouse Gases, Mitigation and Adaption](#). Although specific to Kingston, Powerpoint has lots of information on the impacts of climate change and extreme weather relevant anywhere. Lots of excellent graphics and information. By Don Maciver and Heather Auld of Risk Sciences International.
- [Adapting to a Warmer World](#) This radio interview provides a good overview of the current climate change situation with some examples of real action at the local level (municipal). Show-host, Bob McDonald talks with Dr. Debra Davidson and Dr. Stewart Cohen; both contributed to [Climate Change 2014: Impacts, Adaptation and Vulnerability](#) (report of the Intergovernmental Panel on Climate Change). CBC *Quirks & Quarks*, April 5, 2014
- [Climate Resilience for Municipalities](#), a pamphlet advising municipalities what steps they need to take to prepare for extreme weather – and why (although designed for

<p>3. Analyze and Interpret</p> <ul style="list-style-type: none"> Students reflect on and discuss their preliminary findings and observations to compare this to their previous knowledge and they clarify and modify their focus question(s) and inquiry plan. Students review and evaluate the information they collected and record this information Students use their information to answer their inquiry question(s), test their hypotheses, describe patterns and draw conclusions Students reflect on their findings to create new questions and hypotheses. Note that there may be opportunities for collaboration with another class at this stage because the size of municipalities means there may be another class in your Board or area doing the same inquiry. You and another teacher(s) can use the ‘collaborative space’ in COOL 2.0 to work on this. We can also use social media to help you find a partner class. <p>4. Communicate</p> <ul style="list-style-type: none"> There are many choices of student assessment that are possible for this inquiry. Look for opportunities for authentic tasks connected to your municipality. There might be a city official or elected representative who has talked about how climate change will affect the city budget and might be receptive to hearing from students. Maybe there are even hearings in your area and students could make deputations. Students might want to describe or illustrate what their municipality could look like in 25 years. Maybe they want to educate other students through the school website or in an assembly or display in the school. Individually – create a mind map, poem/song, poster, infographic, PSA (public service announcement), or some other form of work (in consultation with the teacher) that addresses their hypothesis, as formed, of their inquiry. Assessment Rubrics follow. 	<p>municipalities in Alberta, this pamphlet is relevant to all communities). Produced by C3, a climate change and sustainability organization.</p> <ul style="list-style-type: none"> Building Resilience to Climate Risks is a document of 44 slides from a September 2013 webinar with many graphs and infographics – almost all of which apply to extreme weather investigations across Canada. Produced by C3, a climate change and sustainability organization. Calgary Floods Spotlight Cities’ Costly Failure to Plan for Climate Change, “Many Canadian cities and towns are ill-prepared for the rising frequency of catastrophic weather events like the southern Alberta floods, and it’s a problem that taxpayers will ultimately end up paying for, climate change experts say.” Huffington Post, April 21, 2014 The Greenhouse Gas Emissions Calculator enables students to identify and track personal actions to reduce their GHG emissions. Students can also conduct a wider search in the COOL 2.0 Database using such search words as <i>CCWIL</i>, <i>municipality</i>, <i>community</i>, <i>climate change</i>, etc. — keep an eye on the COOL 2.0 Database as new resources are added on an on-going basis. They can also search the web for resources to support their Inquiry; if you or students find a resource(s) to support this Inquiry, please add to the COOL 2.0 Database
--	---

Three Sample Rubrics for the Inquiry, *Climate Change in My Municipality*

Mind Map, Achievement Chart

Criteria	Level R	Level 1	Level 2	Level 3	Level 4
Appropriateness of Key Images	Very little or no evidence of key images. Images that used are ineffective or inappropriate.	Some evidence of key images, however, some or most of the images used are ineffective or inappropriate.	Use of images is evident, but either to few or inappropriate at times.	Good use of images that are appropriate and correct in number and have a good connection to central image.	Dynamic use of key images that are highly suitable and have a deep connection to central image.
Appropriateness of Key Words	No use or very limited use of key words to explain importance of	Limited use of key words to explain importance of images to	Key words are used for images in order to explain their importance	Good use of keywords to demonstrate the relevance and	There is a highly effective use of keywords to

	images to the main idea or connections between ideas. Very limited understanding of topic is demonstrated.	the main idea or the connections to main ideas. Limited understanding of topic is demonstrated.	and/or connections, however at times, not always suitable or relevant. Mediocre understanding of topic is demonstrated.	importance of images and ideas to main topic. A good understanding of topic is demonstrated.	demonstrate the relevance and importance of images and ideas to main topic. A deep understanding of topic is demonstrated.
Overall Structure	Ideas do not radiate outward from centre from most complex to least complex or no apparent connection between ideas and central image.	Little or no indication that ideas are connected to or radiate out from centre from most complex to least complex.	Some indication that ideas are connected and radiate out from central image and for the most part ideas are moving from most complex to least complex.	A clear indication that ideas are connected and radiate out from the central image in a hierarchical manner from most complex to least complex.	A clear and highly effective indication of the connection between ideas and central image is present. The ideas consistently and accurately move in a hierarchical manner from most complex to least complex.
Colour Selection and Appropriateness	No or very little evidence for effective use of colour, codes and/symbols. Most of these efforts lack total purpose and have no positive effective on clarity or understanding of the mind map.	There is some evidence for the use of colour, codes and/or symbols, however, these efforts lack purpose and clarity and do not bring clarity to the mind map.	There is an obvious, earnest attempt at the employment of colour, codes and/or symbols to clarify and highlight the connections for some aspects of the mind map, however, it is not totally effective.	For the most part, there is good use of colour, codes or symbols that help to clarify and highlight the connections for most of the aspects of this mind map.	There is a highly effective use of colour, codes or symbols that help to clarify and highlight the connections for all aspects of this mind map.
Central Image	Not present or not clear at all and cannot be separated from other images with any degree of successfulness	Not very clear and difficult to separate from other images and words in the map	Somewhat clear, but lacking in suitability with topic at hand	Clear picture, relates well to topic at hand, some imagination and creativity involved.	Picture stands out, Very clear, memorable and a high degree of imagination and creativity involved.

Poem / Song Performance, Achievement Chart

Criteria	Level R	Level 1	Level 2	Level 3	Level 4
Presentation of Information Presentation of the elements impacting maple syrup production	Minimal number of elements are presented	Limited number of elements is presented.	Some elements are presented	Considerable number of elements are presented	Thorough presentation of the elements
Accuracy in the presentation of the elements impacting maple syrup production	Contains more than two major errors or more than three minor errors	Contains at least one major error or three minor errors	Contains no more than three minor errors	Contains no more than two minor errors	All events are accurate

Knowledge and Understanding Organization of the song/poem respects the processes involved in maple syrup production	Information is disorganized and difficult to follow	Information is poorly organized with more than three errors	Information is well organized with no more than two errors	Information is well organized with more than one minor error	All information is well organized in a logical order
Communication Delivery of the message	The message is unclear or impossible for the listener to follow	The message is unclear or impossible for the listener to follow	The message to the viewer is clear. Most listeners would have understood the message	The message to the viewer is clear. The listeners would have understood the message	The message to the viewers is clear and strong. It would have been easy for the listener to understand

Infographic, Achievement Chart

Criteria	Level R	Level 1	Level 2	Level 3	Level 4
Application Research period Has the student effectively used print and/or internet sources to research the topic?	- very little research has been demonstrated	- little research has been demonstrated	- some research has been demonstrated	- considerable research has been demonstrated	- a high degree of research has been demonstrated
Thinking / Inquiry Has the student thought about and completed the task in a creative manner?	- creative thinking skills have been utilized with very little effectiveness	- creative thinking skills have been utilized with little effectiveness	- creative thinking skills have been utilized with moderate effectiveness	- creative thinking skills have been utilized with considerable effectiveness	- creative thinking skills have been utilized with a high degree of effectiveness
Communication Has the student included a title, background, colour accurately and NEATLY?	- a title, background, and colour have been done with very little accuracy and neatness	- a title, background, and colour have been done with little accuracy and neatness	- a title, background, and colour have been done with some accuracy and neatness	- a title, background, and colour have been done with considerable accuracy and neatness	- a title, background, and colour have been done with thorough accuracy and neatness
Knowledge / Understanding Did the visual material (minimum 2 pictures and 1 diagram) accurately depict the topic?	- visual material did not accurately depict the climate factor	- visual material depicted the climate factor with little accuracy	- visual material depicted the climate factor with some accuracy	- visual material depicted the climate factor with considerable accuracy	- visual material depicted the climate factor in a thoroughly accurate manner
Communication Has the student effectively answered the questions?	Questions answered with very little clarity	Questions answered with little clarity	Questions answered with moderate clarity	Questions answered with considerable clarity	Questions answered with a high degree of clarity

