

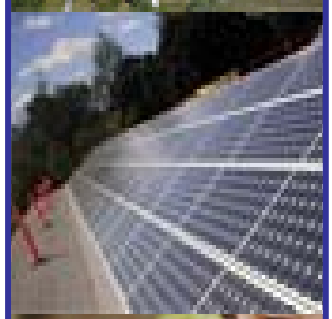



Climate Change: Grade 9

Planning to be part of my Region!
Planning Peel –A Lesson Plans Series

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Welcome!

Welcome to Planning to be part of my Region! A series of lesson plans aimed at educating Grade 9 students about Climate Change in the Region of Peel.

The lesson plans focus on building an understanding of regional climate change and how people can mitigate and adapt to these impacts. Students will be asked to make decisions and voice their opinion about climate change. They will also be asked to share their thoughts on how to build a sustainable Region to combat climate change.

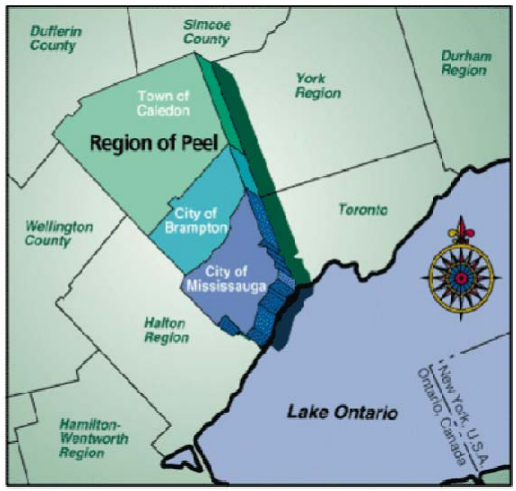
We hope that through teaching these lessons, students will become more aware about the Region they live in and be empowered to make decisions that will impact their future.

Objectives

The Region of Peel Integrated Planning Division has a variety of objectives in the development of these lesson plans:

1. To build an awareness of Region of Peel's planning research projects and initiatives through the development of educational resources and lesson plans for use by teachers and students.
2. To link Regional Planning initiatives to Grade 9 Ontario curriculum expectations.
3. To create hands-on, minds-on, integrated lesson plans to support student learning and understanding of climate change.

The Region of Peel



The following introduction provides background information regarding the geographic Region of Peel and is intended to help you prepare for teaching of the lessons.

Situated in the heart of southern Ontario's major urban centres, the Region of Peel is the second largest municipality in Ontario, with a population of over one million. The Regional municipality of Peel consists of three municipalities – cities of Mississauga, Brampton, and town of Caledon.

The Region of Peel has an urban and rural system. Brampton and Mississauga make up the urban system where the majority of growth has occurred in Peel. Currently, Mississauga comprises the majority of Peel's population, but the significant growth in Brampton is expected to close the gap. Both Brampton and Mississauga have experienced rapid population growth and commercial development which has transformed what was primarily a rural area of natural landscapes, farms and villages into a dynamic blend of urban, industrial and residential areas.

Rapid growth in the Region will potentially contribute to the impact of climate change. An increase in population means an increase in carbon emissions to the area. Increasingly, humans are releasing carbon into the atmosphere through the burning of fossil fuels, the atmosphere now contains 32% more carbon dioxide than it did at the beginning of the 20th century. These actions result in an increase of global temperatures.

Climate change may result in an increase in the frequency and severity of extreme weather events in the Region. It is difficult to determine to what extent these impacts may have, but it is known that the Region of Peel will experience some shifts in climate. These impacts may result in declining availability of water supplies or damage to property due to severe storms. Given the unpredictable nature of these effects the Region of Peel is taking a proactive approach to reduce greenhouse gas emissions (GHG) now and adapt to these changes in hopes of reducing the impact of climate change in the future.

Communities in the Region of Peel can play an important role in combating climate change through the reduction of carbon emissions also known as greenhouse gas (GHG). Taking steps to reduce carbon emissions and preparing to adapt to the impact of climate change will help communities improve their resiliency to climate change.

Providing knowledge about climate change is an important topic for study by youth. Youth are stakeholders of the Region, and therefore need to be engaged in meaningful dialogue that will contribute to decision making pertaining to regional and global climate change. The way we plan and adapt to climate change will have a positive impact in ensuring the Region of Peel is a place where our children can grow up feeling safe and healthy. We must recognize the capacity of students to be authentic participants and stewards in planning for climate change.

1 INTRODUCTION TO CLIMATE CHANGE

Time	Targeted Curriculum Expectations
1-2 periods	-describe the characteristics (e.g. complex, Interconnected, life supporting, driven by solar Energy) of natural systems (e.g., climate, biomes, the lithosphere, the hydrosphere); -explain how human activities affect, or are affected by, the environment

Background Information

In this first lesson of regional climate change, students will show what they know or think they know about climate change. Students will read and discuss articles about climate change, enabling them to build their current understanding of the issue. In doing so, they will acquire understanding of key concepts and terms needed to better understand climate change and its regional and global impacts.

Teaching/Learning Sequence

Minds On → Pre-assessment Graffiti activity. Show what they know.

Provide groups with large sheet of paper and markers. Have group members think for one minute about what they know about climate change. After thinking, students have one minute to record what they know or think they know. Share. Post collection of knowledge on the wall to be added to or revised as needed.

ACTION! Whole Class → Group read and share

1. Working in groups of three or four students read one article on climate change (BLM 1.1,1.2,1.3,1.4). Tell groups to be prepared to explain what they have learned from the reading. Allow students three minutes to record by drawing, labeling or writing what they have learned in the article using the placemat (BLM 1.5). Next, students will do a round table sharing their visual interpretation of what they have learned. Each member has two minutes to share.
2. Following readings have students count off from 1-4 to form new groups. Newly formed groups should have members who have read different articles. Do a round table, each member has three minutes to share what they have learned.
3. Group share- Pick one student from each placemat section to share his or her visual interpretation of the reading. Teacher circulates to assist and clarify misconceptions.
4. Cut placemats sections into four, grouping similar article information into a collage. Post on the placemat sections as a collective collection of ideas and knowledge gained regarding climate change.

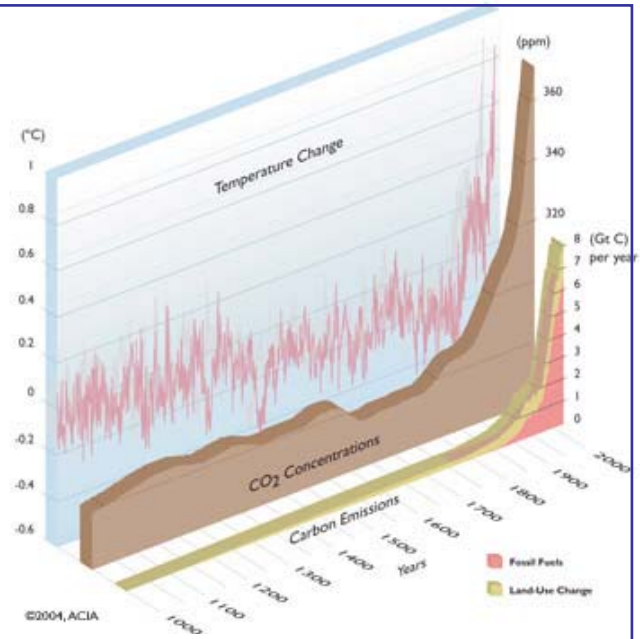
Consolidation and Connection → Individual Activity

Provide copy of readings to students (BLM 1.1,1.2,1.3,1.4). Students use readings to individually complete introduction to climate change questions (BLM 1.6). Assess students understanding of Climate change, provide additional resources if further understandings are needed.

What is climate change?

Climate change is a variation or change in the climate (temperature, wind, precipitation patterns) in a specific location, region, or of the entire planet. This change in weather patterns persists for a long period of time ranging from decades to millions of years. Climate change may be caused by a variety of factors including natural processes; however, scientific evidence shows that the current period of climate change is caused by human activities.

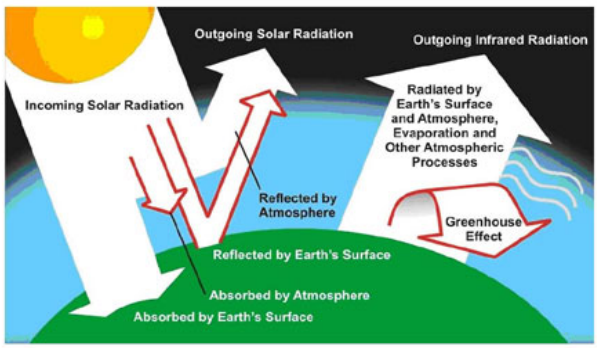
Study the graph to the right. When on the graph do you see a rapid increase in carbon emissions and carbon concentrations? What human activities were happening during this time period? What happened to the average global temperature during this same time period?



This figure illustrates the interaction between human generated carbon emissions, atmospheric carbon dioxide content and average global temperatures (ACIA, 2004).

What is the greenhouse effect?

The greenhouse effect refers to the role of our atmosphere in insulating the planet from heat loss. Sunlight enters our atmosphere and a portion is absorbed by the earth's surface. A large amount of this sun's energy is reflected back or bounces off the earth's surface as thermal infrared radiation and travels toward the atmosphere. At this point, greenhouse gases (water vapour, carbon dioxide, methane and nitrous oxide) in the atmosphere trap the thermal radiation and reflect it back toward the earth's surface. These gases are acting as a blanket to keep the earth warm. Under normal conditions, where the atmosphere contains naturally occurring concentrations of greenhouse gases, this effect keeps the average global temperature at 14°C instead of a very cold -19°C. We definitely need this blanket to keep us warm. But unfortunately, humans are increasing the concentrations of these gases in the atmosphere contributing to an increase in global temperatures. Humans are causing the blanket to keep us too warm!

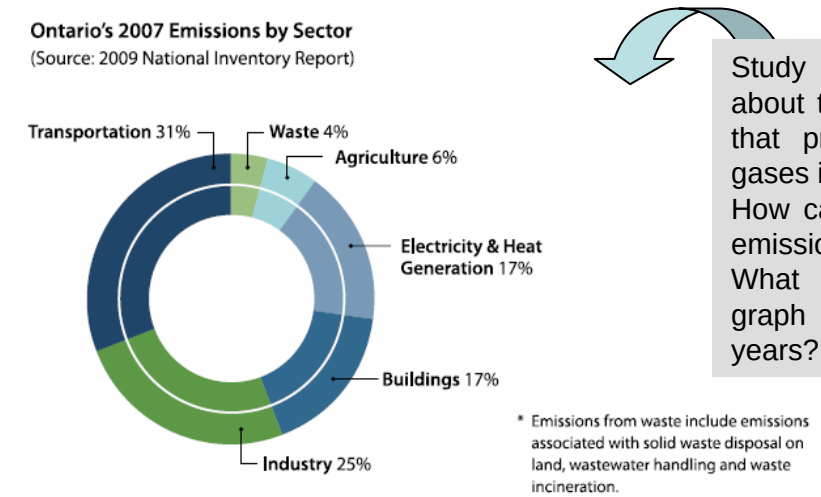


How do humans contribute to climate change?

Humans contribute to climate change by artificially increasing the levels of greenhouse gas occurring in our atmosphere. Burning fossil fuels such as natural gas, gasoline and coal release a large amount of carbon dioxide, methane, and nitrous oxide into the atmosphere where it collects. This activity thickens the insulating blanket around the earth and traps a higher percentage of the thermal infrared radiation reflecting off the earth's surface, increasing average global temperatures.

Humans have released so much carbon into the atmosphere through the burning of fossil fuels and deforestation that the atmosphere contains 32 percent more carbon dioxide today than at the beginning of the 20th century!

Burning fossil fuels for transportation is the most common source of greenhouse gas release by humans. Other forms of greenhouse gases including methane and nitrous oxide which is often produced by humans through waste disposal and industrial practices. The release of any of these gases is known as Greenhouse Gas (GHG) emissions. Most activities that humans do at home, school and work need power. That means each time you turn on a light, use an appliance or ride in a car you are directly adding to the concentration of greenhouse gases in the atmosphere. This is not very good news. The good news is that we can make changes in our communities to reduce the amount of GHG released. What can you do?



Study the graph. Think about the human activities that produce greenhouse gases in each sector.
How can we reduce GHG emissions in each sector?
What do you think this graph will look like in 30 years?

Source: Ontario Climate Change Action Plan Annual Report 2008-2009

Regional Impact of Climate Change

In the Region of Peel, climate change could mean warmer winters, hotter summers and more frequent extreme weather events. Scientists predict that there will be long-term, damaging impacts to our built, natural and human systems. Scientists also know that there will be times when we can find benefits and local opportunities with a changing climate. Some examples of both of these negative and positive impacts of climate change are illustrated below.

Climate Facts….

- In southern Ontario, the number of days exceeding 30°C will more than double by the 2050s
- Extreme daily precipitation events (such as thunderstorms) will become more frequent and severe
- UV levels will increase

CLIMATE CHANGE IMPACTS

Natural Systems

1. Changes in temperature and precipitation patterns may cause: loss and/or shift in plant and animal species
2. Increase erosion, flooding
3. Reduced lake levels and river levels,
4. Increased damage and mortality to trees
5. Increased loss of agriculturally productive land leading to loss of food production
6. Increased abundance of invasive species and pest infestations.

Built System

1. Increased temperatures could lead to higher demand for cooling units; increased utility bills and brown/black-outs.
2. Increased water use could lead to increased cost in water bills and increased cost to deliver and repair water systems
3. Storm damage may cause building damage and increased clean up costs
4. Frequent weather events may increase costs to maintain buildings, roads, bridges and other public structures.

Human Systems

1. Increased risk to human health (higher health care costs: increased heat stroke, allergens, respiratory complications, and disease)
2. Higher demand for public cooling centres
3. Potential for displaced people and injuries due to flooding
4. Residents may be isolated and without power due to extreme weather events (e.g. ice storm 1998)

The debate is over about whether or not climate change is real. Irrefutable evidence from around the world – including extreme weather events, record temperatures, retreating glaciers, and rising sea levels – all point to the fact climate change is happening now and at rates much faster than previously thought.

-David Suzuki-

A Global Problem that has A Regional Solution

Climate change is here and it is time to take action! We as citizens in the Region of Peel must recognize that while it is up to each community, region, province and nation to do their part in dealing with the effects of climate change. The impacts of climate will impact your future, where you live, work, and play.

We can respond to climate change by reducing greenhouse gas (GHG) emissions. This act of reducing greenhouse emission is called **mitigation**. The federal government estimates that 80% of Canada's greenhouse gas emissions are associated with the production of or consumption of fossil fuels for energy purposes. We can mitigate by:

1. Reducing energy use
2. Switching to renewable sources of energy (solar, wind, thermal energy)
3. Capturing landfill gases, and
4. Increasing use of public transit.

Mitigation reduces the build-up of greenhouse gases in the atmosphere and slows climate change over the long term.

We can also take action to prepare for the impacts of climate change. **Adaptation** are actions to reduce the negative impacts of climate change or take advantage of potential new opportunities. Adaptation actions include programs that reduce the impacts of severe storms or weather events that cause flooding, heat waves, ice storms, high winds, erosion, change in lake levels and pest infestations. Adaptation activities include:

1. Upgrading storm sewer systems
2. Developing emergency alert systems
3. Providing "cooling centers"
4. Using thermal energy to heat and cool buildings, and
5. Building storm resistance structures.

There are also actions that will both reduce greenhouse gas emissions and help prepare for climate change **(mitigation and adaption).** These actions include planting trees, building green roofs, buying local food, and reducing water use (saves electricity to pump water and saves water for use during dry spells). Can you explain why these actions both mitigate and adapt to climate?

What Can You Do to Combat Climate Change?

Visit http://www.peelregion.ca/planning/ecofootprint/ to take a Carbon footprint test.

I can Mitigate by…

1. Walking to school, friends, parks
2. Taking public transit
3. Turning off lights
4. Turning down the heat by 1 or 2 degrees in my house
5. Using fans instead of air conditioning
6. Finding recreational activities that do not involve using electricity

I can help Adapt to Climate Change by…

1. Not buying a house on the flood plain
2. Listening for heat alerts, flood and storm warning and advisories
3. Drinking lots of water when out in the heat
4. Getting involved in committees dealing with climate change issues.
5. Building awareness of my own carbon footprint to make lifestyle changes

I can mitigate and adapt by…

1. Taking shorter showers (water conservation)
2. Planting a tree
3. Growing a garden
4. Buying local food
5. Volunteering to restore plant and animal habitat

Climate Change

Article #____

Climate Change

1. Define Climate Change
2. How do humans contribute to climate change?
3. How do you contribute to climate change?
4. Draw a diagram illustrating the greenhouse effect.
5. What does GHG stand for? How do humans produce GHGs?
6. Why is it important to take actions against climate change?
7. What could you do to combat climate change?
8. List the impacts of climate change in a chart form.
9. What is mitigation? How can we mitigate climate change?
10. List 3 things you can do to mitigate climate change.
11. How are we adapting to the impacts of climate change?
12. List 3 things you can do to adapt to climate change.

Extension: Design a poster illustrating how high school students can take action to reduce the impacts of climate change.

2 IMPACT,MITIGATION AND ADAPTATION

Time	Targeted Curriculum Expectations
1-2 periods	- explain how human activities affect, or are affected by, the environment -describe how natural systems influence cultural and economic activities -explain how selected factors cause change in human and natural systems -predict the consequences of human activities on natural systems

Background Information

This lesson will help bring meaning to the concepts of climate change impacts, mitigation, and adaptation. It is anticipated that even small shifts in normal climate conditions will have potentially large impact in the Region of Peel including increased amount of extreme weather events. Floods, wind storms, ice storms will have negative effects on the built, natural and human systems in our communities. Addressing the impact of climate change requires two complementary actions: reducing greenhouse gas emissions (mitigation) and reducing harm to living things and their environment (adaptation) .

Teaching/Learning Sequence

Whole Class

1. Place the words “Impacts of Climate Change” and “Actions to Combat Climate Change” on the walls on either side of the classroom.
2. Hand out the series of Climate change prompts to pairs of students (TR 2.1). After reading and thinking about the prompt, ask students to justify their reasoning by moving closer to the wall that best fits their prompt.
3. Place a VENN diagram on the board (TR 2.2). Have students with the Actions to combat climate change come up and place it in the VENN either in Mitigation, Adaptation or both. Have students with impact statements decide if these actions would combat their impact statement. Ask student to be prepared to justify why.

> **Mitigation** = Actions to reduce GHG emissions
> **Adaptation** = Actions that reduce harm to living things and their environment.
> **Middle of VENN=** Actions that both mitigate and adapt (mostly actions that involve greening the environment) i.e. Planting trees both reduces GHG emissions and is an action to adapt to the impact

Groups of Four – Concept Attainment Chart

Students:

1. Students form groups of four.
2. Follow the instructions on the Concept Attainment Chart (BLM 2.3) BLM 2.4 can be used for students who prefer visual learning styles. Students need to determine the differences and similarities between the factors in Column A (impacts) and the factors in column B (action to mitigate and/or adapt for climate change). Task 2 adds testers to assess knowledge of the concepts. The last task asks students to sort column B using a VENN diagram. Teacher circulates to assist and guide student in their understandings of the concepts.
3. As a class, create definitions for impact, mitigation, adaptation. Post in class room on graffiti for use as an anchor chart.

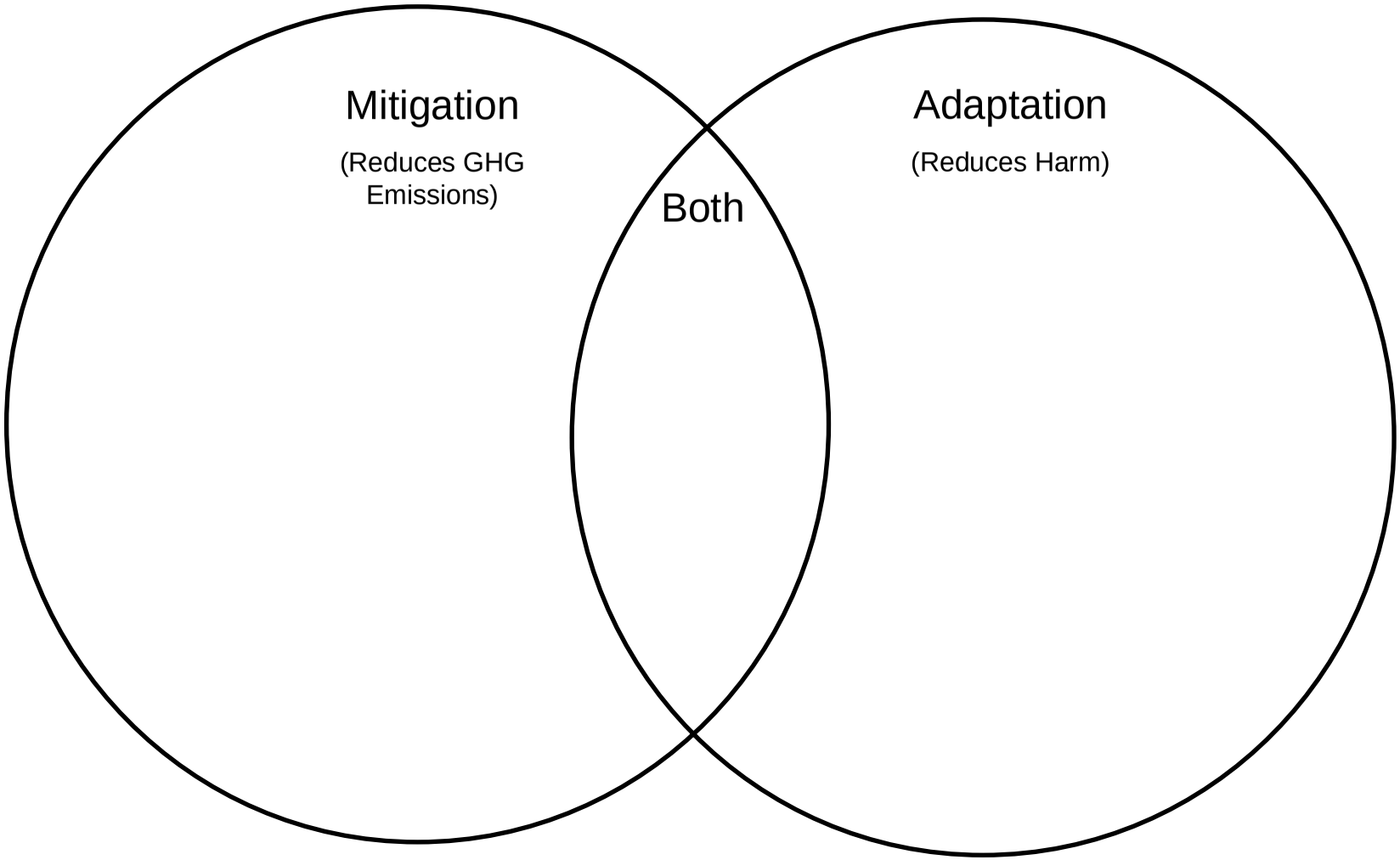
Consolidation and Connection

1. Provide an overview and background knowledge to students for completion of BLM 2.3 and 2.4. Students are to individually work through the tasks to build on their understanding of climate change concepts. These assignments will provide students with concrete examples of the impacts of climate change and how we are mitigating and/or adapting to these changes.
2. Observe and assist students as needed.
3. Collect assignments for assessment and to gage student's understanding of the concepts.
4. Assessment criteria for Task 3 of BLM 2.4 need to be developed with the students.

IMPACT, MITIGATION, ADAPTATION PROMPT LINES

1. Intense high wind weather event hits the Region of Peel. Wind storm causes damage to homes and businesses. Roofs and cars are damaged. Clean up costs exceed $2 million.
2. Increase in seasonal snowfall causes high runoff of snowmelt; resulting in flooding of Cooksville Creek. Basements are flooded.
3. Record heat wave hits the Region of Peel. Power outage occurs due to high demand to power cooling systems.
4. Caledon farmer loses crop due to extreme ice storms; three years in a row.
5. The numbers of Leopard frogs found in the wetland are slowly decreasing.
6. The Region of Peel host a community Tree Planting Day.
7. The City of Brampton upgrades sewers, culverts and overland flow routes for extreme rainfall
8. The City of Mississauga expands the transit system
9. The Region of Peel builds more biking and walking paths. A new website includes an interactive map that will allow cyclists and walkers to plan their trips.
10. A new recycling plant is built and it is heated and cooled by ground source heat pumps (no direct use of fossil fuels)
11. A Solar Thermal Hot Water system is installed at Regional Child Care Centres.
12. There are Indoor recreation programs offered on extreme heat days.
13. Two children's splash pads are built in the Region.
14. One hectare of forest land is donated to the Region of Peel. The land will be protected as parkland.
15. Drive-thrus are no longer permitted in the Downtown areas of Brampton.
16. Cooler uniforms are given to staff working outside in the summer.

VENN DIAGRAM



Name:_____ BLM 2.1

	A	B
1	Extreme ice storm hits city and damages 500 trees.	The students plant 500 trees in Mississauga.
2	Insect infestation causes damage to farmers crops.	No idle-zones are designated in Brampton
3	Flooding causes six families to relocate.	Solar power lights are installed in new bus shelters
4		
5		
6		
7		
8		
9		
10		

Task One:
Compare and Contrast:
Examine the first pair of A and B statements. How are they different?
Examine the second pair of A and B statements. How are they different?
How are all A statements the same? How are all B statements the same?

Task Two:
Testers:
In which column does each of the following statements belong – Column A or Column B?

1. Mateo cannot afford his electricity bill because energy prices have increased
2. Kim buys a hybrid car.
3. Heat alert days increase
4. Overtime, the stream water is warming and there is an increase in fish mortality rates.
5. Sigrid goes to the hospital with heat stroke.
6. The local library is being used as a “Cooling Centre” during prolonged heat waves.
7. The school plants trees in the school yard
8. Tim turns of the lights every time he leaves a room
9. Jamal rides his bike to see his friends at the park
10. Wind storm causes damage to ten houses in Mississauga
11. Create 2 of your own testers; place them in the right column.

Task Three: Draw a VENN diagram. Sort column B into 2 or more categories.

Climate Change

Study the pictures. What do the pictures in column A have in common? What characteristics do the pictures in column A share? What do the pictures in column B have in common? What characteristics do the pictures in column B share?

A	B
	
	
	
	

Name:_____

Task 1: Examine the scenario below. Identify the climate change impact, and the adaptation or mitigation actions that took place. Explain why they are actions of mitigation and/or adaptation.

Scenario 1: Due to extreme ice storms over the past month, a 70 year old woman is unable to purchase groceries. She calls a local food bank organization to deliver her food to her apartment.	
Impacts:	Why is this a climate change impact?
How was the impact Adapted and/or Mitigated:	Why is this action considered to be a mitigation or an adaptation to climate change?

Scenario 2: Increased temperatures over time in Caledon has lengthened the growing season for the farmer. The farmer has calculated that the crop can be grown twice during the season. This will double his farming profits.	
Impacts:	Why is this an impact?
Adaptation/Mitigation or both:	Why is this action considered to be a mitigation or an adaptation to climate change?

Task Two:

Create your own Climate Change Scenario that includes an impact and a response to mitigate and/or adapt to the situation. Explain your thinking. If necessary, you may use resources such as the reading from Lesson 1 or the Internet.

Consider one or more of the following impacts of climate change: health, environment, built structure, or agriculture.

Name:_____

BLM 2.4

Assignment 2

Task One:

Read the statement below. Underline the impacts and circle how the situation has been mitigated and/or adapted (Place an A for Adaptation; M for mitigation or B for both Mitigation/Adaptation above the circle)

1. A local farmer has less crop production due to increased temperatures during the last ten years in the Region. The farmer decides to grow a different type of crop that can withstand warmer temperatures.

2. There are more frequent power failures in the Region due to a high demand for cooling systems. A family needs power to run their business. They install solar panels on the roof of their house.

3. Extreme flood causes erosion on the side of the stream, 50 trees are damaged. A kids camp plants 100 trees along the Credit River.

4. A heat wave hits the Region. Dara and her friends decide to go to an air-conditioned indoor skateboard park.

Task Two:

Using an on-line news portal or a newspaper, find two articles about climate change that contains information on impacts and how the situation is being mitigated and/or adapted to climate change. Highlight or underline the passages of the article that contain the impact, the mitigation and/or adaptations. Explain why it is important to mitigate or adapt to climate change.

Task Three:

Create your own news flash article that talks about how we can take action to combat climate change.

Due Date:_____

3 CLIMATE CHANGE SURVIVAL ACTIVITY

Lesson Overview	Targeted Curriculum Expectations
1-2 periods	-explain how selected factors cause change in human and natural systems -predict the consequences of human activities on natural systems -evaluate the impact of change on a selected planning project

Background Information

This survival activity provides students with the opportunity to work collaboratively to develop critical thinking skills. They will be asked to link a series of climate change events into a logical sequence that incorporates mitigating and adapting to the impacts of climate change events.

Teaching/Learning Sequence

MINDS ON...

Group Discussion on Adaptation → Whole Class

1. Ask students to think of a time when change or a new event was happening in their lives. What did they do to adapt to this change or event.

Possible scenario ideas :

a) Think about the transition from elementary to high school. How did you adapt to the changes in teachers, workloads, school environment? How did your adaptations have negative or positive impacts in your life? Did you react proactively or reactively to the situation? How are you going to adapt to entering the workforce?

b) Joining a team and learning a new sport. They need to adapt to learn the rules, the new position, how to work as a team, constantly change and improving your strategy to be the best you can be. How can your adaptations as a player have negative or positive impacts on you and your team? When do you react proactively and reactively when playing sports?

c) Relate this discussion to climate change adaptations. Human, natural and built systems are going to need to adapt to climate change.

ACTION!

Survival Game → Small Group Activity

1. Form groups of three or four. Provide students an envelope full of the climate change scenario cards (BLM 3.1). Write the title on the front of the envelope.
2. Allow students 10 – 15 minutes to sort through cards and place them in logical sequence. Indicate that most cards will have natural links to other statements. There are climate events leading to impacts, and the eventual need to mitigate and/or adapt to the situation. There are some cards with no real relevance to their survival (tester cards are intentionally placed as tester to assess understanding).
3. Circulate to determine student understanding; provide guidance and feedback as required. Discuss their sequence and conclusions.

CONSOLIDATION AND CONNECTION

Group Discussion → Whole Class

Facilitate a discussion at the end of the task with a series of debriefing questions:

1. How did you decide to sort the information? Is there an obvious pattern to your sequence?
2. What were the impacts?
3. How did you decide to mitigate and/or adapt to the impact?
4. What were the factors that led to the impact?
5. How could your actions have any impact on the issues raised in this survival activity?
6. Could this situation happen in real life?

Odd One Out → Individual Activity

To assess individual understanding of concepts, students complete Odd One Out (BLM 3.2). Submit for assessment.

Climate Change Survival Activity Cards	
Scenario One	**Scenario Two**
Over the past 20 years, the average winter snowfall has increased in Southern Ontario by 6%.	Over the past 20 years, average temperatures have increased in Southern Ontario by 3 °C.
A whopping 53 centimetres of snow fell in the Region of Peel during the 2013/2014 winter season. A Regional record!	News headline: *"Summer Heat wave hits Region of Peel. Temperatures reach all time seasonal high!"*
Due to spring run off, a flood warning was issued on April 22nd, 2014 for Cooksville Creek	On July 10th, Hydro One has announced rolling blackouts due to energy demand for air conditioning and refrigeration.
Ali bought a house on the Cooksville flood plain.	A 75 year old Mississauga resident lives by herself in an apartment building. Since 2007, she has been confined to a wheel chair.
Ali lost his job, he rented the basement out to Sharman Keegan.	Due to brownouts, Ella's air-conditioning unit is not working.
On the night of April 24th, Sharman Keegan called 911: "My basement is filling with water. There is already two metres on the floor, can you help me!"	On July 13th, Ella's neighbour called 911. "I have a 75 year old suffering from heat stroke, I need an ambulance"
Ali had no flood insurance.	City of Brampton designates a local library as a "cooling centre". This is a place for people to visit when there is a heat wave in the city. The cooling centre is air-conditioned, free of charge and provides free drinking water.
The city of Mississauga spent $1.2 million on upgrading the storm sewer systems.	City of Brampton designates no idling zones.
School children are planting trees along Cooksville Creek.	Kelly decides to walk to work today.
Ali bought a bike.	Doug bought solar power panels today.

ODD ONE OUT

Circle the odd one out. Explain why you think it is the odd one out.

					Explain why it is the Odd one out
1.	Tree Planting	Green roof	Violent Wind Storm	Community Garden	
2.	Turn off lights	Hybrid Car	Insulate House	Increased energy prices	
3.	Walk to school	Carpool	Loss of Leopard Frogs	Ride the bus	
4.	Increased number of Brownouts	Solar Power	Thermal Heat	Wind power	
5.	Rain Barrel	Low flow toilet	Energy efficiency appliances	Water shortage	
6.	Buy local food	Plant a garden in your backyard	Increased flooding	Clotheslines	
7.	Cooling Centres	No idling zones	Increase heat stroke	Bike rentals	
8.	**Create your own**				

4 My Climate Change Awareness

Time	Targeted Curriculum Expectations
2-3 periods	-recommend ways in which individuals can contribute to the quality of life in their home, local ecozone, province, nation and the world. -evaluate solutions to environmental problems proposed by various groups and make recommendations for sustainable resource use -collect and synthesize information about the local ecozone

Background Information

Students reflect on how their everyday actions and the community around them can impact climate change. Students are asked to examine their daily actions and minor adaptations in lifestyle can make a difference. Students will complete a climate change self-awareness audit and take a community walk to identify natural, human, and built systems that impact climate change. They will look for evidence of systems or features that have been adapted and/or mitigated to climate change.

Teaching/Learning Sequence

Individual Activity → Climate Change Home Audit

a) As a home assignment, ask students to complete the Climate Change Self Awareness Audit BLM 4.1. Students must choose morning routine, during school hours, after school activities, or night time routines.

b) In small group ask students to share their results. Discuss the combined impacts of over one million people living in the Region of Peel. Ask students if they can quantify the impacts and adaptations? e.g. A regular flush toilet uses 13 litres of water X 1 million people versus a low flow toilet which uses 4 litres X 1 million people.

ACTION!...

Whole Class Activity → Climate Change Tour

Pre-tour tasks:

a) Plan route and print maps of area

b) Collect permission forms

c) Identify any safety concerns and required time prior to the tour.

d) Ensure there are enough digital cameras/cell phone cameras for the students (or sketching materials)

The Tour…

a) In groups of three or four, students take a walk in their local neighborhood to take pictures or make sketches of natural, human, and built systems or features that are affected by changes in climate. Possible stop could include:

•Bike paths/and or symbols	•Cooling Centers (Library/Community Centres)
•Cars/School Buses	•Home with or without cooling systems
•Traffic Lights (LED)	•Urban Forests
•Houses with Trees/Rain Barrels/Natural Landscaping	•Parking Lots
•Agricultural Lands/Gardens	•School Yard (with or without urban trees)
•Grocery Store (Local Products)	•Traffic Congestion
•Water Ways (Water conservation)	•No idling zones
•Natural Areas (Parks)	•Clothes Lines
•Restaurants (Local Food)	•Hospitals
•Transit Bus or Stops	•Homeless Shelters
•Storm sewers	
•Industries	

b) Individually students are required to take two pictures in each of the three categories (natural, human, built).

CONSOLIDATION and CONNECTION

a) After the walk students will individually reflect on how these features can be adapted and/or mitigated to climate change. Students are to post sticky notes on each photograph describing how the feature or system positively or negatively affect climate change and has been or can be adapted to climate change.

b) Mapping the interconnections. Create a large foundation map of the community walk. Post on the classroom wall.

c) Students sort photographs into categories and create map symbols for the categorized features

d) Students place symbols in appropriate places around the map.

e) Individually ask students to post three of their photographs around the map.

f) After all students have posted, provide each student with three pieces of yarn.

g) Individually, students must find at least three climate change interconnections among the features/systems in the Region. Students use string or markers to create a web of climate change interconnection on the map. Using sticky notes, students must describe their chosen interconnections and post it on the map.

e) **Consolidation Questions: (Can be used for assessment purposes)**

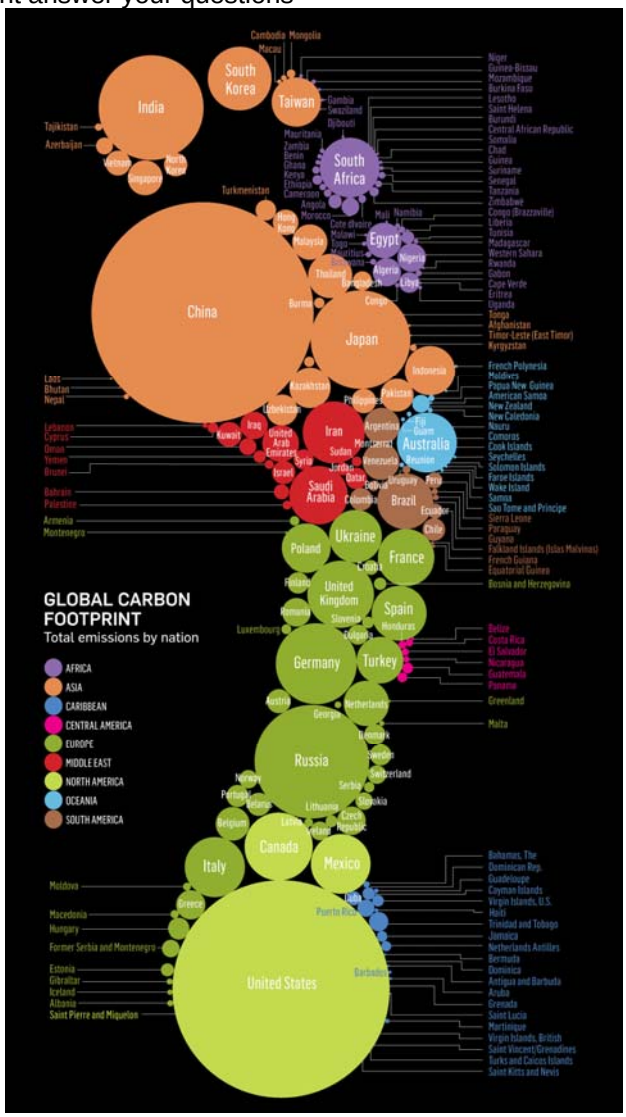
1. Name 2 human systems, 2 natural, and 2 built features in your community that will be impacted by climate change. How can these features be adapted to deal with the changes in climate?
2. How do you feel individual people in the community can adapt to the impacts of climate change? How can you adapt your actions?
3. List five criteria that are essential in planning a community that will help adapt and/or mitigate climate change.

Extensions

1. Have students take the carbon footprint test.
Visit: http://www.peelregion.ca/planning/ecofootprint/
to take a Carbon footprint test.

3. Research a community agency, non-profit or government organization that is working to reduce the impact of climate change.
a) Describe the actions that the organization does to reduce the impacts of climate change.

2. Visit http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions_per_capita
Have students use the data presented in the chart to graph the carbon emission of Canada compared to 3 other countries in the world.
Or review the following image:
http://s3files.core77.com/blog/images/2011/04/Stanford_Kay-Carbon_Footprint_Infographic-full.jpg
a) Ask students to create three questions about their graph
b) Have another student answer your questions



(Source: http://s3files.core77.com/blog/images/2011/04/Stanford_Kay-Carbon_Footprint_Infographic-full.jpg)

Personal Climate Change Audit Tracking Sheet

Describe your action	How does this action impact climate change.	Are you willing to modify or eliminate this action to adapt to climate change? (Circle your choice) Explain.
Take bus to school	The bus emits GHG gases which contribute to the Greenhouse effect.	**Modify** Eliminate Not at this time Will never change **Explanation:** **Will ride my bike during fall and spring months**
		Modify Eliminate Not at this time Will never change Explanation:
		Modify Eliminate Not at this time Will never change Explanation:
		Modify Eliminate Not at this time Will never change Explanation:
		Modify Eliminate Not at this time Will never change Explanation:

5 Planning a Sustainable Region

Lesson Overview	Targeted Curriculum Expectations
4-5 periods	-present the findings from research on ways of improving the balance between human and natural systems -develop and use appropriate questions to define a topic, problem, or issue and to focus a geographic inquiry -gather geographic information from primary sources -evaluate the credibility of sources -use graphic organizers to clarify and interpret geographic inquiry -analyse a regional issue on the basis of information gathered through research -make a planning decision concerning a regional community after studying its existing natural and human systems. -communicate the results of geographic inquiries, for different audiences and purposes; -identify the role of government in managing resources and protecting the environment

Background Information

This lesson asks students to research the impacts of climate change and make recommendations for community action to adapt to the impacts of climate change. Each focus group will have a chance to present their findings to the Regional government and then participate in the development of overall criteria to build a sustainable Region.

Teaching/Learning Sequence

Whole Class → Holding a Regional Council Meeting

a) Elect a student run Regional Council. Seek student nominations or personal campaigns to sit on or chair Regional Council. Nominees or candidate must submit a one page letter and a campaign poster/blog/website or video of their abilities to coordinate a well-run, meaningful regional meeting. When the candidates have been identified, hold a vote. Students with the top three number of votes will be declared Regional Council (Group 1). This activity can be competed by students from a debate club and/or civics/political science related courses.

b) The student with the most votes will serve as the Regional Chair. Group 1 is to follow the activities outline in TR 5.1. The rest of the class proceeds with step 2.

Small Group → Research & Presentation Development

a) Divide student into four or more climate change focus groups. Focus groups will define, research, analyze how the following systems can be adapted to combat the impacts of climate change in the Region of Peel. They will need to recommend how the community can take action to adapt to the changes in climate.

Group 2: Natural Systems

Group 3: Built Systems

Group 4: Human Systems

Note to Teacher: Depending on the availability of time for research and different learning styles of students, you may choose to provide students with a broad topic, subtopic or specific community related adaption action to research. Please see TR 5.1 for choice board ideas.

b) Groups should assign one or two members to write a summary of findings and another one or two to develop the presentation and additional resources. BLM 5.1, 5.2, 5.3, 5.4 details the activities that each group is to complete.

3. Whole Class → Hold a Regional Council Meeting

a) Based on the coordination and schedule times developed by the elected council, each focus group will have a chance to present their findings and make recommendations to Regional Council members.

b) Students listening to the presentations are to take notes using BLM 5.5.

4. Consolidation Activity → Developing Planning Criteria

a) Asks students to analyze the information being presented and draw lines linking any interrelationships on their note taking page BLM 5.5.

b) After listening to all focus group's presentations, students must individually analyse and record what they feel are the best five climate change recommendations that Regional Council must consider in planning a Region for future Climate Change impacts. Each student is to complete BLM 5.6 and submit their recommendations to Regional Council.

c) The Regional Council will tally and consolidate all students criteria and post the top five criteria.

5. a) **Mapping for Climate Change →** Have students create a future Region of Peel Map that reflects the climate change recommendations. For other map information visit the Peel Data centre at: http://www.peelregion.ca/planning/pdc/data/ (You may choose to divide the class into two groups: one group will adapt the rural areas of the Region and the other group will adapt the urban areas of the Region.) This activity can be completed as class bulletin board activity or an individual summative assessment.

Extension

1. Planning policy → Ask a guest speaker from the Region of Peel Integrated Planning Division to speak about what strategies and policies are being developed to ensure the Region of Peel is being planned for the impacts of climate change. After the talk, illustrate one of the policy ideas on the individual or class map that was produced for the "Mapping for Climate Change Activity"

2. Social Networking → Create a social networking bulletin board or voting board on Climate Change. Have students respond and question what is written on the a climate change board. Visit http://blip.tv/foratv-environment/a-climate-change-exhibit-inspired-by-social-networking-5305834 for an example of a social networking board that can be designed and maintained.

Choice Board

Broad Topic	Sub Topic Groups	Community Action Project Specifics
Natural Systems	-Natural Systems in the Urban (city)Environment -Adaptations to the Natural Environment in rural areas.	-Community Gardens -Green Roofs -Urban Forests -Parks -Protecting Lands/Water/Air -Invasive Species -Greenbelts
Human Systems	-Public Health -Emergency Disaster Response	-Heat Alert Systems -Sun Protection Education Program -Vector Borne Disease Program -Cooling Centers -Emergency Response -Grown in Peel
Built Systems	-Transportation -Energy -Buildings	-Active Transportation - Designing Energy Efficient Buildings -Water Efficiency -Solar Systems -Thermal Energy Systems, Wind Systems

Group 1: Regional Council

Your group task is to research how to run an effective meeting. Based on your research findings you are to prepare an agenda, run the meeting and report on the recommendations presented by the four focus groups.

Step 1: **Research How to run an effective meeting**

a) Find websites and other sources to help you organize and run an effective meeting. Visit http://www.peelregion.ca/council/ to view a Region of Peel Council Meeting in progress or if you are able, attend a scheduled Regional Council meeting.
b) Discuss and write seven rules that will be followed during the meeting.
c) Define and write roles of each member of your group.
d) Decide how you are going to communicate the process and proceeding to the rest of the group. You may wish to design a website, blog or bulletin board to post up-to-date information and rules of the meeting.

Step 2: Set the agenda

a) With your teacher set the date and time for the council meeting.
b) Determine the order of presentations.
c) Create an agenda and post it for all groups to review
d) Review the material provided to you by the focus groups.

Step 3: Hold a Regional Council Meeting

a) Prepare the room for the council meeting
b) Hold the meeting according to set agenda
c) Record the proceedings and motions for recommendations.

Step 4: Post Meeting Activities

a) Prepare a summary report of the focus group findings and recommendations. Post for comment.
b) Develop a set of comments on the recommendations of the focus groups.
c) Invite others to make comments on the recommendations.

Focus Group 2: Natural Systems

Your job is to create and present a climate adaptation plan for Regional Council. The plan must recommend how the community can take action to adapt to the impacts of Climate Change on natural systems. Natural Systems include all living things including forests, wetlands, wildlife, plus the human activities to monitor, protect, and enhance the natural environment. Choose to research ways to adapt to Climate Change in rural natural system or urban natural systems. Research topic could include urban forests, greenbelt plans, parks, invasive species or tree planting programs.

Focus group tasks:

Step 1: RESEARCH

a) Investigate and research information on the general topic of climate change impacts on natural systems and how communities are adapting. Use key search words such as: Climate Change, Adaptation, Natural Environment, Region, Community, Municipality, Ontario, Urban Forests, Community Gardens, Tree Planting Programs, Greenbelt, Conservation Authorities.

b) Create a chart to record and organize your information.

IMPACTS of Climate Change on Natural Systems (Community or Regional examples)	**ADAPTATION ACTION**

c) Choose one adaptation from your chart. Develop five questions about your chosen adaptation. Have your teacher approve your topic and research questions.

Step 2: FIND

a) Find information that will help you describe your community action plan and answer your five questions.

b) Information may be accessed in many different forms including videos, newspapers, magazines, organizations, government websites and case studies.

c) Find at least one table, chart, and/or graph and one photograph illustrating your community action

d) Find one example of where this adaptation to climate change has been successfully run in a community or region.

Step 3: ORGANIZE and RECORD

You may wish to organize your information using the following questions or create your own graphic organizer.

1. What is a definition or description of your community action?
2. What are the possible negative effects of Climate Change on the Natural systems in the Region of Peel?
3. What are the possible positive effects of Climate Change on the Natural systems in the Region of Peel?
4. What are the negative consequences of not implementing this community action plan?
5. Describe how these actions have been successful in another community or region.

Step 4: COMMUNICATE

a) The following must be submitted to Regional Council:

- ❑ Write a one page letter to the Regional Council describing your community action plan and how it will be useful.
- ❑ Prepare a five to seven slide presentation summarizing your findings.
  You may decide to use the following slide titles:
    - Positive Impacts of Climate Change on the natural system
    - Negative Impacts of Climate Change on the natural system
    - Description of Action plan
    - Case study (Where these actions worked in another community)
    - Recommendations
    - Include at least one photograph and one chart or graph
    - Where does the community action take place
- ❑ In addition to your presentation, decide how you are going to promote your adaptation action to the public. Your focus group can decide to do a video, song, built a model, brochure, poster, poster board, website to promote your community action plan e.g. build a model house with a green roof.

Focus Group 3: Built Systems

Your job is to create and present a climate adaptation plan for Regional Council. The plan must recommend how the community can take action to adapt to the impacts of Climate Change on the built systems. Built systems involves the way we plan, construct and use man-made structures and systems in our communities. These features include our roads, homes, factories, water and sewer systems, energy systems, and other related built structures. You may wish to research community action programs related to climate change and active transportation, smart commute programs, renewable energy sources (solar, wind, thermal systems), water conservation programs, or energy efficient home designs.

Focus group tasks:

Step 1: RESEARCH

a) Investigate and research information on the general topic of climate change impacts on natural systems and how communities are adapting. Use key search words such as: Climate Change, Adaptation, Smart Commute, renewable energy, solar energy, water conservation, energy efficient homes.

b) Create a chart to record and organize your information.

IMPACTS **On Built Systems** **(Community or Regional examples)**	**ADAPTATION** **ACTIONS**

c) Choose one adaptation from your chart. Develop five questions about your chosen adaptation. Have your teacher approve your topic and research questions.

Step 2: FIND

a) Find information that will help you describe your community action plan and answer your five questions.

b) Information may be accessed in many different forms including videos, newspapers, magazines, organizations, government websites and case studies.

c) Find at least one table, chart, and/or graph and one photograph illustrating your community action

d) Find one example of where this adaptation to climate change has been successfully run in a community or region.

Step 3: ORGANIZE and RECORD

You may wish to organize your information using the following questions or create your own graphic organizer.

1. What is a definition or description of your community action.
2. What are the possible negative effects of Climate Change on the built systems in the Region of Peel?
3. What are the possible positive effects of Climate Change on the built systems in the Region of Peel?
4. What are the negative consequences of not implementing this community action plan
5. Describe how these actions have been successful in another community or region.

Step 4: COMMUNICATE

a) The following must be submitted to Regional Council:

- ❑ Write a one page letter to the Regional Council describing your community action plan and how it will be useful.
- ❑ Prepare a five to seven slide presentation summarizing your findings.
  You may decide to use the following slide titles:
    - Positive Impacts of Climate Change on the built systems.
    - Negative Impacts of Climate Change on the built systems
    - Description of Action plan
    - Case study (Where these actions worked in another community)
    - Recommendations
    - Include at least one photograph and one chart or graph
    - Where does the community action take place
- ❑ In addition to your presentation, decide how you are going to promote your adaptation action to the public or school community. Your focus group can decide to do a video, song, build a model, brochure, poster, poster board, website to promote your community action plan e.g. Build a solar powered oven

Focus Group 4: Human Systems

Your job is to create and present a climate adaptation plan for Regional Council. The plan must recommend how the community can take action to adapt to the impact of Climate Change on Human Systems. It is expected that climate change will make it more difficult to manage our health and well being especially for vulnerable groups including the elderly, the young, the disabled and the poor. Extreme weather events including heat waves, floods, and storms will increase the amount of human disease and trauma. There will be increased cases of asthma, heat stroke, heat exhaustion, and vector borne and water borne diseases in the Region of Peel. You may wish to research community action programs such as emergency response programs, heat alert systems, local food production, sustainable agriculture, and programs to protect people from vector borne disease.

Focus group tasks:

Step 1: RESEARCH

a) Investigate and research information on the general topic of climate change impacts on natural systems and how communities are adapting. Use key search words such as: Climate Change, Adaptation, health, heat alert system, cooling centres, sustainable food production, vector borne disease,

b) Create a chart to record and organize your information.

IMPACTS of Climate Change on Human Systems (Community or Regional examples)	**ADAPTATION ACTION**

c) Choose one adaptation from your chart. Develop five questions about your chosen adaptation. Have your teacher approve your topic and research questions.

Step 2: FIND

a) Find information that will help you describe your community action plan and answer your five questions.

b) Information may be accessed in many different forms including videos, newspapers, magazines, organizations, government websites and case studies.

c) Find at least one table, chart, and/or graph and one photograph illustrating your community action

d) Find one example of where this adaptation to climate change has been successfully run in a community or region.

Step 3: ORGANIZE and RECORD

You may wish to organize your information using the following questions or create your own graphic organizer.

1. What is a definition or description of your community action.
2. What are the possible negative effects of Climate Change on the human systems in the Region of Peel?
3. What are the possible positive effects of Climate Change on the human systems in the Region of Peel?
4. What are the negative consequences of not implementing this community action plan
5. Describe how these actions have been successful in another community or region.

Step 4: COMMUNICATE

a) The following must be submitted to Regional Council:

- ❑ Write a one page letter to the Regional Council describing your community action plan and how it will be useful.
- ❑ Prepare a five to seven slide presentation summarizing your findings.
  You may decide to use the following slide titles:
    - Positive Impacts of Climate Change on the human systems.
    - Negative Impacts of Climate Change on the human systems
    - Description of Action plan
    - Case study (Where these actions worked in another community)
    - Recommendations
    - Include at least one photograph and one chart or graph
    - Where does the community action take place
- ❑ In addition to your presentation, decide how you are going to promote your adaptation action to the public or school community. Your focus group can decide to do a video, song, built a model, brochure, poster, poster board, website to promote your community action plan e.g. develop a public service announcement for flood or heat alerts for radio or television use.

Some sites to check out!

Natural Systems

http://www.lifeisbetterinpeel.ca/trca.html
http://www.greenbelt.ca/about-greenbelt
http://www.youtube.com/watch?v=4cCOy78R8wU
http://www.youtube.com/watch?v=zE409d9TPkM
http://www.youtube.com/watch?v=7UA1rjnPZtU
http://www.youtube.com/watch?v=I9mnd0GC0yQ&feature=related
http://vimeo.com/7205224
http://www.youtube.com/watch?v=drINEQFXbPY

Built Systems

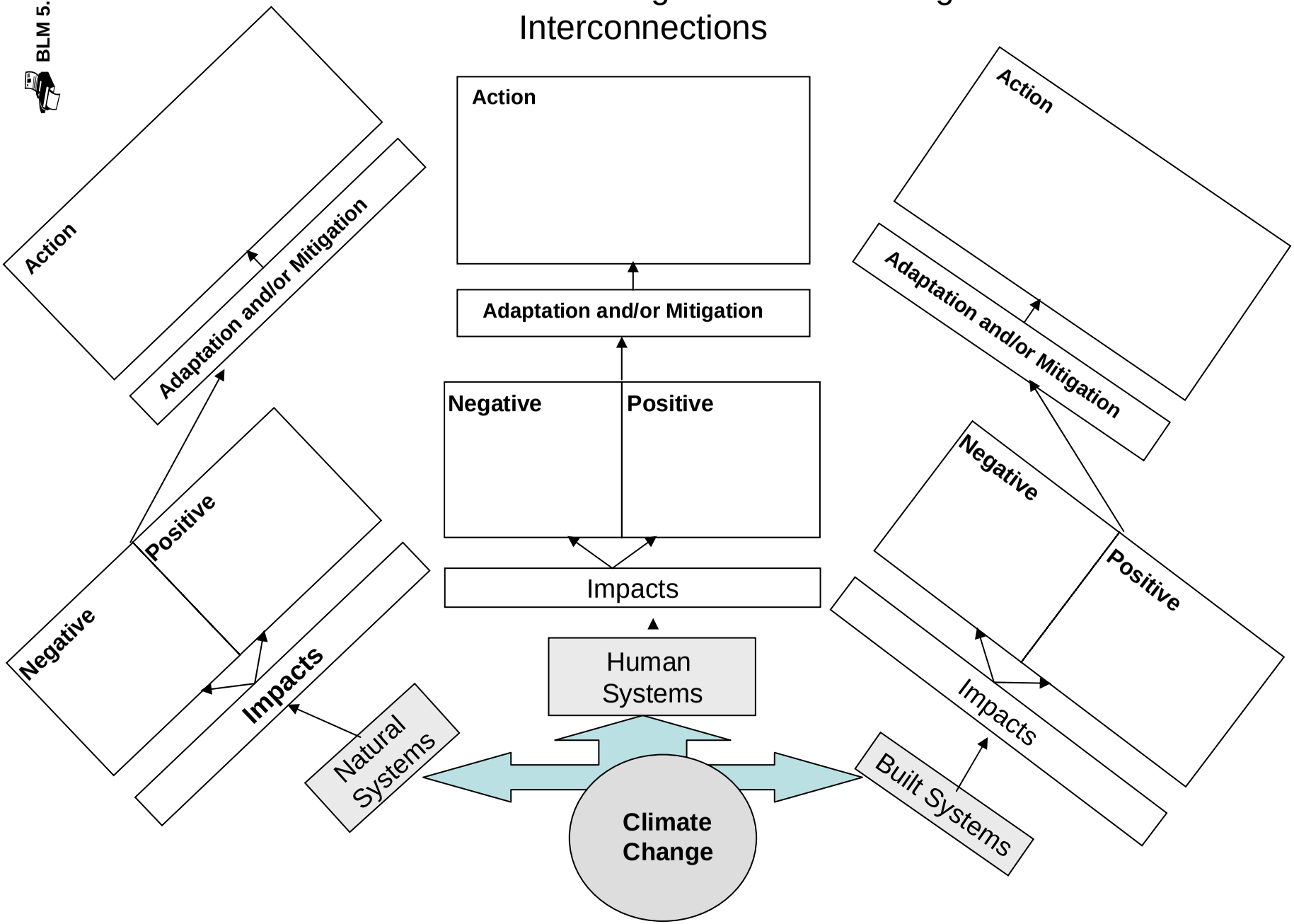
Region of Peel sources:
Active Transportation: http://walkandrollpeel.ca/
Home and Community Conservation:
http://www.peelregion.ca/conservation/programs/energy.htm
Renewable Energy: http://www.peelregion.ca/finance/corp-energy/renewable/
Smart Commute: http://www.peelregion.ca/planning/transportation/smartcommute/
Bike to Work Day: http://www.peelregion.ca/conservation/teachgreen/resource.asp?rid=327
http://www.youtube.com/watch?v=Ovl5N-euHCM
Walking School Bus: http://www.peelregion.ca/health/shp/issues/1fall2001/fall-2001-6.htm

Other sources:
Active Transportation: http://www.youtube.com/watch?v=aphyUt3gSus
http://www.youtube.com/watch?v=hgIIy82o5Ks&feature=related
http://oee.nrcan.gc.ca/transportation/idling/health.cfm?attr=8
http://fleetsmart.nrcan.gc.ca/index.cfm?fuseaction=docs.view&id=city-bus-cornwall]
http://www.therecord.com/news/local/article/499201--waterloo-looks-to-be-region-s-lead-dog-in-sustainable-transportation
http://planetgreen.discovery.com/videos/g-word-online-clips-public-transportation-in-la.html
http://www.metacafe.com/watch/5838801/active_transportation_planning/
http://www.youtube.com/watch?v=dResD8pX2Og
http://www.youtube.com/watch?v=n5anotSSlc4
http://www.youtube.com/watch?v=uvqU_L5PZtk&feature=related

Human Systems
Region of Peel
http://www.peelregion.ca/planning/gip/
http://www.peelregion.ca/health/cleanairpeel/initiatives/energy.htm
http://www.peelregion.ca/health/heat/pdfs/hwg-gen-pub.pdf
http://www.peelregion.ca/health/heat/default.asp?page=peopleatrisk
http://www.brampton.ca/en/residents/Emergency-Measures/Documents/HeatAlert.pdf

Other sources:
http://www.hc-sc.gc.ca/ewh-semt/climat/index-eng.php
http://www.who.int/mediacentre/factsheets/fs266/en/
http://www.youtube.com/watch?v=Z5gtjhWJ-3M
http://www.youtube.com/watch?v=g_yPprC8gSQ
http://chd.region.waterloo.on.ca/en/healthyLivingHealthProtection/resources/SmogAlert_SummerHeat_Brochure.pdf

Presentation Note Organization – Finding Interconnections



Name:_____

I recommend that Regional Council:

1._____

2._____

3._____

4._____

5._____

Glossary (of terms used in this Lesson Plan)

Active Transportation: using human power to get from place to place. Walking, cycling and in-line skating are all forms of active transportation.
http://www.walkandrollpeel.ca/about/what-is.htm

Adaptation: Adjustment in natural or human systems in response to actual or expected climate stimuli and their effects, which moderates harm or exploits beneficial opportunities. There are various types of adaptation, including anticipatory, autonomous and planned adaptation. (From Impacts to Adaptation : Canada in a Changing Climate, 2007, http://adaptation.nrcan.gc.ca/assess/2007/ch11/index_e.php#R)

Blackout: A power loss affecting many electricity consumers over a large geographical area for a significant period of time. *www.energy.ca.gov/glossary/glossary-b.html*

Brownout: A controlled power reduction in which the utility decreases the voltage on the power lines, so customers receive weaker electric current. Brownouts can be used if total power demand exceeds the maximum available supply. The typical household does not notice the difference. *www.energy.ca.gov/glossary/glossary-b.html*

Built Systems: Involves land use planning, community design, development, and construction of the built environment and neighborhoods. It also involves maintenance of existing buildings and retrofitting.
http://www.peelregion.ca/planning/climatechange/reports/pdf/climate-chan-strat-bgr.pdf

Climate change: Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing factors, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. ” The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes. (From Impacts to Adaptation : Canada in a Changing Climate, 2007, http://adaptation.nrcan.gc.ca/assess/2007/ch11/index_e.php#R)

Greenhouse effect: Greenhouse gases effectively absorb infrared radiation, emitted by the Earth's surface, by the atmosphere itself due to the same gases and by clouds. Atmospheric radiation is emitted to all sides, including downward to the Earth's surface. Thus, greenhouse gases trap heat within the surface-troposphere system. This is called the greenhouse effect.
http://www.ipcc.ch/publications_and_data/ar4/wg3/en/annex1sglossary-e-i.html

Greenhouse gas (GHG): Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth 's surface, by the atmosphere itself and by clouds. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary greenhouse gases in the Earth's atmosphere. In addition, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances. (From Impacts to Adaptation : Canada in a Changing Climate, 2007, http://adaptation.nrcan.gc.ca/assess/2007/ch11/index_e.php#R)

Mitigation: Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. (IPCC, 2008)

Natural Systems: Includes the natural environment (forests, wetlands, wildlife, etc.) plus human activities to monitor, protect and enhance the natural environment and educate the public on the current and future state of our natural systems.
http://www.peelregion.ca/planning/climatechange/reports/pdf/climate-chan-strat-bgr.pdf

Public Health: Involves the combination of programs, services and policies that protect and promote the health of all. Public health is involved in the enhancement of the health status of the population; reduction of disparities in health status among individual/groups within that population; preparation for and response to outbreaks and emergencies; and enhancing the sustainability of the healthcare system.
http://www.peelregion.ca/planning/climatechange/reports/pdf/climate-chan-strat-bgr.pdf

Urban forest: The trees, forests and associated organisms that grow near buildings and in gardens, green spaces, parks and golf courses located in village, town, suburban and urban areas. http://canadaforests.nrcan.gc.ca/glossary/u