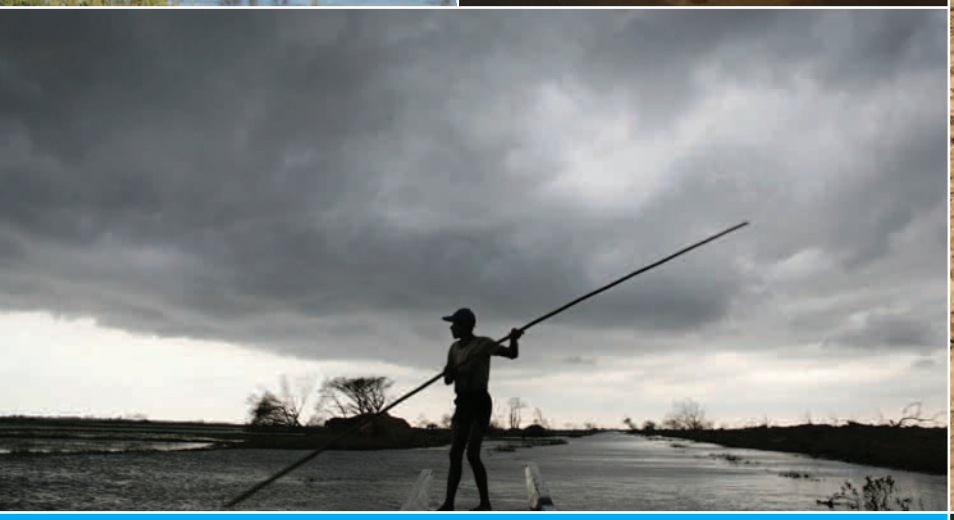
CLIMATE CHANGE, CHILDREN AND YOUTH



Local Connections to Global Issues

TEACHER RESOURCE GUIDE
Grades 9-12

global classroom
MOVE YOUR WORLD

unicef

Canadian International Development Agency

COVER PHOTOS

Mozambique, 2008

Children stand amidst flooded crops in Mutarara District in Tete Province.

Haiti, 2005

A girl fishes for shrimp in a sewage-infested pond left by Tropical Storm Jeanne in the northern city of Gonaives, capital of Artibonite Department. The city's waterfront area was dubbed 'Cité Jeanne' after the September 2004 storm destroyed homes, schools and basic infrastructure, affecting some 300,000 people.

Myanmar, 2008

A man steers a boat as a storm gathers, some 50 kilometres south-west of the township of Kunyangon. Further storms would complicate cyclone relief efforts and leave families increasingly vulnerable to disease.

Somalia, 2006

A shepherd seeks water for his goat at a large catchment area outside the village of Isdorto in the southern Bakol Region. The catchment has been empty for 70 days. Many livestock are dying, and the nearest water point is 25 km away. The water basin has dried up only three times in the past 80 years. The last time was in 1992, Somalia's worst drought in recent history.

CONTENTS

ACKNOWLEDGEMENTS

Fiona Zawadzki, B.Ed, of Skye Consulting (**www.skyeconsulting.net**), Paula Gallo and Kelly Quinlan of UNICEF Canada (**www.unicef.ca**) created this guide.

Fiona Zawadzki is a sustainability educator who has developed resources and in-class presentations including co-founding Green Bricks Education Society (**www.greenbricks.ca**), which involves youth in sustainable land use and development. Kelly Quinlan is the Education Manager for UNICEF in British Columbia, and Paula Gallo is the Senior Education Manager for UNICEF Canada.

A special thanks goes to Diana Klein, LEED AP, P.Eng, of Eco-Integration for her assistance with researching background materials for this guide.

UNICEF UK's Climate Change Report 2008: *Our climate, our children, our responsibility* provided the inspiration for this guide.

UNICEF Canada would like to sincerely thank Bogna Haddad (Ontario Catholic District School Board/Ontario Secondary School Teachers' Federation Science Subject Council Co-Chair); Jennifer Mahon (School District 5, Southeast Kootenay); David Weightman (Peel District School Board); Demetra Kotsalis (School District No. 40, New Westminster); and the team at Projecting Views of Youth (former UNICEF Junior 8 team) for taking the time to review this resource and provide us with comments that have informed our writing and revisions.

> *"This resource goes beyond educating our adolescents on the impacts of climate change; it encourages meaningful local actions that are within the reach of every* student." (Bogna Haddad)

INTRODUCTION

THANK YOU for inviting UNICEF Canada into your classroom. This guide has been created to support secondary school educators in their efforts to work with youth to take action on climate change. Through the thought-provoking activities contained here, students will have the opportunity to nurture their compassion and discover how climate change is affecting children around the world, especially children in developing countries. We aim to provide you with tools that will support your students in their efforts to affect meaningful and lasting change, and inspire them to take action at a local level.

This guide explores the scientific facts of climate change without leaving students with a feeling of despair. Educators can provide youth with the knowledge of the issues facing their future, the tools to explore solutions, and a sense of awareness that they have the capacity to make a difference. The goal of this guide is to inspire both teachers and students to connect local issues to global concerns and develop the attitudes needed to change our world for the better.

Here's what educators are saying about this guide:

> "This guide will help teachers reach the goal of making our students educated, global citizens." (Jennifer Mahon)
>
> "This guide is a key resource for any social action-oriented educator." (Bogna Haddad)
>
> "It is evident that the preparation of this resource was extensive. The links, specifically multimedia, are superb." (David Weightman)
>
> "Included are great project ideas that students can personalize for their own needs and community." (Demetra Kotsalis)

This guide contains interactive activities and support documents around six interconnected themes, as presented in the UNICEF UK's Climate Change Report 2008: *Our climate, our children, our responsibility*. This report details how the issues threatening the survival of children in developing countries link with the impacts of climate change.

The themes in this resource can stand alone, or be delivered in combination. Also provided is an introductory activity (page 14) to connect all the themes. The themes are identified as:

- Food Security
- Health
- Natural Disasters
- Natural Environment
- Water
- Energy

This guide is designed for Grade 9 to12 educators across Canada in order to fulfill curriculum expectations (including the revised 2008 Ontario curriculum) in the following subjects:

Province	Curriculum Connections
Alberta	Science 9; Science 10,20, 14, 24; Biology 20 ; Social Studies 20; and Environmental and Outdoor Education Junior High
British Columbia	Science 9 and 10; Sustainable Resources 11 and 12; Civics 11; Geography 12
Saskatchewan	History 11; World Issues 11; Biology 11; Physics 12

Manitoba	World Geography 12; Biology 12; Science 10; World Issues 10; World Geography 12
Ontario	Science 9 Academic & Applied; Science 10 Applied; Biology 11; Chemistry 11; and Environmental Science 11
Quebec	Social Sciences: Geography, History and Citizenship Education, and Contemporary Economic Environment; Secondary English Language Arts
Atlantic Canada	Atlantic Canada in the Global Community 9, Science 9, Science 10, Biology 11, Physics 11, Global Geography 12, Global History 12

This guide was initially created to support Ontario and British Columbia curriculum connections, but we have since added connections across Canada, which can be found in Appendix I and online.

UNICEF CANADA'S GLOBAL CLASSROOM PROGRAMME

The goal of UNICEF Canada's Global Classroom programme is to move a generation of Canadians from awareness of global issues affecting children to personal involvement and informed action. Working with educators, students, parents and governments at all levels, the Global Classroom is fostering a commitment in Canada's rising generation to social justice, human rights and support for Canada's humanitarian engagement on international issues.

UNICEF supports teachers with professional development opportunities to help them bring challenging global issues into the classroom. Across Canada, thousands of teachers are committed to global education. Science teachers, math teachers, geography teachers; across the curriculum, global education has relevance to the daily lives of students and to their capacity to navigate a rapidly changing world. UNICEF connects with many of these teachers at workshops, at conferences and through a variety of education partners.

UNICEF collaborates with educators to develop curriculum-linked resources and events to promote global education. With our partners in the education sector, UNICEF produces and distributes print, electronic and online resources for global education linked to provincially mandated curricula. Make sure you check out our Global Classroom website, at **http://globalclassroom.unicef.ca/**, or in French, **http://lemondeenclasse.unicef.ca/fr/** to find relevant and timely resource guides to use in your classroom. You can also sign up for our quarterly newsletter, and find out about global education across Canada.

To further explore the science of climate change in your classroom, UNICEF Canada has posted online resources and lesson plans at **http://globalclassroom.unicef.ca/climate_change_resource_guide**.

UNICEF provides young people with opportunities to learn about the key issues affecting children around the world and to take action in support of the world's children. UNICEF designs print and electronic resources specifically for and with young people. Through interactive web-based features, special events, campaigns on issues including malaria and HIV and AIDS, and close to 400 live presentations every year, we motivate thousands of elementary, secondary and university students across Canada to learn and do more.

UNICEF also coordinates international conferences for young people that coincide with and connect Canada's youth to world leaders. The UNICEF Junior 8 Summit is an annual event, which invites high school students across Canada to develop their ideas about issues on the G8 agenda. The winning team then travels to the G8 Summit, where youth delegates from around the world discuss their perspectives and share them directly with the G8 leaders. The winning team

in 2009 was Carpe Diem, from London, Ontario. Their suggestions involving how best to tackle climate change can be found on our website at **http://moveyourworld.unicef.ca/en/involved/secondary_junior8.htm** or in French, **http://moveyourworld.unicef.ca/fr/involved/secondary_junior8.htm**

COP15

The United Nations Climate Change Conference took place in Copenhagen, Denmark in December 2009. This conference, which is also known as COP15, brought together close to 20,000 delegates from around the world for a historic high-level meeting on climate change. The goal was to build on agreements reached as part of the Kyoto Protocol (1992), and to reach a new, comprehensive and far-reaching agreement on key climate change issues, including mitigation, adaptation, the financial architecture to support climate action and the technology transfer to facilitate a transition to low-carbon growth paths. For final results of the Conference, reference the Web site at **http://en.cop15.dk/**

As climate impacts are likely to worsen over the years and decades to come, today's children — and tomorrow's children — will be the greatest beneficiaries of a successful international deal on climate change.

On this occasion, the City of Copenhagen and UNICEF organized a Children's Climate Forum to give children from both developing and industrialized countries a voice in this debate, and a chance to influence the important discussions at COP15.

The young people attending met with other young activists from around the world, and were offered an incredible opportunity to connect with and influence the world leaders who continue to make historic decisions regarding the future of our world.

UNICEF has also launched an online platform where thousands of children from around the world have the opportunity to collaborate on solutions, and present their ideas to world leaders and decision makers. Check out **http://uniteforclimate.org/**, or in French, **http://uniteforclimate.org/?lang=fr)** for details, and make sure to connect your students to this unique opportunity.

The lessons learned at the Children's Climate Forum will help today's children adapt and respond to rapidly changing environments — and contribute to meaningful and sustainable change. Together, we can support young people in addressing these challenges.

UNITED NATIONS CONVENTION ON THE RIGHTS OF THE CHILD (UNCRC)

UNICEF was created by the UN General Assembly on December 11, 1946 as a temporary organization called the United Nations International Children's Emergency Fund, to respond to the suffering of children in European countries devastated by World War II.

In 1953, UNICEF was made a permanent arm of the UN to address the light of children in Asia, Africa, the Middle East and Latin America. Its name was changed to the United Nations Children's Fund although the acronym (UNICEF) did not change.

UNICEF is funded entirely by voluntary contributions from individuals, businesses, foundations, schools, associations and governments. The world's largest provider of vaccines for developing countries, UNICEF supports child health and nutrition, safe water and sanitation, quality basic education and the protection of children from violence, exploitation and HIV and AIDS.

UNICEF's work with children around the world is not just a moral assertion, it is codified in the UN Convention on the Rights of the Child (UNCRC)—the world's most widely ratified human rights treaty, adopted by 193 countries, including Canada. The CRC states that children have the absolute right to live in a decent environment with all that implies: living and growing in safety, enjoying good health and attending school.

There are 54 articles that comprise the UNCRC, all interrelated. What follows are the key articles relating to climate change, as outlined in the UNICEF UK Climate Change Report 2008.

Article 6: Children have the right to live. Governments should ensure that children survive and develop healthily.

Article 12: When adults are making decisions that affect children, children have the right to say what they think should happen and have their opinions taken into account.

Article 22: Children have the right to special protection and help if they are refugees (if they have been forced to leave their home and live in another country).

Article 24: Children have the right to good quality health care—the best health care possible—to safe drinking water, nutritious food, a clean and safe environment, and information to help them stay healthy. Rich countries should help poorer countries achieve this.

Article 28: All children have the right to a primary education, which should be free. Wealthy countries should help poorer countries achieve this right.

Article 38: Governments must do everything they can to protect and care for children affected by war.[1]

For details on all 54 articles, refer to Appendix D: The UN Convention on the Rights of the Child in Child-Friendly Language.

WHY IS UNICEF TACKLING CLIMATE CHANGE?

UNICEF is mandated by the United Nations General Assembly to advocate for the protection of children's rights, to help meet their basic needs and to expand their opportunities to reach their full potential, and so it has joined the fight to protect our children from the impacts of climate change.

Children in developing countries will be the hardest hit by climate change. Because climate change reduces the availability of food in developing countries, children will not have the food they need to sustain their growth and maintain a healthy disposition. Already children in developing countries suffer from poverty, poor water and sanitation, lack of water and poor health. The effects of climate change exacerbate these issues. In addition, developing countries do not have the resources to quickly and safely adapt to the effects of climate change alterations in weather patterns, droughts, floods and the increase in the number and severity of natural disasters.

However, children are also a strong voice in the fight against climate change. According to a recent UNICEF Innocenti Research Centre report called *Climate Change and Children: A Human Security Challenge*, children are among the greatest victims of climate change. But they can also act as vehicles for change, as children from developed nations can work with the adults in their lives to bring about meaningful and sustainable change. Therefore, we need to educate today's youth to be "proactive and prepared citizens empowered to adapt and respond to rapidly changing environments. An education, which will prompt young citizens to question and modify existing conditions and structures moving toward enhanced development objectives and disaster risk reduction and preparedness activities." [2]

Visit UNICEF's Press Centre at **http://www.unicef.org/media/**. These pages are updated daily with the latest news from UNICEF around the world and will keep you posted on UNICEF's commitment to the environment.

Scientists once referred to the issue as 'global warming' but today the term 'climate change' is more widely used as it encompasses both the changes in the temperature (warming) and the changes in weather patterns such as severe storms and melting of the glaciers.

CANADA'S RESPONSIBILTY TO DEVELOPING NATIONS

In 1987, the World Commission on Environment and Development (WCED) published a report commonly referred to as the Brundtland Report. This groundbreaking work detailed guiding principles for sustainable development and continues to act as the road map for sustainability today. This report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." [3]

A key concept of the Brundtland Report that is now commonly accepted is that of the three pillars of sustainability. Simply stated, sustainability cannot be understood as just the environment, there are three factors or pillars that also need to be considered:

- Environment
- Economics
- Society: adults and children.

Our children's future depends on a balance between the three pillars. We need to nurture and preserve our planet, have the resources (money and labour) to make this happen and ensure global human needs are met.

As developed nations are fortunate to have in place the resources to balance the three pillars, it is the responsibility of nations like Canada to support developing countries in their struggles with climate change, as stated in Article 24 of the UN Convention on the Rights of the Child:

Children have the right to good quality health care — the best health care possible — to safe drinking water, nutritious food, a clean and safe environment, and information to help them stay healthy. Rich countries should help poorer countries achieve this.

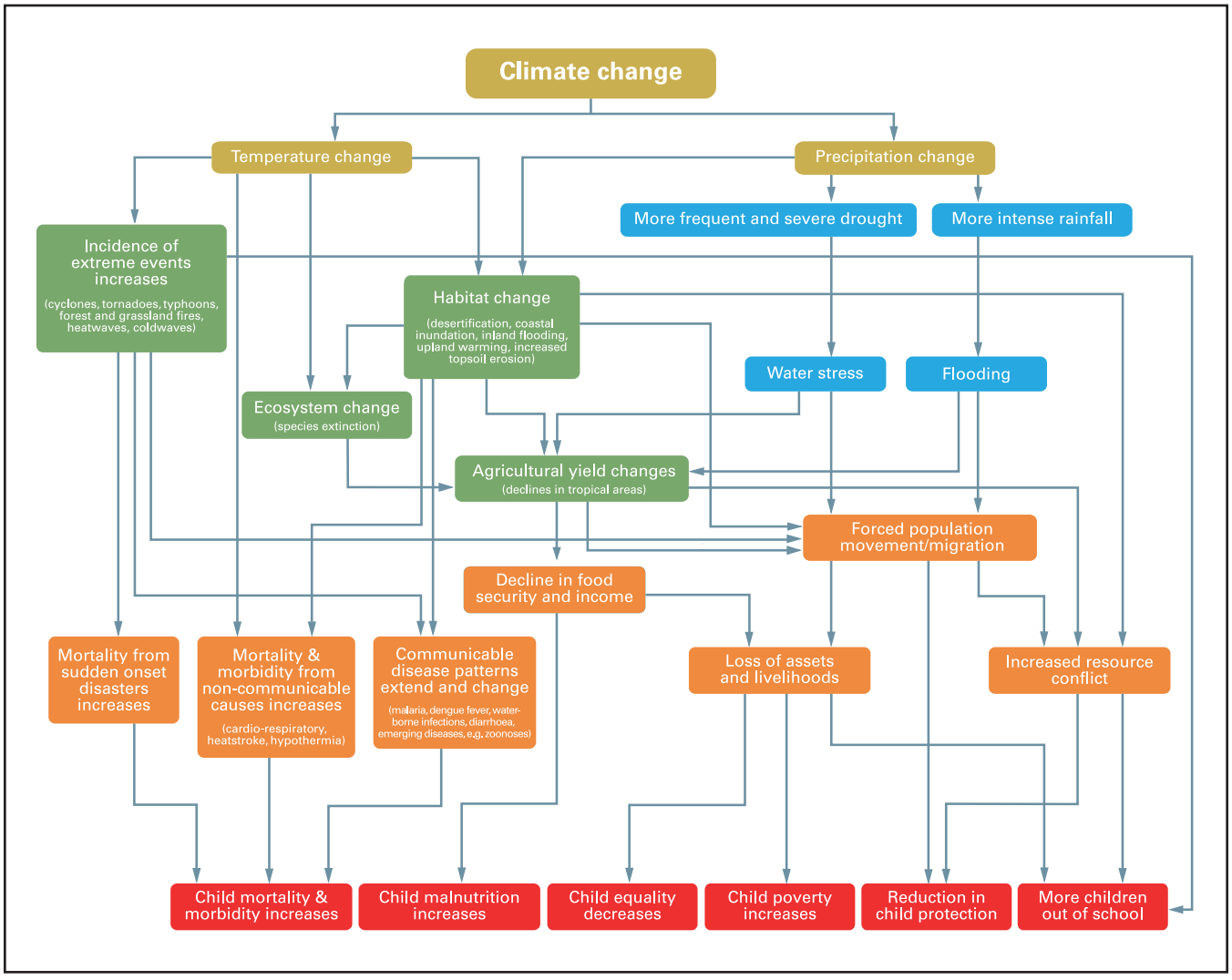
The reality is that citizens of developed nations continue to have the greatest impact on climate change; we are dependent on fossil fuels and overall consumerism to sustain our current standard of living. We need to do our part in restoring the balance of our world and help children in developing countries affected by our actions. We need to educate our youth on solutions, inspire them to take action and lead by example. As we adapt to ending the dependency on fossil fuels and appreciate the value of our natural treasures, we will learn what makes us strong as a global community — the human spirit.

CLIMATE CHANGE CONNECTIONS

Climate change is defined as the increase in Earth's temperature due to human impact by way of greenhouse gas emissions. Gases, such as carbon dioxide, build in the atmosphere and form a barrier. This gaseous wall lets the heat from the sun into our atmosphere but does not let it escape, resulting in the warming of the planet. The increase in global temperature means alterations in the world's weather patterns and rising sea levels.

The effects of climate change cannot be viewed in isolation; they are all connected. For example, as the water cycle intensifies both drought and flooding increase. This affects agriculture, increases the likelihood of waterborne disease, and can negatively affect what was once a fertile land rich with resources.[5]

The citizens most vulnerable to climate change and its many connections are children. Since children have developing immune systems and rely on proper nutrition and clean water to progress into adulthood, they are less likely than adults to weather the effects of climate change. A summary of the key impacts of climate change on children is presented schematically below.[6]



GUIDE OVERVIEW

This guide contains a series of activities with accompanying handouts connected to the six themes: natural disasters, food security, health, natural environments, water and energy.

Share photos of your students working towards a sustainable lifestyle. Please email photos to UNICEF Canada at **globalclassroom@unicef.ca**

Each theme includes the following sections:

- **Activities:** interactive and thought-provoking student activities to explore each theme
- **Backgrounder:** informative facts and statistics providing the background basics for the educator and/or student to facilitate each theme
- **Youth Take Action Handout:** inspirational profiles and student projects challenging youth to make change
- **Student Handouts:** easy-to-understand student handouts accompanying each activity

Distribute the handout found on page 105 (Appendix G: Reflect and Act). This handout will allow students to journal lessons learned throughout each theme, or can be used to summarize lessons learned from the entire unit.

The glossary (addressing the underlined words in the guide) and other appendices (including the curriculum expectations/outcomes, United Nations Convention on the Rights of the Child, and a culminating task rubric), can be found in Appendix C.

Please note that all websites referenced in the themes were accurate at the time of printing. UNICEF Canada apologizes for any inconvenience that may be caused due to an inactive link.

Youth participate in a UNICEF "Water Walk," an interactive activity designed to raise awareness about water issues around the world, in Port Alberni, BC.

EDUCATORS – LET'S GO GREEN!

Students learn by example. Challenge yourself and your colleagues to make a difference and 'walk the talk.' It is empowering for students to see how your small changes can make a big difference. Here are some ideas:

- walk, run, bike, train, bus or car pool to school
- have organic, fair-trade coffee and local food for staff social events
- use a reusable travel mug and water bottle
- pack waste-free lunches
- green your classroom; reuse paper, start a worm compost in your classroom, recycle blue bin items
- open the blinds and turn off the lights in the classroom.

At your next staff meeting, gather your colleagues and agree to challenge another school to have the greenest staff! How can you get your students involved in the solution?

Meet two amazing teachers who are leading by example:

- Susan Ng Chung, a science teacher at Prince of Wales Secondary in Vancouver is leading by example. Susan commutes to school on two wheels every other day.
- Graeme Mitchell, a teacher at Stelly's Secondary School in Saanich, BC, developed a popular course called Sustainable Development for Grade 11 students. The goal is to shed light on models, tools and ideas that already exist, and, that if widely adopted, would completely change our world for the better.

NOTES

1 UNICEF UK, *Our climate, our children, our responsibility* (York: UNICEF UK, 2008), p. 12.
2 UNICEF Innocenti Research Centre, *Climate Change and Children: A Human Security Challenge* (Florence: UNICEF Innocenti Research Centre, 2008), p. 2.
3 World Commission on Environment and Development, *The Brundtland Report*, **http://www.un.org/documents/ga/res/42/ares42-187.htm** (accessed November 2009).
4 Toronto District School Board, *Ecoschools: Climate Change in Grade 11 and 12 Science* (Toronto: Toronto District School Board, 2004), p. 9.
5 UNICEF UK, *Our climate, our children, our responsibility*, p. 4.
6 Ibid., p. 3.

THEMES

Pakistan, 2007
A girl stands in the Nasirabad camp in Kech Valley in Balochistan Province, one of the worst-affected areas. The camp is home to 25,000 people displaced from eight villages, many of whom are sleeping in the open. Up to six families are sharing the few tents available. Some of the children have developed skin infections from the extreme temperatures (which average 50 degrees centigrade) and from poor hygiene conditions in the camp, whose only sources of water are a well and a river located 1 km away. An estimated 75,000 of Kech Valley's 500,000 inhabitants were displaced by flooding caused primarily when a nearby reservoir overflowed as a result of heavy rains in the wake of Cyclone Yemyin. Homes in more than 20 villages were swept away, and nearly 95 per cent of the yearly date harvest, Kech's most-important income source, was destroyed. UNICEF has provided blankets, water-purification tablets, tents, jerry cans, emergency health kits and other relief supplies for flood-affected children and families in Balochistan.

CONNECTING THE THEMES

Zimbabwe, 2008
A nurse takes notes, as a woman, child and other patients rest nearby, in a cholera treatment centre in the town of Chegutu in Mashonaland West Province.

INTRODUCTORY ACTIVITY

Climate Change Connections

Objective: To discuss issues facing children in the world today, and to discover how climate change can intensify these issues. This activity is intended to introduce students to all the themes presented in the guide.

Time: 30 minutes

Materials

- Coloured marker for each student
- Reused paper for each student (personal white boards or laptops)
- Student Handout #1: Climate Change and Children
- Appendix F: How Climate Change Affects Children (page 104)
- Clip #1: *Climate Change and Children*: **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm**

ACTIVITY

1. Ask students to consider what is the most important issue facing children in the world today. Examples may include poverty, hunger, mortality rates, drinkable water and climate change.

2. Instruct each student to record his or her answer on paper, in large writing, using only one or two words for the answer.

Some students may have difficulty accessing YouTube clips while at school, so we have provided many of them directly on the UNICEF Teacher website at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and on the UNICEF Student website at **www.unicef.ca/climatechangeresources**

3. Ask students to circulate the room and read what everyone has written. This is to be done in silence.

4. Ask everyone to pair up and discuss his or her respective issues.

5. Stop the class, and ask student pairs to choose only one issue with which to go forward, and to be prepared to talk about it with a larger group. Ask pairs to hold the one piece of paper between them and circulate the room and form a larger, like-minded group with another pair of students. Ask groups to discuss the commonalities in their larger group.

6. Next, have each larger group present its issue to the rest of the class. This could be done as a tableau (a silent performance of different motionless actions where actors move from position to position, usually freezing for 10 seconds between each), or ask groups to create a slogan or catchy phrase.

7. Back in their groups, ask students to reflect on what connections were made between each issue. If students haven't already made the connection, explain that almost all issues affecting children today are connected to climate change. Ask students to discuss. For example, if the topic is hunger, students may dialogue that climate change will result in drought conditions in select areas, making it difficult to grow crops. If a group had originally picked climate change as the most important issue facing children, instruct them to now pick another topic of importance, and make the connections to climate change. Instruct students to record their responses and be ready to share with the class. Allow 5 minutes for this.

8. Show the clip *Climate Change and Children,* **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and **www.unicef.ca/climatechangeresources**, a UNICEF video that details how the effects of climate change are affecting children in developing countries. Ask students to share what they learned about the connection of climate change to children.

9. After viewing the clip, ask students to complete Student Handout #1: Climate Change and Children.

Keep the Discussion Going

Review the connections between the topics discussed today. For example, how does poverty affect the health of children? How do natural disasters affect the water supply for children? You may want to record all issues discovered in class on the board, or distribute Appendix F: How Climate Change Affects Children (page 104), so the students have a visual of the issues.

Was there group consensus as to what is the most pressing issue facing children today? Why or why not?

What global stories about children affected your decision?

What can Canadians do to help children in developing countries?

Student Handout #1

CLIMATE CHANGE AND CHILDREN

Question and Answer

1. An action that saves the planet also helps meet the basic rights and needs of children. Explain this statement:

2. How does climate change threaten the basic necessities of human survival?

3. While many of the Earth's resources are threatened by climate change, one resource remains unchanged: the power of youth to affect positive change.

   a) List three actions you can personally take to help stop climate change, and explain how they contribute to the fight against climate change. For example, I can ride a bike instead of getting a drive.

   b) List three actions you can take in your community to help stop climate change, and explain how they contribute to the fight against climate change. For example, I can advocate for better waste management practices in my community.

   c) List three actions you can take globally to help stop climate change, and explain how they contribute to the fight against climate change. For example, I can support global organizations tasked with the job of stopping climate change.

Some students may have difficulty accessing YouTube clips while at school, so we have provided many of them directly on the UNICEF Teacher website at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and on the UNICEF Student website at **www.unicef.ca/climatechangeresources**

FOOD SECURITY

Pakistan, 2006
A boy eats a meal at the Government of Punjab's Child Welfare and Protection Bureau in Lahore, capital of Punjab Province. The UNICEF-assisted centre provides food, shelter, educational assistance, psychosocial counselling and family tracing and reunification services to children who live and work on the streets. The centre also assists repatriated victims of child trafficking, including former 'camel jockeys' from the United Arab Emirates.

INTRODUCTION

Food is an essential ingredient of life. As with water, without food we cannot survive. Climate change is affecting our ability to produce food. Sadly, in developing countries malnutrition is already a leading cause of infant and child mortality.[1]

From a local perspective, most of our food travels thousands of kilometers to reach our plates. That trip generates greenhouse gases, which add to the effects of climate change. Climate change increases natural disasters which destroy agricultural land and decrease the availability of food for people in the developed world. Fossil fuel prices and the cost of healthy food then rise. Youth need to understand the issues and work together to adopt solutions: growing food locally, eating seasonally and eating a less carbon intensive plant-based diet.

The **good news** is we **can** produce healthy food to feed everyone, and we can start by understanding the issues and then doing our part to make a difference.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links on pages 91 and 95, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec on page 107.

Province	Course	Expectation/Learning Outcome
Ontario	HFN10 and HFN20 Grades 9 and 10 Social Sciences and the Humanities: *Food and Nutrition*	Diversity, Interdependence and Global Connections Complete an investigation of current global issues related to food (e.g., food distribution, food shortages, gene manipulation), using current social science research methods.
Ontario	HF4AM Grade 12 Social Sciences and the Humanities: *Food and Nutrition Sciences*	Personal and social Responsibilities determine the relationship among nutrition, lifestyle, health and disease.
British Columbia	Science and Technology 11 *Agriculture*	Describe the elements of agricultural systems found locally, provincially, and globally. Describe the role of genetics in agriculture.
British Columbia	Geography 12 *Resources and Environmental Sustainability*	Assess the environmental impact of human activities, including: • Energy production and use • Forestry • Agriculture • Waste disposal • Water use

Setting the Stage

Objective: To define food security as it relates to climate change.

Time: 15 minutes

Materials

- Scrap paper for each student (or personal laptops)
- Appendix G: Reflect and Act (page 105)

ACTIVITY

1. Explain that you will be discussing the connection between food security and climate change; share how climate change can magnify the global food crisis already facing children in developing countries.

2. Distribute to each the Appendix G: Reflect and Act on page 105 and ask students to journal lessons learned during discussion and activities around the theme.

3. Ask the students to consider the term "food security." What does it mean?

4. Instruct students to write down five words that they would use to describe food security; create a master list of words on the board.

5. Share that food security means the availability of food and how we can obtain that food. There may be plenty of food in the world, but not everyone has the same access to it.

Food for Thought

Objective: To engage students in critical thinking discussions around global food security and climate change.

Time: 15 minutes

Materials
- Photos (page 20)
- Student Handout #3: Circles

ACTIVITY

Arrange students into six groups.

- Explain that you will discuss global food security and hand out photos to each group. Instruct students to discuss the photos and captions.

- Remind students of the definition of food security. You may want to have this definition displayed on the board. Ask students to share how the photos relate to this definition.

- Ask students to think of a place in the world where food is scarce. Explain that there are many reasons why food security issues can arise, and most are magnified because of climate change.

- Distribute Student Handout #3: Circles (page 28) and instruct students to decide how each circle might relate to food security connected to climate change. How are these effects magnified for children? Record answers in each circle. Possible answers for each circle are:

  Health: Malnourished children cannot fight off infection as well as children who are nourished. Climate change affects crop production; children are at risk of malnutrition.

  Natural Disasters: As floods and droughts worsen with climate change, it will be more challenging to grow food in many areas; this adds to the malnutrition of children in developing countries.

  Natural Environments: One reason why there is excess CO_2 in the atmosphere is because we are cutting down our irreplaceable old growth trees, which act as necessary carbon sinks. As we lose our trees, the soil erodes and can lead to land degradation and desertification, which makes select crops harder or impossible to harvest.

  Population: With our world population on the rise, we have more children to feed. Climate change is affecting crops and livestock, especially in developing countries, making it even harder to feed a growing global population.

  Poverty: Developing countries don't have the resources in place to weather a period of food shortage, and children are more vulnerable.

  Water: The water cycle is affected by climate change, which results in less water available for agriculture and failure of crops. This in turn adds to the malnutrition of children in developing countries.

Nature is a series of balances but humans are impacting the natural rhythms of the planet; we are changing the natural global carbon cycle by excessively burning fossil fuels. "Forests, soil, oceans, the atmosphere, and fossil fuels are important stores of carbon. Carbon is constantly moving between these different stores that act as either 'sinks' or 'sources.' A sink absorbs more carbon than it gives off, while a source emits more than it absorbs. Before the Industrial Revolution, the amount of carbon moving between trees, soil, oceans and the atmosphere was relatively balanced." By burning oil, coal and gas, we have far more "sources" than "sinks" and this alters the natural balance.

In Niger, community gardens nourish hope.

A barefoot boy stands on parched, cracked soil in southern Malawi. In 2005, drought caused a massive food shortage that left 4 million people without adequate food supplies.

Keep the Discussion Going

1. Which food security circle(s) is most affected by climate change? Why?

2. How are the food security circles connected to each other? Draw a web to connect the circles to each other.
   Refer to Appendix F: How Climate Change Affects Children (page 104).

3. Climate change affects crops by making it harder to grow food in extreme environments like drought conditions, but how does the decrease in crops affect climate change?
   Plants are carbon sinks as they remove carbon dioxide from the atmosphere. The less plants, the more greenhouse gas emissions (ghg) being released.

4. Why is rainforest deforestation not an acceptable means of making way for crop harvests? What can you do to take action against this practice?
   One reason is that trees are ideal carbon sinks since they can store carbon longer than plants. The less carbon sinks available, the greater the release of CO_2 into the atmosphere; the result is climate change. Children in developing countries are the most susceptible to climate change. Ensure wood products come from a sustainably-managed forest.

Is Your Food Too Warm?

Objective: To understand that climate change is negatively affecting food supplies in developing countries, and therefore magnifying the problem of childhood malnutrition. Also, to discover that the process by which most of North America's food reaches our plates is significantly impacting climate change.

Time: 45 minutes (plus 20 minutes, if students calculate their ecological footprint)

Materials
- Food Trivia Tango (below)
- Four signs placed around the classroom: one sign for each of the letters A, B, C, D
- Reused paper for each student (personal white boards or laptops)
- Student Handouts #4, 5, 6: Food Facts Cards
- Clip #2: *Fix the Food Chain* at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and **www.unicef.ca/climatechangeresources**

ACTIVITY

1. Place signs (one sign for each of the letters A, B, C, D) in four different locations in the classroom.

2. Read the first question and ask students to decide whether the answer is A, B, C or D and move to the appropriate place in the room. Reveal the answer, ask for feedback, and read the next question.

3. Here are the questions. The answers appear in bolded text below. These questions are adapted from David Suzuki's *Green Guide*, unless otherwise stated.[3] Suggestion: To prepare for this activity, you might want to assign students the task of researching the answer to one question the night before you do this activity. This may elicit better discussions at the end of the activity.

   i. Raising livestock contributes more to climate change than the worldwide transportation sector.
      a) **True** b) False

   ii. The use of chemical pesticides increased by what percentage in the U.S. during the second half of the 1900s?
      a) 80% b) 200% c) **600%** d) 750%

iii. The U.S. Environmental Protection Agency estimates that agriculture is responsible for what percentage of the nation's water pollution?
a) 80% b) **70%** c) 50% d) 30%

iv. When raising cattle, how many litres of water does beef require per kilogram?
a) **70,000 litres** b) 40,000 litres c) 10,000 litres d) 1,000 litres

v. Millions of hectares of rainforest have been cut down for livestock grazing and feed crops (corn and soy) since 1970. This loss of rainforest is significantly adding to climate change.
a) **True** b) False

vi. According to the UN News Centre, rising greenhouse gas emissions threaten what percentage of the key fishing grounds? [4]
a) 80% b) **75%** c) 50% d) 20%

vii. This loss of fishing grounds could affect how many people who derive their protein from seafood worldwide? [5]
a) 2.9 million b) 10 million c) 4.5 billion d) **2.6 billion**

Read the UN News Story on climate change and fish stocks: Climate change leading to shrinking fish stocks, UN says.
http://www.un.org/apps/news/story.asp?NewsID=25716&Cr=fish&Cr1

4. Knowing your ecological footprint is a good starting point to making change. As the food we choose can have a significant impact on our ecological footprint, students should first calculate their ecological footprint, if they have not done so recently. The ecological footprint measures the amount of nature's resources an individual, a community, or a country consumes in a given year. Here is a quick ecological footprint analysis students can complete: **http://www.myfootprint.org/**.

5. Explain how David Suzuki shows that by eating a local, organic, mainly plant-based diet, we can significantly lower our ecological footprint and therefore reduce the release of CO_2, which is proven to contribute to climate change.[7] If we can regulate the Earth's climate, we can improve global food security issues. As children are most affected by climate change, this will help to end malnutrition around the world.

6. Discuss the 100 Mile Diet, which is a low carbon diet. This is a simple approach to thinking locally in terms of your food as the premise is to ensure everything on your plate has travelled no more than 100 miles to reach your plate. Instruct students to create a meal that follows the 100 Mile Diet. The menu should consist of a list of ingredients. Ask students what challenges they encountered when creating their meal.

7. Arrange students into six groups. Give each group one of the three Student Handouts #4, 5, 6: Food Facts Cards on the actions (buying local, eating organic and reducing meat/eggs/dairy) we can take to significantly lower our ecological footprint. Record answers to the questions listed on the handouts.

8. Have groups share results. Ask students to consider further food actions that will lower their footprint. For example, choosing whole foods, which require less packaging and processing, over highly processed foods which in turn saves energy and greenhouse gas emissions.[8]

Dr. William E. Rees, a professor at University of British Columbia's School of Community and Regional Planning, is best known as the co-creator of 'ecological footprint analysis'. "Ecological footprint analysis is an accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area." [6]

Inspired by the fact that the average North American's food travels over 1500 miles from farm to plate, Alisa Smith and J.B. MacKinnon committed, for one year, to eating foods that travel no further than 100 miles (or 160 km) to their plate. Read their story at **http://100milediet.org/.**

9. Show the *Friends of the Earth* clip on Join The Food Chain Campaign (a campaign in the UK to educate citizens on the environmental impacts of our food choices) and discuss. This clip can be found at **http://www.foe.co.uk/campaigns/biodiversity/press_for_change/join_food_chain_campaign_17315.html**.

If students want to investigate Fair Trade items, TransFair Canada is Canada's only non-profit certification and public education organization promoting Fair Trade Certified products. The primary benefit of Fair Trade Certified is to ensure world farmers get a decent wage for their products.

TransFair Canada monitors every step of a product from production to consumer to ensure fairness for farmers and farm workers in developing countries. By supporting Fair Trade companies, we are helping alleviate the effects of poverty on food security. Visit **http://transfair.ca/en/node** for more information.

How can you make your school a Fair Trade environment? Learn about Fairtrade Schools in the UK at **http://www.fairtrade.org.uk/schools/**. This program is supported by UNICEF UK.

Keep the Discussion Going

If you ride a bike instead of driving a car, you are significantly reducing your ghg emissions. If you are also a vegetarian, you may be able to double your reduction of emissions!

For example, meat requires significantly more fossil fuels to produce than plant-based foods. Plus, plants are carbon sinks whereas meat is not. Refer to the article at **http://www.cbc.ca/health/story/2009/04/19/obese-global-warm.html** *that states that people who eat less food are helping the planet as ultimately they are burning less fossil fuels.*

Does buying local, organic food help children in developing countries? Why or why not?

Buying local food means the environmental impact of transporting our food is significantly reduced, resulting in less ghg emissions being released into the atmosphere. As children are most susceptible to climate change, reducing the greenhouse gases, and therefore the effects of climate change, will benefit global children. Also, choosing organic produce helps limit the pesticides in the environment.

If you adopt the 100 Mile Diet, what foods would be difficult to get within a 100-mile radius?

Coffee, chocolate, tropical fruit and certain grains are not generally produced locally.

What are the benefits of a farmer's market? Where is the closest market?

Farmers markets are good sources of local and organic foods. Ontario residents can visit **http://www.farmersmarketsontario.com/** *to find a market, and B.C. residents can visit* **http://www.bcfarmersmarket.org/**. *You can also check out* http://www.foodkm.com.

How are genetically modified (GM) foods connected to food security and climate change? Prepare a debate on the issue, with one side debating the positives and the other the negatives of allowing the continued production and research of GMs.

Experts are divided on whether or not GMs should be one solution for food security; especially since climate change is magnifying the world food crisis and leaving children undernourished.

Is organic farming better than conventional agriculture in terms of climate change?

Some experts believe organic farming uses more land, so is less efficient. However, the use of pesticides and fertilizers is adding to our dependency on fossil fuels and adding to our ghg emissions as well as depleting our soils rendering areas unsuitable for farming.

The ethics of genetically modified (GM) foods are often debated. The opponents of GMs are concerned, for example, about the terminator gene that prevents plants from producing fertile seeds. Farmers would not be able to save seeds to plant next year, but would instead have to purchase new seeds annually. What does this mean for farmers in developing countries? The proponents of GMs offer a different picture and may, for example, promote the ability to create a durable plant that could survive in extended periods of drought and/or increased temperatures and therefore help to feed our children, even in light of climate change.

The World Health Organization presents 20 questions and answers on GMs at **http://www.who.int/foodsafety/publications/biotech/20questions/en/**.

The Australian government has a biotechnology website that includes a timeline of significant events illustrating our current uses of GMs at **http://www.biotechnologyonline.gov.au/foodag/timeline.html**.

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #2: Youth Take Action (page 27) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action, or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric on page 103.

BACKGROUNDER FOOD SECURITY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What is the Issue?
Children in poor countries are the most vulnerable to climate change since they do not have the ability to anticipate and adapt to the effects of climate change.[9]

The effects of climate change such as changes in water cycles and temperature increases are all interconnected with food security. For example:

- Increasing drought and flooding are having a devastating effect on agriculture and the growing of food
- In arid and semi-arid areas, decline in rainfall is accelerating land degradation and desertification
- In tropical areas, small increases in temperature lead to declining crop yields[10]

The impact of climate change depends on the following:

- Hazard: defined as the physical effects of climate change like drought, flood and storms
- Vulnerability: defined as a country's ability to deal with these hazards

Some Statistics:

- By 2080, as a result of climate change, developing countries in Asia, Africa and Latin America are expected to see reductions in agricultural productivity of between 5% and 25%, adding to the malnutrition of the world's children[11]
- The International Rice Research Institute has found that rice yields fall by 15% with every degree of warming; if temperatures stay above 35^{0}C for one hour while rice is flowering, this heat will sterilize the pollen[12]
- In addition, rising ozone levels (contributing to climate change) in rich nations are causing reductions in food production; the expected ozone increase in China will cause maize, rice and soybean production to fall by over 30% by 2020[13]
- As carbon dioxide levels rise, less water is released from the leaves of trees and from crops, resulting in less rainfall; this further exacerbates the crop production decline due to water stress

In summary:
As crops decline due to water constraints, rising temperatures and other natural disasters triggered by climate change, the following could occur:

- The availability of food for the farming household, as well as what is available for market, will decrease
- Livestock will be affected resulting in a decrease of meat and dairy products, as well as a decrease in the use of animals in small-scale agriculture, ploughing and transporting goods to market[14]

These will affect the ability of parents to feed themselves and their children.

The Effects of Malnutrition on Children
The consequences appear to be lasting and often permanent. For example, lack of nutritional food could result in

- Loss in growth
- Lower cognitive function
- Premature death[15]

To learn more about climate change connected to food security, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* at **http://www.unicef.org.uk/campaigns/publications/pdf/climate-change.pdf**.

NOTES

1 UNICEF UK, *Our climate, our children, our responsibility*, p. 14.
2 David Suzuki Foundation, *Science: Forests and Sinks*, **http://www.davidsuzuki.org/Climate_Change/Science/Forests_And_Sinks.asp** (accessed November 2009).
3 Suzuki, David and David R. Boyd, *David Suzuki's Green Guide* (Toronto: Douglas & McIntyre, 2008), p. 46.
4 UN News Centre, "Climate Change Leading to Shrinking Fish Stocks, UN says," **http://www.un.org/apps/news/story.asp?NewsID=25716&Cr=fish&Cr1** (accessed November 2008).
5 Ibid.
6 Rees, William and Mathis Wackernagel, *Our Ecological Footprint: Reducing Human Impact on the Earth* (Gabriola Island, BC: New Society Publishers, 1998), p. 9.
7 Suzuki, D. and D.R. Boyd, *David Suzuki's Green Guide*, p. 46.
8 Ibid., 62.
9 UNICEF UK, *Our climate, our children, our responsibility*, p.4.
10 Ibid.
11 Ibid., p. 9.
12 Monbiot, George, *Heat: How to Stop the Planet From Burning* (Cambridge: Southend Press, 2006), p. 7.
13 Ibid.
14 UNICEF UK, *Our climate, our children, our responsibility*, p. 14.
15 Ibid.

Student Handout #2

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. Research what the Tesco grocery chain, in the UK, is doing to assist consumers in buying locally produced food. Part of the plan is to develop a carbon calorie counter that will allow shoppers to calculate the carbon footprint of their weekly shop.

PROJECT: Approach a local grocer to survey its policy on food choices related to climate change. Look at the origins of the produce and devise a plan the store can use to make change. For example, are the apples local, or travelling across the globe? What are local choices for produce? Are customers willing to pay extra for local produce? On the internet, search "Tesco regional sourcing" for more information.

2. Learn more about the 100 Mile Diet at **http://100milediet.org/**. What are the benefits? What are the challenges? Also, refer to David Suzuki's *Green Guide* (2008) to find out how to create a diet that will lower your ecological footprint.

PROJECT: Create a YouTube clip, power point presentation or a song/jingle/Public Service Announcement (PSA) to promote a diet that is local, organic and plant-based. Include the global environmental benefits of this diet. How can eating a local diet help children in developing countries?

3. Research how different high nutritional foods (like Plumpy'Nut) are helping developing countries feed severely undernourished children.

PROJECT: Host a fundraiser at your school to help UNICEF support the global food crisis. On the internet, search "UNICEF Canada emergency donation" for more information.

4. Food production, from seed to table, has changed drastically over the last 50 years. What are the environmental impacts of these changes? How is food production connected to climate change and children?

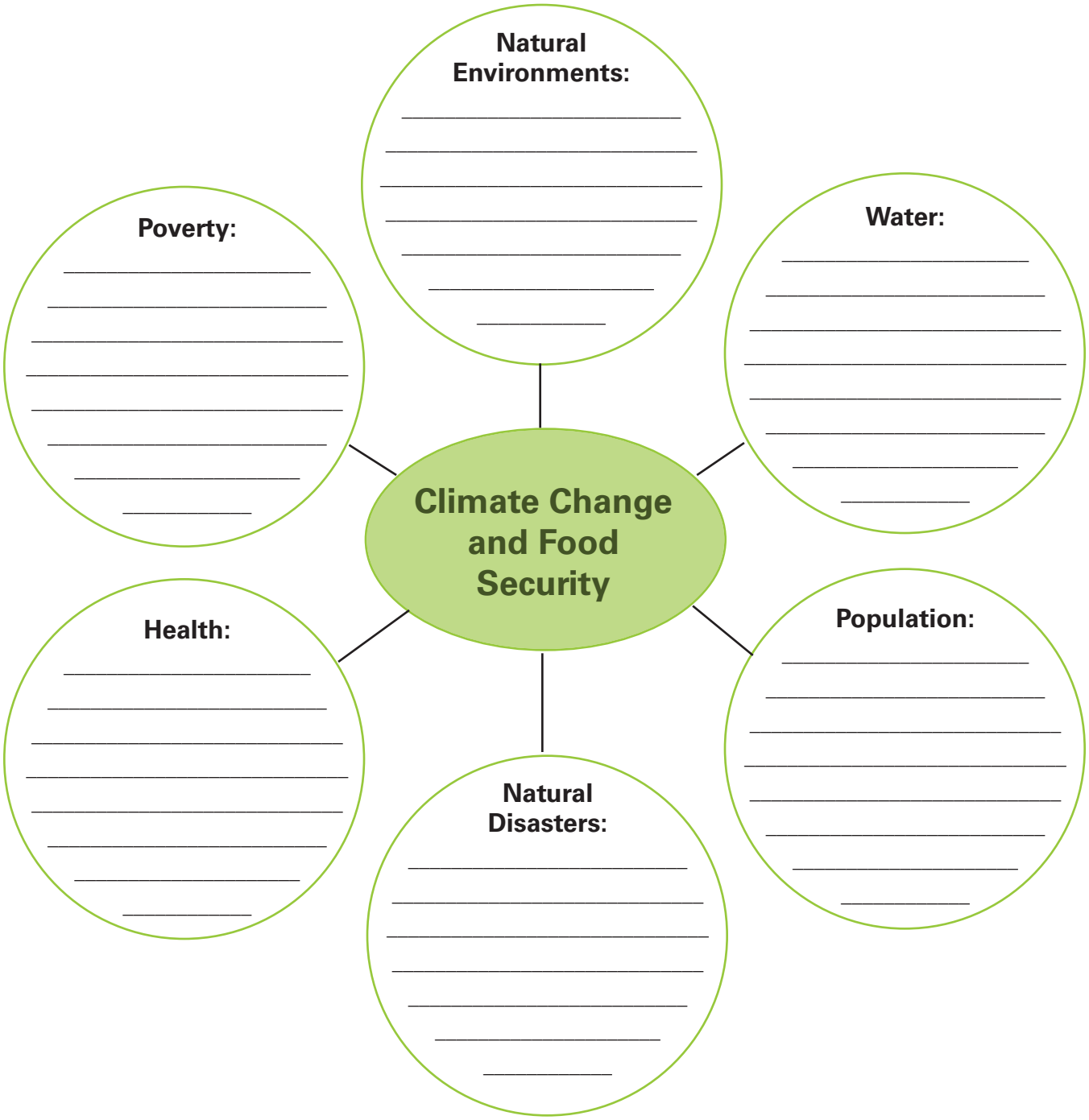
PROJECT: Interview older relatives and neighbours on their experiences with food in the past. How was it different from today? Why do they believe things have changed? Students can present an oral presentation or a written report.

New Westminster Secondary School, New Westminster, British Columbia
According to Wayne Esaias, a NASA scientist, the seasonal cycle of weight fluctuations in a beehive colony is an indicator of the impact of climate change. To create awareness of bee colony collapse disorder, students at New Westminster designed a presentation highlighting the issues. They also encouraged peers to "adopt-a-bee" and purchase beeswax candles, which supports their own apiary as well as the construction of apiaries in developing countries. For more information see **http://www.bcgreengames.ca**.

Addis Ababa, Ethiopia
To address future disruptions with food supplies caused by climate change, it is important to ensure the supply of nutritional foods for children all over the world. Plumpy'nut is a high-protein and high-energy, peanut-based paste, and is used for the treatment of severely undernourished children in many developing countries. As climate change affects world food supplies, this paste saves lives by providing much needed nutrition for children. For more information see **http://www.unicef.org**.

Student Handout #3

CIRCLES



Student Handout #4

FOOD FACTS CARDS: MEAT, EGGS, AND DAIRY

According to the David Suzuki Foundation, the average North American diet makes our food footprint four times greater than what we can sustain. A simple step to reduce your ecological footprint in terms of food is to eat a diet of local, organic plant-based foods. This could reduce your environmental impact by as much as 90%!

Here are some reasons to limit the meat, eggs, and dairy in your diet:

- ✔ Food from raising livestock is the most environmentally damaging food
- ✔ Raising and transporting livestock uses more fossil fuels than growing plant-based foods
- ✔ Producing animal protein requires 10 times the energy needed to produce plant protein
- ✔ Producing animal protein emits 10 times the greenhouse gas as plant protein
- ✔ Raising a kilogram of beef generates the same greenhouse gas emissions as driving an average car for 250 km
- ✔ There are several plant sources of protein (nuts, seeds, legumes, grains, etc.) so eating meat to obtain protein is not always a necessity

Adapted from David Suzuki's Green Guide, 2008.

Discuss and Record Responses for:

1. Explain how eating little or no meat, eggs and dairy will help significantly reduce your ecological footprint and create less greenhouse gas emissions

2. Give examples of how you can be successful in reducing the meat, eggs and dairy in your diet

3. How eating a plant-based diet could help children in developing countries with their food security? Think about this answer in terms of climate change. If we eat a diet rich in meat, eggs and dairy, how can it affect children in developing countries?

4. Design a meal that is local, organic and plant-based

Student Handout #5

FOOD FACTS CARDS: GOING ORGANIC!

According to the David Suzuki Foundation, the average North American diet makes our food footprint four times greater than what we can sustain. A simple step to reduce your ecological footprint in terms of food is to eat a diet of local, organic plant-based foods. This could reduce your environmental impact by as much as 90%!

Here are some reasons to include organic foods in your diet:

- ✔ Organic food production includes traditional farming practices with modern technology but does so without the use of synthetic pesticides and fertilizers
- ✔ Organic agriculture avoids the use of genetically modified (GM) foods
- ✔ Farmers who grow organic crops focus on improving the soil and using nature's way to control pests
- ✔ Organic farms know the importance of biodiversity and grow different plants
- ✔ Food sold in Canada can only use the word "organic" if it is certified by an accredited organization
- ✔ In the 1960s, 11% of US corn was treated with pesticides, whereas today it is 95%
- ✔ Organic ways of growing our food can lower greenhouse gas emissions, create better soil, and save energy

Adapted from David Suzuki's Green Guide, 2008.

Discuss and Record Responses for:

1. Explain how eating organic foods will help significantly reduce your ecological footprint and create less greenhouse gas emissions

2. Give examples of how you can be successful in eating organic foods. Where can you get them? What is available on the market?

3. How could you eating an organic, plant-based diet help children in developing countries with their food security? Think about this answer in terms of climate change. If we eat a diet that is not organic, how can it affect children in developing countries?

4. Design a meal that is local, organic and plant-based

Student Handout #6

FOOD FACTS CARDS: LOCAL FOODS

According to David Suzuki, the average North American diet makes our food footprint four times greater than what we can sustain. A simple step to reduce your ecological footprint in terms of food is to eat a diet of local, organic plant-based foods. This could reduce your environmental impact by as much as 90%!

Here are some reasons to eat local foods in your diet:

- ✔ Fish caught in British Columbia could be shipped to China for processing into fish sticks and then shipped back to Canada to be sold in local grocery stores
- ✔ Foods purchased that are not local could travel up to 33 times the distance as food that is local
- ✔ Canada continues to get much of our food from China, even with the increase of energy costs to transport the foods
- ✔ By eating local foods, local farmers are supported and therefore the agricultural sector in Canada is stimulated
- ✔ Local foods produce significantly lower greenhouse gas emissions as compared to food that travels great distances
- ✔ A good way to eat local is to grow your own food and/or visit a local farmer's market or check out what is available in local grocery stores

Adapted from David Suzuki's Green Guide, 2008.

Discuss and Record Responses for:

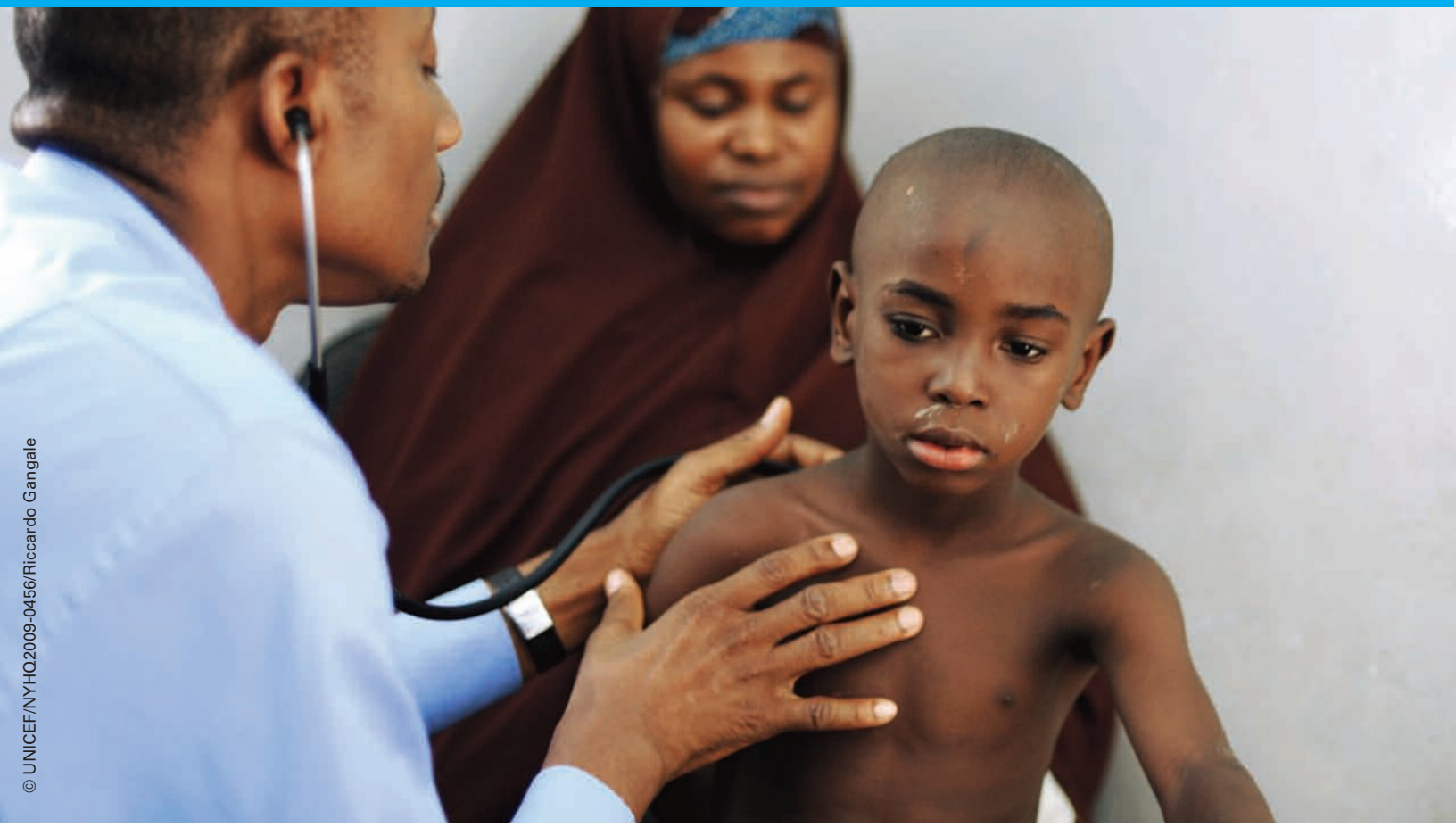
1. Explain how eating local foods will help significantly reduce your ecological footprint and create less greenhouse gas emissions

2. Give examples of how you can be successful in eating local foods. What is available on the market?

3. How could you eating a local, plant-based diet help children in developing countries with their food security? Think about this answer in terms of climate change

4. Design a meal that is local, organic and plant-based

HEALTH



Nigeria, 2009
Dr. Yusuf Robbinson, a physician at Specialist Hospital in the town of Bauchi, uses a stethoscope to examine Usman Abubakar, 7. Usman is suspected of having malaria. A clinical diagnosis, including pathology to identify the parasite that causes malaria, is needed to confirm his illness.

INTRODUCTION

Our health means life. All children have the right to nutritional food and clean water, access to medical help and a clean and safe environment.[1] The effects of climate change, such as shortages of food and clean water, polluted air and temperature increases, are affecting the health of children, particularly those who are most vulnerable in developing countries.

The effects of climate change also affect the health of our children in developed countries. For example, climate change is fueling the spread of West Nile virus. Mosquitoes and ticks are surviving due to warmer winters and expanding their range, bringing health threats to developed countries.

However the good news is we can envision a world where children and adults can be healthy; we can start by understanding the issues and adopting the solutions.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links on pages 91 and 95, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec.

Province	Course	Expectation/Learning Outcome
Ontario	SVN3M Environmental Science, Grade 11, University/College *Human Health and the Environment*	C1. Analyze initiatives, both governmental and non-governmental, that are intended to reduce the impact of environmental factors on human health; C3. Demonstrate an understanding of various environmental factors that can affect human health, and explain how the impact of these factors can be reduced.
Ontario	HF4AM Grade 12 Social Sciences and the Humanities *Food and Nutrition Sciences*	Personal and social Responsibilities determine the relationship among nutrition, lifestyle, health, and disease.
British Columbia	Geography 12 *Weather and Climate*	Analyze interactions between human activity and the atmosphere, with reference to: • Global climate change • Ozone depletion • Acid precipitation.
British Columbia	Socials 11 *Human Geography*	Assess environmental challenges facing Canadians, including: • Global warming • Ozone layer depletion • Fresh water quality and supply.

Setting the Stage

Objective: To define health as it relates to climate change

Time: 15 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Appendix G: Reflect and Act (page 105)

Some students may have difficulty accessing YouTube clips while at school, so we have provided many of them directly on the UNICEF Teacher website at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and on the UNICEF Student website at **www.unicef.ca/climatechangeresources**

ACTIVITY

1. Explain that you will be discussing health and how climate change can magnify the health concerns already facing children in developing countries.

2. Distribute Appendix G: Reflect and Act on page 105 to each student and ask them to journal lessons learned during discussion and activities around the theme.

3. Try a Think-Pair-Share activity. Ask pairs of students to draft a definition of what 'health' means. Next, join students in larger groups to discuss.

4. Share the World Health Organization's definition of health, which is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[2] Discuss how this definition compares to the students' definitions.

Healthy Planet

Objective: To understand health concerns that children in developing countries are facing. Learn how some health concerns are made worse by the effects of climate change.

Time: 20 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Student Handouts #8, 9: Information Sheets on Meningitis Belt and Cholera Outbreak

ACTIVITY

1. Arrange students into six groups.

2. Ask each group to record one or two examples of Canadian health issues (heart disease, cancer, cost of health care, etc.).

3. Next, distribute a copy of Student Handouts #8, 9: Information Sheets on Meningitis Belt and Cholera Outbreak (pages 40 and 41) instruct the groups to discuss the information. Ask students to record answers to the questions found on the bottom of each.

4. Ask students to share their findings. If Internet access is available, suggest students research the concept that the effects of climate change will lead to the emergence of new disease. For example, zoonoses (diseases in animals) often mutate due to changes in the environment. How can this mutation affect us?

Every 30 Seconds

Objective: To learn about malaria, how climate change can affect the spread of malaria, and what we can do to protect children who are at risk of contracting malaria.

Time: 35 minutes (or longer, depending on clips)

Materials

- Reused paper for each student (personal white boards or laptops)
- Student Handout #10: Malaria Numbers
- Clip #3: *Spread the Net*
  Clip #4: *Malaria TV*
  Clip #5: *My Birthday Wish*
  All of these YouTube Clips can be found here:
  http://globalclassroom.unicef.ca/en/resources/resource_guide.htm and
  www.unicef.ca/climatechangeresources

ACTIVITY

1. As a class, brainstorm possible health impacts on children that can be made worse by the effects of climate change. You may want to help by encouraging discussions on water supply (waterborne disease such as cholera) and climate-sensitive vector-borne (infections transmitted by the bite of infected arthropod species, such as mosquitoes) diseases such as malaria. For background information, refer to pages 37 and 38, Backgrounder — Health.

2. Ask students to share what they know about malaria. Possible answers may include how it is transmitted and what we can do to control the spread of it. Tell the students that malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected mosquitoes.

3. Distribute Student Handout #10: Malaria Numbers (page 42) to each group and instruct students to fill in a number they think best fits each blank space. You can distribute one handout per student, arrange them into six groups, or read out each question and instruct students to answer on scrap paper or individual white boards.

4. In groups or pairs, ask students to discuss why climate change could be a reason for the reintroduction of malaria in areas where malaria had been eradicated (mosquitoes need a warmer climate to survive). Ask groups to share with the class.

5. Play clips on malaria so students can understand the symptoms, prevention and cures of the disease. Here are some good examples:
   - The Malaria Hunter is a quick look at how the malaria parasite spreads in the body through red blood cells. (1:09)
   - Spread the Net was born when Belinda Stronach and Rick Mercer travelled to Africa in 2005. This is a short clip explaining the Spread the Net campaign. (0:50)
   - A student in Port Dover, Ontario documents his birthday wish to raise money for Spread the Net. Port Dover Composite raised over $48,000 during the 2008/09 Spread the Net Student Challenge. (2:13)

   You can find these clips on the UNICEF Teacher website at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and student websites at **www.unicef.ca/climatechangeresources**.

6. Instruct the students to design a presentation or a public service announcement that will promote the sale of nets or raise awareness of the spread of malaria. They can either create a clip, poster or PowerPoint presentation. Encourage them to share these with students in the school. Students can visit **http://www.spreadthenet.org** for more information.

Keep the Discussion Going

How does malaria enter and infect the body? To what extent are children in developing countries at greater risk of being infected by malaria?

Malaria is preventable and curable. How can developing countries win the fight against malaria? What are real solutions?

With the introduction of globalization, is it easier or harder to fight the battle against malaria? Why?

How is West Nile transmitted? What can be done to stop the spread of West Nile? How can the effects of climate change help spread West Nile?

West Nile is transmitted from a bite from a mosquito that has fed on the blood of an infected bird; malaria is transmitted from a bite from a mosquito that has fed on the blood of an infected person. The death toll for each is quite a different picture; 10 Canadians died of West Nile in 2003[3] *whereas close to 900,000 (mostly children) died of malaria in 2008*[4]*.*

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #7: Youth Take Action (page 39) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric (page 103).

BACKGROUNDER HEALTH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What is the Issue?
The effects of climate change are affecting children's health. Children in the world's poorest communities are the most vulnerable.

The physical effects of climate change are:
- Drought
- Floods
- Storms
- Increase in temperature
- Changes in weather patterns
- Natural disasters.

Which result in:
- Food shortages
- Water shortages and contamination
- Heat waves
- Increase in disease (diarrhoea, malaria and respiratory issues)
- Natural disaster devastation

The effects of climate change directly impact the health of children in the following ways:

1. Impacts of malnutrition in children, due to food shortages are:
   - High mortality rates
   - Stunted growth
   - Development leading to other health issues.

2. Impacts of water shortages resulting in children not having access to safe water but instead drinking water that contains waterborne diseases such as:
   - Diarrhoea
   - Cholera
   - Typhoid.[5]

3. Impacts of contamination (particularly in urban areas) caused by an increase in rainfall and flooding:
   - Increased sanitation issues
   - Increasing waterborne diseases
   - More people will move to urban areas as natural resources are depleted compounding this problem.[6]

4. Impacts of climate variability on vector-borne diseases:
   - Malaria
   - Dengue fever
   - Yellow fever.

"Malaria is known to be influenced by factors such as rainfall, humidity, temperature and levels of surface water, all of which affect vector reproduction and lifespan."[7] These changes in environmental factors are resulting in malaria being reintroduced into areas where it has been eradicated. An example of this is in the highlands of Kenya. A new malaria case was reported after 50 years of no malaria cases. Dengue fever, and yellow fever, two other types of vector-borne diseases, are also likely to increase.[8]

Note: A vector-borne disease is one in which a disease is transmitted from one organism to another by an arthropod such as a mosquito.

Other impacts of climate change:

- Researchers in West Africa have recently documented a series of complex interactions between patterns of irrigation and malaria transmission, land degradation and meningitis, and deforestation and onchocerciasis (river blindness).[9]

- Drier climate conditions (hot, dry weather and dusty environments), affect the susceptibility of children to diseases such as meningitis.[10] It is predicted that climate change will result in not only an increased occurrence of common illnesses in both developed and developing nations, but also the emergence of new diseases.

- There is also evidence that high ground level ozone may cause an increase in childhood asthma. Other climate-related increases in levels of other aeroallergens that trigger asthma are well documented such as pollen. Heat or cold stress due to climate change also can increase child deaths and exacerbate chronic conditions.[11]

- Indoor air pollution caused by burning fossil fuels in cooking is leading to an increase in respiratory illness in children. Where there is not enough ventilation and smoky conditions exist, children are exposed to poor air quality for longer periods of time. As global energy demands bring an increase in the burning of fossil fuels, air quality will likely drop.

To learn more about climate change connected to health, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* at **http://www.unicef.org.uk/campaigns/publications/pdf/climate-change.pdf**.

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NOTES

1 UNICEF UK, *Our climate, our children, our responsibility*, p. 12.
2 World Health Organization, "Frequently Asked Questions," **http://www.who.int/suggestions/faq/en/index.html** (accessed November 2009).
3 Healthy Ontario, "West Nile Virus," **http://www.healthyontario.com/ConditionDetails.aspx?disease_id=288** (accessed November 2009).
4 World Health Organization, "Global Malarial Programme", **http://apps.who.int/malaria/** (accessed November 2009).
5 UNICEF UK, *Our climate, our children, our responsibility*, p. 10.
6 Ibid., p. 16.
7 Ibid., p. 15.
8 Ibid., p. 13.
9 Ibid., p. 14.
10 Ibid., p. 15.
11 Ibid., p. 16.

Student Handout #7

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. Conduct further research on malaria and how bed nets help save lives. Could malaria spread at the same rate in Canada? Why or why not?

PROJECT: Organize a fundraiser to raise money to buy nets for distribution in Africa. UNICEF is the world's leading supplier of mosquito nets. Research what UNICEF is doing to make a difference. Get creative with your fundraising ideas. For example, plan a hockey game where the admission goes to buy nets and call it "'Puck in the Net for a Net." For more information see **http://spreadthenet.org**.

John F. Ross Collegiate Vocational Institute, Guelph, Ontario
Many Canadian schools joined UNICEF Canada's Spread the Net Student Challenge and helped raise funds for the purchase of insecticide-treated bed nets for Liberia and Rwanda. Bed nets have been proven to save lives as they help stop the spread of malaria. Students at John F. Ross raised almost $60,000 during the 2008/09 campaign that will buy 6,000 bed nets and provide education on the reduction of malaria through the use of bed nets. For more information see **http://www.spreadthenet.org**.

2. Research waterborne diseases. Every year, waterborne diseases like diarrhoea, cholera and typhoid claim the lives of millions of children in the developing world.

PROJECT: Develop fact sheets on three waterborne diseases and include the statistics and facts of each. Research what UNICEF is doing to make a difference (e.g. rainwater harvesting) and learn how your school can get involved in the solution. Document this in your fact sheets. For more information on the internet, search "UNICEF global rain water harvesting."

Luanda, Angola
The first-ever Global Handwashing Day was celebrated on October 15, 2008. Students and teachers from more than 700 schools across Angola sang songs, learned the facts and washed their hands. Using water and soap is a simple act that can save lives. As the physical effects of climate change (drought, floods, storms and increase in temperatures) cause water shortages and contamination, an increase in diseases such as diarrhoea and cholera will follow. Washing hands helps stop the spread of these diseases. For more information see **http://www.unicef.org**.

3. Research your municipality's plan to prevent mosquitoes from breeding and spreading West Nile. As mosquitoes breed in stagnant water, it is important to empty containers where water collects. On a municipal level, Metro Vancouver is working to stop mosquitoes before they start breeding, by applying larvicide to control mosquitoes in breeding areas, catch basins and surface water.

PROJECT: Create a YouTube clip, PowerPoint presentation or a song/jingle/PSA to promote actions that help control the breeding of mosquitoes. Include facts about the spread of West Nile and actions that work. For more information on the internet, search "Metro Vancouver West Nile."

Student Handout #8 Information Sheet 1

UNICEF AND PARTNERS PREPARE FOR MENINGITIS OUTBREAKS

UNICEF has provided thousands of doses of measles, polio and meningitis vaccines to protect young children and their families from preventable diseases in the crowded environment of Maltam Camp in northern Cameroon.

The Global Alliance for Vaccines and Immunisation (GAVI) will give UNICEF and the World Health Organization over $50 million to purchase meningococcal vaccines and pay for reactive campaigns in the highly endemic African "meningitis belt" countries. The goal is to save lives and contain the spread of meningitis, a highly contagious disease.[1]

Four hundred million people currently are at risk of contracting this meningococcal disease. "The highest burden of meningococcal disease occurs in a swathe of sub-Saharan Africa known as the "meningitis belt", which stretches from Senegal in the west to Ethiopia in the east and where epidemics occur every year. During the dry season, between January and June, many factors, including social and climate habits, increase the risk of meningitis. Each year, the disease takes a heavy economic and human toll."[2]

According to the World Health Organization, "Meningitis is an infection of the meninges, the thin lining that surrounds the brain and the spinal cord. Several different bacteria can cause meningitis and *Neisseria meningitidis* is one of the most important because of its potential to cause epidemics."[3]

The bacteria are transmitted from person to person through droplets of respiratory or throat secretions. Close and prolonged contact (e.g. kissing, sneezing and coughing on someone, living in close quarters or dormitories (military recruits, students), sharing eating or drinking utensils, etc.) facilitates the spread of the disease. The most common symptoms are stiff neck, high fever, sensitivity to light, confusion, headaches and vomiting. Even when the disease is diagnosed early and adequate therapy instituted, 5% to 10% of patients die, typically within 24-48 hours of the onset of symptoms."[4]

Meningitis outbreaks may be seen in drier, hotter areas. The physical effects of climate change such as drought and increase in temperature appear to be the reason why there have been meningitis outbreaks in the African Sahel region's "meningitis belt". Children are most at risk.[5]

Discuss and Record

1. How does this case study differ from your examples of Canadian health issues?
2. What are some facts about meningitis?
3. List reasons on how climate change can worsen this picture of a meningitis outbreak.
4. What actions can you take locally to make a difference globally?

NOTES

1 UNICEF Press Centre, "UNICEF and Partners Mobilise to Counter Meningitis Outbreaks," **http://www.unicef.org/media/media_49254.html** (accessed November 2009).
2 Ibid.
3 World Health Organization, "Meningococcal Meningitis," **http://www.who.int/mediacentre/factsheets/fs141/en/** (accessed November 2009).
4 Ibid.
5 UNICEF UK, *Our climate, our children, our responsibility*, p. 15.

Student Handout #9 Information Sheet 2

CHOLERA OUTBREAK IN SOUTHERN AFRICA

A girl rests beside an elderly woman on a bench as they wait to be treated for cholera, at a UNICEF-assisted clinic in Musengezi village, Zimbabwe.

Thousands of cases of cholera, a waterborne disease, have been reported in Southern Africa. In Zimbabwe, for example, early in March 2009 close to 90,000 suspected cases of cholera resulting in 3,975 deaths had been reported to the World Health Organization, according to a recent UNICEF article.

"Cholera is spread through contaminated water supplies and is highly communicable. Many of the areas with the highest rates of infection are in areas bordering Zimbabwe, where political unrest, economic collapse and a ravaged health-care system have combined to fuel the epidemic."[1]

According to the World Health Organization, "Cholera is an acute diarrhoeal infection caused by ingestion of the bacterium *Vibrio cholerae*. Transmission occurs through direct faecal-oral contamination or through ingestion of contaminated water and food. The extremely short incubation period — two hours to five days — enhances the potentially explosive pattern of outbreaks, as the number of cases can rise very quickly. Cholera is an extremely virulent disease that affects both children and adults. Individuals with lower immunity, such as malnourished children or people living with HIV, are at greater risk of death if infected by cholera."[2]

Cholera is primarily transmitted through contaminated water and food. There is a correlation between contaminated water and inadequate living conditions. "The absence or shortage of safe water and sufficient sanitation combined with a generally poor environmental status are the main causes of spread of the disease."[3]

The physical effects of climate change such as drought, floods, storms, increase in temperature and changes in weather patterns cause a multitude of outcomes, including water shortages and contamination. The result is a rise in diseases such as cholera. All directly impact the overall health of the population; young people in the world's poorest communities are the most vulnerable.

Discuss and Record

1. How does this case study differ from your examples of Canadian health issues?

2. What are some facts about cholera? Name three reasons why the average Canadian is not at risk for cholera.

3. List reasons how climate change can worsen this picture of a cholera outbreak.

4. What actions can you take locally to make a difference globally?

NOTES

1 UNICEF, "Cholera Outbreaks Raise Concern in Nine Southern African Countries," **http://www.unicef.org/health/index_48553.html** (accessed November 2009).
2 World Health Organization, "Cholera," **http://www.who.int/mediacentre/factsheets/fs107/en/index.html** (accessed November 2009).
3 Ibid.

Student Handout #10

MALARIA NUMBERS

Using only eight numbers from the list below, fill in the blanks to complete the story of malaria. No number should be repeated.

A woman unfurls an insecticide-treated mosquito net over a child's bed in Papua New Guinea. UNICEF supplies bed nets as part of a community-based program that helps families implement sound maternal and early childhood development practices, including the use of insecticide-treated mosquito nets.

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected mosquitoes. A child dies of malaria every ____ seconds. There were _____ million cases of malaria in 2006, causing about _____ deaths, mostly among African children.

Malaria is _____ of the most climate-sensitive vector-borne diseases. In recent years, the number of epidemics of malaria has increased across East Africa. Previous highland malaria epidemics were not as severe or as frequent as they have been over the past two decades. For instance, from the 19___s to the early 19____s, there were virtually no recorded malaria epidemics in the East African highlands.

Approximately _____% of the world's population is at risk of malaria, particularly those living in lower-income countries. A study in Kenya shows that the use of bed nets results in a ____% drop in the number of child deaths. Malaria is curable and preventable!

Possible answers:

40 880,000 44 30 100 100,000 247 50 80 2,000 60 1 12 14

Student Handout #10

ANSWER KEY

MALARIA NUMBERS

Using only eight numbers from the list below, fill in the blanks to complete the story of malaria. No number should be repeated.

A woman unfurls an insecticide-treated mosquito net over a child's bed in Papua New Guinea. UNICEF supplies bed nets as part of a community-based program that helps families implement sound maternal and early childhood development practices, including the use of insecticide-treated mosquito nets.

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected mosquitoes. A child dies of malaria every ____ **(30)** seconds. There were _____ **(247)** million cases of malaria in 2006, causing about _____ **(880,000)** deaths, mostly among African children.

Malaria is _____ **(one)** of the most climate-sensitive vector-borne diseases. In recent years, the number of epidemics of malaria has increased across East Africa. Previous highland malaria epidemics were not as severe or as frequent as they have been over the past two decades. For instance, from the 19___**(60)**s to the early 19____ **(80)**s, there were virtually no recorded malaria epidemics in the East African highlands.

Approximately _____% **(50)** of the world's population is at risk of malaria, particularly those living in lower-income countries. A study in Kenya shows that the use of bed nets results in a ____% **(44)** drop in the number of child deaths. Malaria is curable and preventable!

NATURAL DISASTERS

Pakistan, 2008
On 1 November, Sulima Paten, holding her two-year-old son, Mohammed, stands outside their destroyed home in Kili Mirgha Kawas Village in Ziarat District, one of the worst-affected areas, in Balochistan Province. UNICEF is assessing needs in the earthquake-ravaged community, located in a very sparsely populated area.

On 5 November 2008 in Pakistan, relief efforts continue on behalf of children and families in the aftermath of a 6.4-magnitude earthquake that hit the remote south-western province of Balochistan on 29 October.

INTRODUCTION

Natural disasters are increasing in severity and frequency; we are becoming more aware that climate change is contributing to this growth. Children have the right to be raised in a safe environment and so it is our responsibility to ensure children obtain this right, as stated in Article 24 of the UN Convention on the Rights of the Child.[1] Many organizations worldwide are taking action to equip communities with knowledge and skills to prepare for emergency disasters rather than simply responding after the disaster has taken place. This is essential to protect the lives of children, particularly those most vulnerable in developing countries.

Here in Canada, youth need to be aware of natural disasters that could affect our communities as a result of climate change. We need to equip youth to not only have compassion and take action in developing countries, but also to be prepared for issues facing us locally.

The **good news** is that we **can** learn from the innovative and practical actions underway to address the negative effects of climate change and participate in preparing to lessen the effects of natural disasters. We can start by understanding the issues and then doing our part to make a difference.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links on pages 91 and 95, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec. .

Province	Course	Expectation/Learning Outcome
Ontario	HPW3C Grade 11 Social Sciences and the Humanities: Living and Working with Children	Socialization of Children Evaluate various global influences on children and families
Ontario	SNC2P Science, Grade 10 Applied *Earth and Space Science*	D1. Analyze effects of human activity on climate change, and effects of climate change on living things and natural systems.
British Columbia	Socials 11	Assess environmental challenges facing Canadians, including • Ozone layer depletion • Fresh water quality and supply
British Columbia	Civics 11 *Civic Deliberation*	Analyze the domestic and international effects Of Canada's record with respect to issues and events in one or more of the following categories: • Environment • Trade • Foreign aid • Peace and security • Human rights

Setting the Stage

Objective: To define natural disasters as they relate to climate change

Time: 10 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Appendix G: Reflect and Act (page 105)

ACTIVITY

1. Explain that you will be discussing natural disasters connected to climate change; climate change results in an increase in (and severity of) global natural disasters. Natural disasters can strike at any time and children are affected the greatest by the aftermath of a disaster.

2. Distribute Appendix G: Reflect and Act (page 105) to each student and ask them to journal lessons learned during discussion and activities around the theme.

3. Ask students to draft personal definitions of what a "natural disaster" means. Ask students to list examples of natural disasters. Have students share their responses.

4. Share that natural disasters are disasters caused by natural forces. Examples of natural disasters include floods, storms, droughts, cyclones and landslides. Today, millions of children from all over the world suffer from the effects of natural disasters; it is predicted that storms, floods and droughts will become more severe, because of climate change.[2]

When Disaster Strikes

Objective: To list basic human needs and how they are met after natural disasters, which increasingly occur because of changing climatic patterns.

Time: 25 minutes plus time for research project

Materials

- Reused paper for each student (personal white boards or laptops)

ACTIVITY

1. Discuss natural disasters and brainstorm examples: floods, earthquakes, storms, fires, landslides, tsunamis, etc.

2. Share the details of a recent natural disaster that caused devastation such as Hurricane Katrina, the tsunami in Thailand, etc. Instruct students to research one recent natural disaster (as homework or during class time). In their report, students should give details on the type of natural disaster, where and when it took place, what toll it took on the local people and environment, and what assistance the community received. This report can be presented on a poster board or as an oral presentation.

3. Explain that inevitably it is the poor who are most vulnerable to a natural disaster in developing countries, "as their livelihoods are often dependent on land, crops or livestock. They are also more likely to live in high-risk locations such as flood plains, river banks, steep slopes, on reclaimed land, and in densely populated slums of poorly constructed houses."[3]

4. Ask students to list basic human needs that might not be met after a natural disaster. Examples may include food, clean water, shelter, first aid, etc. Discuss which of these needs are matters of survival. How can the inability to obtain these essentials impact the welfare of the children?

5. Debate Article 24 of the UN Convention on the Rights of the Child (CRC) the most widely ratified human rights treaty and the foundation for UNICEF's work with and for children. Article 24 states that it is the responsibility of developed nations to help developing nations. Why (or why not) should we help? How can we help?

6. Next, ask students to research how the aftermath of a natural disaster in Canada may differ from one in a developing country. How are Canadians prepared for a natural disaster? What role does the Canadian government play?

An earthquake of magnitude 9.0 unleashed tsunami waves up to 10 metres high across South Asia and East Africa as people slept one early morning in December 2004; this natural disaster was responsible for killing tens of thousands of people. For more information see **http://www.unicef.org/media/media_24628.html.**

A category 4 cyclone struck the southern coast of Bangladesh in November of 2007 resulting in torrential rains and strong winds. Over 3 million people were affected by the intense storm; children among the hardest hit. For more information see **http://www.unicef.org/infobycountry/bangladesh_41830.html.**

Be Prepared

Objective: To develop a list of basic survival items needed in the event of a natural disaster and help students discover why developing countries are at greater risk of a natural disaster.

Time: 45 minutes

Materials:
- Student Handout #12: Emergency Kit
- Slide show on Cyclone Nargis aftermath and media set-up (**http://www.unicef.org/thailand/8243.html**)
- Student Handout #13: A Picture says a Thousand Words

ACTIVITY

1. Arrange the class into six groups.

2. Distribute Student Handout #12: Emergency Kit (page 52) and discuss the items that could comprise a disaster emergency kit.

3. Instruct groups to choose, and come to a consensus on, an emergency list containing only 10 items from this list.

4. Compare the lists in the class. Have groups defend their choices.

5. Ask students to compare luxury items versus survival items. What items in their emergency kit could change for people in different parts of the world? After a natural disaster, humans have basic needs; are those basic needs different in Canada than in other countries like India or Malawi?

6. Discuss the Myanmar (Burma) Cyclone Nargis emergency, which devastated that region in May 2008. Cyclone Nargis was a deadly tropical storm. Myanmar is located just northwest of Thailand.

7. Show the slide photo essay on the Myanmar Cyclone Nargis aftermath at **http://www.unicef.org/thailand/8243.html**. Distribute and ask students to complete Student Handout #13: Pictures say a Thousand Words (page 53).

Keep the Discussion Going

Are all humans given the same assistance after a natural disaster? Why or why not?

What role does the inequity of wealth play in managing a natural disaster?

What are some of the health issues that may develop after a disaster? How could we prepare for this?

As climate change is linked to the increase of natural disasters globally, how we choose to live can affect our global neighbours. What actions can you take to lessen your ecological footprint and therefore help stop climate change?

Yukon's Zelma Lake is losing water at a rapid rate. For more information see **http://www.cbc.ca/canada/north/story/2007/08/07/yk-zelma.html?ref=rss**.

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #11: Youth Take Action (page 51) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric on page 103.

BACKGROUNDER NATURAL DISASTERS

What is the Issue?

There is increasing evidence of the changes in the climate system resulting in an increase in the frequency and severity of natural disasters. "Evidence that our climate is warming is now deemed 'unequivocal' by the Intergovernmental Panel on Climate Change (IPCC) based on global surface temperature records, revealing that eleven out of the last twelve years rank among the warmest since 1850."[4]

The effects of climate change will result in the following:

- Droughts
- Floods
- Storms
- Temperature changes
- Weather pattern changes

What is happening around the world?

2006

- January: Russia and Eastern Europe experienced a coldwave, similarly in India and Bangladesh a coldwave claimed around 300 lives.
- Later in 2006, western and Central Europe experienced the hottest temperatures on record during July to October.
- Severe drought in 2006 affected millions of people across China, Afghanistan and Brazil.
- East Africa experienced the worst flooding in 50 years, with more than 600 lives lost in Ethiopia alone.

2007

- July: floods, Africa – 1.5 million people affected by extreme rainfall across 18 countries of West East and Central Africa.
- August: typhoon, Philippines, Taiwan and China – typhoon Sepat affected more than 1.53 million people in China alone.
- November: floods, Gulf of Mexico – Mexico experienced its worst floods in 50 years affecting more than 1 million people. Thousands of families were forced out of their homes by floodwaters and were in desperate need of water, food and medicine.
- November: cyclone, Bangladesh – Cyclone Sidr leaves a trail of destruction across 30 districts of Bangladesh, 7 million people affected, 600,000 children under the age of 5.

As with the other impacts of climate change, developing and poor countries are most vulnerable to these natural disasters and climate change effects. They do not have the ability to respond and adapt to the disasters, having no resources and finances to invest in disaster preparedness. The developing countries have lower economic diversification, and generally are very reliant on agriculture, making them more vulnerable. Children are the most vulnerable as they may be killed or injured, suffer malnutrition, become orphans, or be separated from their families.[5]

Communities taking action

Actions plans are being created to equip communities with knowledge and skills to prepare for emergency disasters rather than just responding after the disaster has taken place.

- For example, in West Bengal, UNICEF, the state government, and other organizations have been working with communities to establish action plans. They have identified vulnerable people in their villages, such as the elderly, the sick, and young children. Some have learned to make rafts, and each family has learned to prepare a survival kit.[6]

- Small island developing nations are also a high vulnerability risk since a natural disaster may wipe out the entire nation, forcing displacement and permanent migration. Many nations, including Trinidad and Tobago, are developing risk-reduction and awareness initiatives that will empower communities to plan in advance and effectively address the issues that natural disasters bring to the forefront. Check out UNICEF's SIDS (Small Island Developing States) Fit for Children Network at **http://thesids.org/unicef/index.htm**.

To learn more about climate change connected to natural disasters, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* at **http://www.unicef.org.uk/campaigns/publications/pdf/climate-change.pdf**.

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NOTES

1 UNICEF UK, *Our climate, our children, our responsibility*, p. 12.
2 Ibid., p. 26.
3 UNICEF, *Climate Change,* **http://www.unicef.org.uk/campaigns/campaign_sub_pages.asp?page=95** (accessed November 2009.)
4 UNICEF UK, *Our climate, our children, our responsibility*, p. 4.
5 Ibid., p. 5.
6 Ibid., p. 27.

Student Handout #11

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. Research and assess your preparedness in accordance with the Government of Canada's 72 Hour Plan; download the step-by-step guide on how to put together an emergency preparedness kit at home. Survey your peers to see who has put together an emergency preparedness kit at home or at school.

PROJECT: Create a YouTube clip, PowerPoint presentation or a song/jingle/PSA to encourage Canadians to be prepared for a natural disaster. Include a global connection to why Canadians should also help developing countries prepare for a natural disaster. Ensure you include information on Canada's 72 Hour Plan. You may want to display a sample emergency preparedness kit at school. For more information see **http://www.getprepared.gc.ca/index-eng.aspx**.

Barrie North Collegiate, Barrie, Ontario
Students at Barrie North Collegiate became part of the solution when they tackled issues affecting developing countries: climate change, pollution, war and poverty. Student clubs organized clothing drives, book fairs and garbage-free lunch days. Students also raised funds for local charities and UNICEF. Barrie North is a recent winner of Lakehead University's "Do Something" contest; schools were asked to demonstrate action around issues of climate change, the environment, and social, economic and political issues. For more information see **http://www.lakeheadu.ca**.

2. Learn about Arctic residents living along the coast of the Beaufort Sea who are worried about the effects of climate change as rising sea levels and melting permafrost could erode away communities. How can a plan of action help residents prepare for a natural disaster?

PROJECT: Contact a school in a Canadian Territory to interview students on their reactions to the melting permafrost. What changes have they seen over the past five years? What have the teachers noticed over the past 10 years? What local actions are being taken? What actions can we take to make a difference? For more information see **http://www.cbc.ca/canada/north/story/2009/01/12/permafrost.html**.

Bangkok, Thailand
In February 2005, Alicia Keys hosted MTV Asia Aid. Cheering fans watched their favourite stars perform as part of a benefit to assist the tsunami relief effort in Asia. Because children were especially hard hit by the natural disaster, UNICEF was the chief beneficiary of the concert. For more information see **http://www.unicef.org**.

3. Research the actions UNICEF is taking to offer relief in developing countries in times of natural disasters and document a recent UNICEF relief mission. What support did UNICEF offer? How can we become involved?

PROJECT: Get involved in a recent relief effort by organizing a fundraiser to raise money (and awareness) for medical, food, and water supplies for regions hit with a natural disaster. For more information see **http://www.unicef.org/emerg/index.html**.

Student Handout #12

EMERGENCY LIST

Check only the most important TEN items you would require after a natural disaster.

- ❑ First aid kit
- ❑ Cash
- ❑ Gloves
- ❑ Portable radio
- ❑ Coffee
- ❑ Clean sheets
- ❑ Doll
- ❑ Bucket
- ❑ Camera
- ❑ Plastic tarp
- ❑ Flashlight
- ❑ Shampoo
- ❑ Sewing kit
- ❑ Pillow
- ❑ Cell phone
- ❑ Tent
- ❑ Football
- ❑ Towel
- ❑ Toilet paper
- ❑ Whistle
- ❑ Pen and paper
- ❑ Book
- ❑ Plates
- ❑ Knife
- ❑ Light bulb
- ❑ Dried fruit
- ❑ Soap
- ❑ Garbage bags
- ❑ Dried soup
- ❑ Tinned food
- ❑ Medicine
- ❑ Camping cook set
- ❑ Survival blanket
- ❑ Chewing gum
- ❑ Duct tape
- ❑ Mailing stamps
- ❑ Disinfectant
- ❑ Shoes
- ❑ Container of water

Children find shelter in Charpara just before the cyclone hits Bangladesh.

A displaced mother with her children in search of shelter in Charpara, Bangladesh.

Student Handout #13

A PICTURE SAYS A THOUSAND WORDS

Children stand amid the debris of their village, which was destroyed by the cyclone, near the township of Kunyangon in the southern Yangon Division. In May 2008 in Myanmar, an estimated 1.5 million people struggled to survive under increasingly desperate conditions in the wake of Cyclone Nargis, which hit the south-western coast on 3 May, killed some 100,000 people, and displaced 1 million across five states.

1. As a result of the cyclone, how many people in Myanmar had to struggle to survive under the desperate conditions?

2. UNICEF distributed pre-positioned emergency supplies to the hardest hit areas. What was included in these supplies?

3. What percentage of children in the worst-affected areas were suffering from diarrhoea, a major threat to children's lives in emergencies?

4. To combat diarrhoea and other waterborne diseases, what did UNICEF airlift into Myanmar?

5. How long has UNICEF been working in Myanmar?

6. How would relief in Myanmar differ from relief in Canada?

7. What can we do to make this picture different?

8. What natural disaster plan would you suggest for Myanmar for the future? What obstacles are there to implementing this plan?

Student Handout #13

ANSWER KEY

A PICTURE SAYS A THOUSAND WORDS

Children stand amid the debris of their village, which was destroyed by the cyclone, near the township of Kunyangon in the southern Yangon Division. In May 2008 in Myanmar, an estimated 1.5 million people struggled to survive under increasingly desperate conditions in the wake of Cyclone Nargis, which hit the south-western coast on 3 May, killed some 100,000 people, and displaced 1 million across five states.

1. As a result of the cyclone, how many people in Myanmar had to struggle to survive under the desperate conditions?

   Answer: 1.5 million

2. UNICEF distributed pre-positioned emergency supplies to the hardest hit areas. What was included in these supplies?

   Answer: water-purification kits, essential drugs for hospitals, shelter materials and mosquito nets

3. What percentage of children in the worst-affected areas were suffering from diarrhoea, a major threat to children's lives in emergencies?

   Answer: 20%

4. To combat diarrhoea and other waterborne diseases, what did UNICEF airlift into Myanmar?

   Answer: 3 million water purification tablets

5. How long has UNICEF been working in Myanmar?

   Answer: 58 years

6. How would relief in Myanmar differ from relief in Canada?

   A possible answer could be that the Canadian government would organize and fund the relief programs.

7. What can we do to make this picture different?

   - **Possible answers include:**
   - **Taking action to stop the effects of climate change**
   - **Donating to organizations like UNICEF that provide disaster relief**
   - **Supporting programs tasked with working with world governments to help them prepare for possible natural disasters**

8. What natural disaster plan would you suggest for Myanmar for the future? What obstacles are there to implementing this plan?

   A possible answer could be to educate the people of Myanmar on disaster preparedness. The main obstacles could include a lack of funds and the difficulty involved in reaching people in rural communities.

NATURAL ENVIRONMENTS

A woman holds her child amid debris in front of their cyclone-damaged home near the town of Kunyangon in Yangon Division.

In May 2008 in Myanmar, an estimated 1.5 million people are struggling to survive under increasingly desperate conditions in the wake of Cyclone Nargis, which hit the south-western coast on 3 May, killed some 100,000 people, and displaced 1 million across five states. Up to 5,000 square kilometres of the densely populated Irrawaddy Delta, which bore the brunt of the storm, remain underwater. The displaced are living in congested shelters or in the open and lack access to drinking water, latrines, food and medical supplies. The conditions pose serious risks for outbreaks of infections and water-borne diseases.

INTRODUCTION

We all rely on our forests for life. They provide oxygen, remove air pollution, lower temperatures and add moisture to the air.

Forests can also, as we know, provide fuel for warmth, furniture, paper and many other products that we deem necessary for our current lifestyles.

As self-defeating as it may seem, we are destroying our forests, often in the name of those lifestyles, forgetting that short-term gains can mean long-term loss.

Children have the right to a clean and safe environment, and our forests are their inheritance. We have a responsibility to uphold those rights.

The people, especially children, most vulnerable to environmental degradation are in developing countries, but the issue also affects Canadian youth.

The **good news** is that it is not too late to change this picture and protect our forests. A good place to start is understanding the issues and then doing our part to make a difference.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links (pages 91 and 95), and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec. .

Province	Course	Expectation/Learning Outcome
Ontario	SBI3U Biology, Grade 11 *Diversity of Living Things*	B1. Analyze the effects of various human activities on the diversity of living things
Ontario	SVN3M Environmental Science, Grade 11, University/College Preparation *Sustainable Agriculture and Forestry*	D1. Evaluate the impact of agricultural and forestry practices on human health, the economy, and the environment D3. Demonstrate an understanding of conditions required for plant growth and of a variety of environmentally sustainable practices that can be used to promote growth.
British Columbia	Geography 12 *Biomes*	Analyze the interactions between human activity and biomes, with reference to: • Deforestation • Desertification • Soil degradation • Species depletion
British Columbia	Sustainable Resources 12 *Forest Resources and Society*	Analyze current forest management practices.

Setting the Stage

Objective: To define natural environment as it relates to climate change

Time: 15 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Appendix G: Reflect and Act (page 104)

ACTIVITY

1. Explain that you will be discussing natural environments and how climate change can alter our global natural environments.

2. Distribute Appendix G: Reflect and Act on page 104 to each student and ask them to journal lessons learned during discussion and activities around the theme.

3. Ask students to draft a personal definition of what "natural environment" means. Next, ask them to list ways that climate change can alter this definition. For example, an example of a natural environment is a forest. Climate change will bring an increase in forest fires altering the forest natural environments. Have a few students share their responses.

Amazing Amazon

Objective: To expand on the knowledge of why trees are essential to our existence

Time: 15 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Highlighters
- Student Handout #15: Amazing Amazon
  Clip #6: *In the Name of Progress* . This can be found on the UNICEF Teacher and student websites at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and **www.unicef.ca/climatechangeresources.**

ACTIVITY

1. Get ready to set a timer for two minutes.

2. Instruct groups or individual students that they will have two minutes to record all the direct and indirect benefits trees give us. Examples will include oxygen, carbon sinks, chairs, paper, medicine, hydro poles, etc.

3. Discuss which benefits are essential to our survival (oxygen) and which are not (chairs). Ask students to highlight the essential benefits, and explain that children have the absolute right to live in a decent environment and have access to the essential benefits trees give us. The rights of children are codified in the UN Convention on the Rights of the Child (CRC) the world's most widely ratified human rights treaty and the foundation for UNICEF's work with and for children. Refer to Appendix D: The UN Convention on the Rights of the Child in Child-Friendly Language (page 101) for more information.

4. Distribute Student Handout #15: Amazing Amazon (page 63) and ask students to discuss the questions found at the end of this handout.

5. Play and discuss Clip #6, *In the Name of Progress,* found at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and **www.unicef.ca/climatechangeresources**. This clip is about 15 minutes in length and is produced in partnership with Greenpeace. It details what is happening in the Amazon Rainforest with respect to the global increased demand for soya products.

6. If time permits, assign each group a further research task. The tasks could be to:
   - Write a letter to a local politician or the Minister of Environment to support local efforts to save the Amazon Rainforest
   - Learn about the Forest Stewardship Council (FSC), an organization that promotes the responsible management of forests. Research local businesses to learn who is selling FSC certified products
   - Research the indigenous peoples of the Amazon to learn about their plight to save their homeland.

Forest Fables Card Game

Objective: To understand the importance of biodiversity in a forest and how the loss of this diversity adds to the effects of climate change.

Time: 30 minutes

Materials

- Six sets of Student Handout #16: TREE cards
- Six sets of Student Handout #17: SITUATION cards

ACTIVITY

1. Explain that biodiversity is the variation of life forms. Ask students to comment on why biodiversity is essential in a forest. Remind students that we need to protect the biodiversity on the planet because, "in losing that vast reservoir of diversity, we are allowing an utterly irreplaceable asset base to be removed. And it cannot be brought back."[1] Also, if we favour one species over biodiversity, it can impact climate change further. For example, if a forest is planted only with pine trees, what happens to that forest if the Mountain Pine Beetle attacks the trees and destroys that forest?

2. Arrange the students into six groups.

3. Explain that groups will play a card game called Forest Fables. The object of the game is to preserve the trees in your forest and to have at least six different species of trees in your forest. The winner will be the one with the most diversity in their forest (the one with the most variety of TREE cards at the end of the game).

4. Explain the rules of play. You might want to make a copy of these rules to distribute to each group.

    a) The game consists of two decks of cards: The TREE cards — Student Handout #16 (page 64) and the SITUATION cards — Student Handout #17 (page 66). Place both decks face down and side-by-side, in the middle of the group.
    b) To begin, one player randomly hands out four TREE cards to each player.
    c) The student whose birthday is closest to the current day begins. Taking turns, players pick up one SITUATION card, read aloud, and follow the directions. The SITUATION cards will either ask players to pick up or discard TREE cards. If the player does not have TREE cards to discard when asked, the next player will take a turn.
    d) If the SITUATION card reads ALL PLAY, this situation affects all players. All players must do what is asked on the card.
    e) Record details of each SITUATION card to use for later discussion.

5. At the end of 15 minutes, ask players to count how many different species of TREE cards they have. The winner in each group is the player with the most diverse forest the greatest number of species of TREE cards.

6. As a class, discuss the SITUATION cards, which are based on true events that are occurring today. Topics you can further explore are forest fires, both natural (serving vital ecosystem functions) and man-made (clearing land for farming); climatic changes in the world caused by cutting down the rainforest, and how children are affected by the climatic changes when forests are cut down. Here are some good sites on trees:

    Environmental Literacy Council
    http://www.enviroliteracy.org/article.php/46.html

    Natural Resources Canada
    http://cfs.nrcan.gc.ca/forestresearch/subjects/biodiversity

    World Wildlife Fund
    http://www.worldwildlife.org/what/wherewework/amazon/index.html.

Keep the Discussion Going

Discuss biodiversity. Why is it important to have a variety of different species of trees, plants and animals in a forest? How does this affect climate change and children?

Some argue that the rainforest preservation movement is in the way of "progress." Explain this statement in reference to climate change.

What do you know about the pine beetle? On the internet, search "pine beetle temperature" for details on how temperature affects the pine beetle.

What can you, your school, your community, do to save our rainforests, and therefore help reduce the effects of climate change on children?

We can support organizations that are protecting our rainforests and we can ensure the wood products we purchase are FSC certified.

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #14: Youth Take Action (page 62) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric on page 103.

BACKGROUNDER NATURAL ENVIRONMENTS

Planting trees in Ethiopia

What is the Issue?

A healthy natural environment is essential to reduce the effects of climate change. Changes in land use, deforestation and agriculture all contribute to a rise in the emission of carbon dioxide. Human activities, primarily in the developed countries, rely almost exclusively on the use of fossil fuels, which release vast amounts of carbon dioxide, all contributing to climate change. Although some efforts are in place to protect our natural environment, we need to do more to counteract many of the harmful activities that are currently taking place, such as: :

- Forests being destroyed to provide wood, and sometimes to plant alternate crops such as soy or palm oil
- Vegetated land being developed into housing, roads and buildings, resulting in urban sprawl
- Natural resources being used extensively for construction, industries, transport and consumption
- Ever-increasing volumes of solid waste being created, which result in the destruction of fertile vegetated land to create landfil.

What is the wood used for?

Wood from forests is used in many aspects of our lives:

- Buildings
- Goods
- Fuel source; in developing countries, wood is being used as the fuel source for cooking and heating homes. Burning wood in the home results in very poor indoor air quality that can result in deaths of infants and young children. A solution to this issue is to switch from solid fuels to renewable energy sources, however we in the developed countries have to offer support to developing countries to make this happen.[2]

Deforestation facts

The destruction of our forests has far-reaching effects; these are some of the effects on our forests:

- Deforestation contributes more to global carbon emissions every year than the transport sector
- The oxygen trees produce removes air pollution, lowers temperatures and adds moisture to the air
- Trees hold soil in place and reduce run-off from streams
- Trees prevent soil erosion, control avalanches and mitigate desertification.
- Deforestation is contributing to flash-flooding and the destruction of homes and crops directly affecting the lives of children[3]

Forests store 283 gigatonnes of carbon in their biomass — curbing deforestation is essential in order to reduce carbon emissions

However, we can still use wood in various ways without destroying our forests. There are a number of forest certification systems that ensure that the wood is being harvested sustainably, allowing wood to be used as a renewable resource, instead of clear cutting, and destroying a resource that can never be replaced to its full capacity.

Deforestation for other crops

Forests are not just being destroyed for the wood:

- In Sumatra and Borneo, over 4 million hectares of forest are being converted to palm oil. The palm oil is being used to create biofuels. To harvest a palm oil plantation, the forest is burnt, the habitat is destroyed, and the ground is drained; more carbon is released from the peat on the forest floor. Also, biofuels often use more energy than they produce.
- In the National Park in Kalimantan, Indonesia, for example, many species are being rendered extinct and thousands of indigenous people are being evicted[4]

Ethiopia today

At the turn of the 20th century, *40% of Ethiopia was covered by forest. Today that figure is just 3%.* As a consequence, deforestation is jeopardizing livelihoods and taking its toll on children's development, most especially in its remote and underdeveloped regions.

In 2007, as part of its millennium celebrations, the Government of Ethiopia pledged to plant more than 60 million trees across the country. They have engaged children and young people to plant and nurture two-year old seedlings from five indigenous species. UNICEF is a key partner in this initiative, contributing to the planting of at least 20 million trees.[5]

To learn more about climate change connected to natural environment, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* found at **http://www.unicef.org.uk/campaigns/publications/pdf/climate-change.pdf**.

NOTES

1 Juniper, Tony, *Saving Planet Earth* (London: Collins, 2007), p. 60.
2 UNICEF UK, *Our climate, our children, our responsibility*, p. 32.
3 Ibid.
4 Monbiot, George, *Heat: How to Stop the Planet From Burning*, p. 159.
5 UNICEF UK, *Our climate, our children, our responsibility*, 2008, p. 32.

Student Handout #14

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. Research global forest preservation. View the following clips:
   - Clip #7: *Destruction of the Rainforests* (**http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and student link at **www.unicef.ca/climatechangeresources**)
   - Clip #8: *Save Rainforests, Save Lives* (**http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and student link at **www.unicef.ca/climatechangeresources**)

Some students may have difficulty accessing YouTube clips while at school, so we have provided many of them directly on the UNICEF Teacher website at **http://globalclassroom.unicef.ca/en/resources/resource_guide.htm** and on the UNICEF Student link at **www.unicef.ca/climatechangeresources**

PROJECT: Contact The Nature Conservancy of Canada (NCC) which is Canada's leading national land conservation organization. Since 1962, NCC and partners have helped to conserve more than 2 million acres (over 800,000 hectares) of ecologically significant land nationwide. Organize a fundraiser so your school can become involved in preserving ecologically significant land in your region. For more information see **http://www.natureconservancy.ca**.

2. Research the concept of a life cycle analysis (LCA). An LCA for a product (i.e. chair) involves looking at the total environmental impact of the production, use and disposal of that product.

PROJECT: Devise a simple LCA of a piece of clothing or a pair of running shoes. Check out William McDonough's book, *Cradle to Cradle*, which details how we can go from a "'throw away"' society, to one that can make a product with very little environmental impact. Also, visit **http://www.gdrc.org/uem/lca/life-cycle.html**.

3. Trees and plants act as carbon sinks to store carbon dioxide and to produce oxygen. Research a national tree planting organization.

PROJECT: Plant or adopt a tree on the school grounds in honour of the graduating class and/or start a school garden. Encourage composting in the cafeteria and use that compost on the garden.

Lusaka, Zambia
In March 2009, in support of the Millennium Development Goals, UNICEF Zambia's Child Ambassadors led a group of schoolchildren in planting hundreds of trees at the Beit Cure Children's Hospital in the Zambian capital. Around 80 youths planted 300 fruit and fast-growing trees. In addition to addressing problems caused by deforestation, these young people are also taking action to address food security issues. For more information see **http://www.unicef.org**.

Kiilinik High School, Cambridge Bay, BC
Students witness the effects of climate change such as the snow conditions during the Victoria Day weekend when they hold the "Omingmak Frolics" snowmobile races. Every year it appears the conditions are becoming wetter and slushier than the year prior. As a class, they discussed the "David Suzuki's Nature Challenge" and came up with a list of actions they could do as northerners to help save the planet. For more information see **http://www.climatechangenorth.ca**.

Student Handout #15

AMAZING AMAZON

"My name is Nadino Calapucha and I'm 16 years old. I belong to the Kichwa Nation from the Amazon region, the heart of the green tropical forest. I admire my parents, my community and the organizations that have given their whole-hearted support and efforts to fight for my forest, for the rights of children and community rights. (We need to) forbid authorities to allow logging, oil, and other companies to enter our communities because we the children are the ones who are the hardest hit by their activities."

Adapted from *Nadino Calapucha Lives in the Amazon Rainforest* found at **http://www.unicef.org/ecuador/programme_proandes_8530.htm**.

The Amazon Rainforest is an amazing place, which reaches the borders of eight countries, including Brazil. Fifteen percent the size of France of the Amazon Rainforest has already been destroyed.

The Amazon Rainforest has often been called the "lungs of the planet" as it acts as a carbon sink and releases oxygen. Not only is it rich with plants and trees, but it is also our largest river basin and the source of 20% of all free-flowing fresh water on the planet.[1]

"As if the depredations of loggers, ranchers, soya farming and mining weren't serious enough in causing degradation, fragmentation and progressive clearance of this incredible planetary asset, it now seems that there is a far larger threat to the Earth's largest rainforest: a lack of rain."[2]

Over 2,000 tropical forest plants have been identified with some form of anti-cancer elements but we have only tested 10% of the plants available; many are becoming extinct before being researched. The original malaria drug, Quinine, was discovered in the bark of a cinchona tree. Also, skin taken from a species of frog in the Amazon is part of a compound that helps treat Alzheimer's disease.[3]

Soya is a protein-rich food that is a base in many foods we eat and in the livestock feed we use to raise cattle and chicken. Soya can now be harvested in the rainforest soil, and as a result some of the Amazon Rainforest is being cleared to make way for soya plants. We need to think about why such large amounts of rainforest are being cleared. *We need to protect our rainforests. We need them for life*!

Discuss and record answers on the back…

1. List five actions you can take locally to save the Amazon Rainforest.

2. What global policies should be in place to protect the rainforest? For example, the Forest Stewardship Council (FSC) supports environmentally appropriate, socially beneficial, and economically viable management of the world's forests. For more information see **http://www.fsccanada.org/**.

3. How does climate change affect the rainforest? How does the rainforest (or the degradation of it) affect climate change?

4. To what extent are children more susceptible to the loss of the rainforest?

NOTES

1 World Wildlife Federation, "Amazon: World's Largest Tropical Rain Forest and River Basin," **http://www.worldwildlife.org/what/wherewework/amazon/index.html** (accessed May 2009).
2 Juniper, Tony, *Saving Planet Earth*, 2007, p. 136.
3 Ibid.

Student Handout #16

TREE CARDS

ASH	ASH
ASH	ASH
ASPEN	ASPEN
ASPEN	ASPEN
BIRCH	BIRCH
BIRCH	BIRCH
CEDAR	CEDAR
CEDAR	CEDAR
CHERRY	CHERRY
CHERRY	CHERRY
ELM	ELM
ELM	ELM
FIR	FIR

TREE CARDS

FIR	FIR
MAPLE	MAPLE
MAPLE	MAPLE
LINDEN	LINDEN
LINDEN	LINDEN
OAK	OAK
OAK	OAK
PINE	PINE
PINE	PINE
POPLAR	POPLAR
POPLAR	POPLAR
SPRUCE	SPRUCE
SPRUCE	SPRUCE
SYCAMORE	SYCAMORE

Student Handout #17

SITUATION CARDS

A Brazilian farmer was offered good money, so he cleared his land to manage a cattle ranch. Discard 2 TREES	Forest Stewardship Council (FSC), an independent, non-profit NGO, ensures wood products with its stamp come from a sustainable forest. Collect 2 TREES
ALL PLAY The forest was devastated by a hurricane, probably due to climate change. Discard 3 TREES	Due to climate change, the pine beetle has devastated the pine trees in the area. Discard all **PINE** TREES
Some farmers are forced off their land to make way for a soya plantation. The land is cleared. Discard 2 TREES	A new medicine to fight childhood leukemia was found from a bark of one of the trees. Those trees are saved. Collect 3 TREES
The diversity of the forest is threatened as rainfall decreases. Researchers feel that this lack of precipitation is caused in part by climate change. Discard 2 TREES	**ALL PLAY** UNICEF Zambia's Child Ambassadors led a group of schoolchildren in planting hundreds of trees at Children's Hospital in Zambia. Collect 4 TREES
People are adopting a plant-based diet so fewer forests are cleared to manage livestock. Collect 2 TREES	A local aboriginal territory is being reforested. Trees are being protected. Collect 2 TREES
A local timber company continuously studies the forest microsystem to ensure the soil can support new seedlings. Collect 2 TREES	The increase in hot, dry weather is likely due to climate change and results in increased forest fires. Discard 2 TREES

SITUATION CARDS

As we burn fossil fuels (releases CO2) and clear trees (stores CO2), the balance of the carbon cycle is tipped. Because of their developing respiratory systems, children are most at risk. Discard 2 TREES	A youth from the Kichwa Nation from the Amazon region joins the fight to save the rainforest; the Amazon rainforest is referred to as the lungs of our planet. Collect 2 TREES
Over 2,000 tropical forest plants have been identified with some anti-cancer elements, but many plants are becoming extinct before being researched. Discard 2 TREES	By holding soil in place and reducing run-off from streams, trees prevent soil erosion, control avalanches and mitigate desertification. Collect 2 TREES
Deforestation is contributing to flash-flooding and the destruction of homes and crops directly affecting the lives of children. Discard 1 TREE	Tropical hardwood floors are an inexpensive way to renovate but the environmental impact is the loss of trees from the rainforest. Discard 3 TREES
In developing countries wood is used to cook food and heat the home, resulting in poor air quality, which can mean death in infants and young children. Discard 2 TREES	In Sumatra, forests are being converted to palm oil; the forest is burnt, the habitat is destroyed, and the ground is drained. Discard 2 TREES
ALL PLAY At the turn of the 20th century, 40% of Ethiopia was covered by forest. Today it's just 3%. Discard 3 TREES	Deforestation is jeopardizing livelihoods and taking its toll on children, especially underdeveloped regions. Discard 2 TREES
In 2007, Ethiopia pledged to plant 60 million trees, with the help of children and youth. Collect 2 TREES	UNICEF is contributing to the planting of at least 20 million trees in Ethiopia. Collect 2 TREES

SITUATION CARDS

Scientists warn that the effects of climate change will lead to the emergence of new disease. One such a disease threatens elm trees. Discard all **ELM** TREES	A local youth group raises money to support the efforts to save the Amazon rainforest. Collect 2 TREES
A local Brazilian family was forced off their land to plant soya due to the global demand for this crop. The land is cleared. Discard 2 TREES	Since 1962, Nature Conservancy of Canada (NCC) and partners have helped to conserve more than 2 million acres of ecologically significant land in Canada. Collect 2 TREES
Deforestation is contributing to soil degradation so new plants are struggling to grow. Discard 1 TREE	More consumers are asking for 100% recycled paper so demand for virgin paper decreases. Collect 1 TREE
A school in Vancouver raises money to buy solar ovens for a village in Darfur. Wood is no longer needed for cooking fuel. Collect 2 TREES	A local school adopts an old growth tree to protect it from logging. Collect 1 TREE
ALL PLAY An infestation of a new bug has wiped out all cedar trees. Foresters blame climate change. Discard all **CEDAR** TREES	A local secondary school becomes carbon neutral and plants 10 trees on the school grounds as part of the plan. Collect 2 TREES

WATER

Bangladesh, 2000
In 2000 in Bangladesh, a smiling two-year-old girl, Richi, splashes water drawn for her bath in a small plastic basin, beside a No. 6 tubewell in the village of Chandai in Manikganj district, west of Dhaka, the capital. The tubewell was installed with UNICEF assistance.

INTRODUCTION

Water is essential to life; without it we cannot survive. Without food we can survive for approximately a month; without water we can only live for a few days. Children have the right to safe drinking water, and climate change is adding to water stress worldwide. Droughts, melting icecaps and contamination caused by flooding are all affecting our water sources.

Water is our most precious resource. It is important that we work with our youth to protect their future supplies. We need to understand the importance of water, and how conserving it and only using what we need is critical to our survival.

The **good news** is we **can** manage our water to provide safe drinking water and we can start by understanding the issues and then doing our part to make a difference.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links on pages 91 and 95, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec. .

Province	Course	Expectation/Learning Outcome
Ontario	SVN3E Environmental Science, Grade 11, Workplace Prep *Human Impact on the Environment*	B2. investigate air, soil, and water quality in natural and disturbed environments, using appropriate technology; B3. demonstrate an understanding of some of the ways in which human activities affect the environment and how the impact of those activities is measured and monitored.
Ontario	SCH3U Chemistry, Grade 11 *Solutions and Solubility*	E1. analyze the origins and effects of water pollution, and a variety of economic, social, and environmental issues related to drinking water
British Columbia	Science and Technology 11 *Natural Resources and the Environment*	Discuss the impact of society on natural resource management and the environment.
British Columbia	Geography 12 *Resources and Environmental Sustainability*	Assess the environmental impact of human activities, including: • energy production and use • forestry • agriculture • waste disposal • water use.

Setting the Stage

Objective: To illustrate the interconnectedness of water and climate change.

Time: 15 minutes

Materials

- Reused paper for each student (personal white boards or laptops)
- Appendix G: Reflect and Act (page 104)

ACTIVITY

1. Explain that you will be discussing water and the right that we all have to safe, clean drinking water and proper sanitation, as mentioned in Article 24 of the UN Convention on the Rights of the Child. Children have the right to good quality health care the best health care possible to safe drinking water, nutritious food, a clean and safe environment and information to help them stay healthy. Rich countries should help poorer countries achieve this.

2. Distribute Appendix G: Reflect and Act (page 105) to each student and ask them to journal lessons learned during discussion and activities around the theme.

3. Try a Think-Pair-Share activity. Ask pairs of students to list global water concerns facing children. Discuss what "water and sanitation crisis" might mean and what role climate change could play. Next, join students in larger groups to discuss.

4. Share that water is a basic need that is essential to our existence. Ask students to brainstorm water uses, both for our survival and pleasure. Every child has the right to clean drinking water, but this is not the reality in many developing countries. Access to safe, clean water is many areas is becoming scarce as "climate change dries up the water tables and depletes rainfall, leaving communities to battle the devastating effects of drought."[1]

Let it Rain!

Objective: To discover successful global water conservation and sanitation practices that are part of the solution to water shortages due to the effects of climate change.

Time: 40 minutes

Materials

- Slide show on Indonesia's rainwater harvest and media set-up found at **http://www.unicef.org/indonesia/7749.html**
- Student Handout #19: Bio-Sand Filter
- Student Handout #20: UNICEF Basic Family Water Kits

ACTIVITY

1. Arrange students into six groups.

2. Explain that although some children in developing countries have to walk up to 3km to collect water for their families, this is preferable to having no safe drinking water available. Climate change will result in a shortage of safe drinking water for most of the world. Pollution and improper management of human waste threaten the safe water sources currently available. Incidences of waterborne disease like diarrhoea, cholera and typhoid will increase and will claim the lives of million of children in the developing world. (It is important to note that girls often cannot attend school as they are the ones tasked with collecting water.

3. There are two Water Case Studies Student Handout #19: Bio-Sand Filter (page 77) and Student Handout #20: UNICEF Basic Family Water Kits on page 78. Distribute the bio-sand filter case study to half the groups, and the UNICEF water kits case study to the other half. Ask groups to discuss the case study and complete the task on the bottom of the case study. The task is to create a one-minute public service announcement or radio jingle.

4. Ask each group to present its findings to the class.

5. Show the photo essay on Indonesia's rainwater harvest at **http://www.unicef.org/indonesia/7749.html** and discuss. Ask students to consider the fact that climate change will likely bring less rainfall. What can be done to help minimize the effects of less rain?

Keep the Discussion Going

List ways in which you use water in your life. What strategies would you employ if you suddenly were restricted to using no more than 20 litres of water per day?

Many feel that water will be the "oil" of this century. Why would people make this statement? Do you agree with it? Why or why not? What consequences could we face by selling Canada's water in a global market?

Read the following on the topic: **http://www.cbc.ca/news/background/water/** *and* **http://www.davidsuzuki.org/Oceans/Freshwater/**.

List connections between poverty and water. Explain.

How can you conserve potable water in your life? How does this affect global water issues and help children in developing countries?

Water Run Clean

Objective: To consider how climate change is affecting the availability of clean sources of water in developing countries. To understand the importance of reusing water as an alternative to finding new sources of clean water supplies, you will design and test a water filtration system.

Time: 60 minutes

Materials

- 2 litre empty plastic bottle (pop/water) for each group (no bottle cap)
- Scissors for each group
- Paper and pencil to record design and results
- Various filtering materials such as coffee filter, cotton wool, cheese cloth, sand, gravel. The sand and gravel must be clean (run under water in a sieve or colander). Activated carbon could also be added to the list this is readily obtainable from pet stores that stock aquarium supplies. You can add other materials to use a filter medium, or alternatively, ask the students to bring their own filtering mediums.
- One TDS (Total Dissolved Solids) Meter (approximately $40). Here is a link to Canadian distributors: **http://www.tdsmeter.com/products/where-to-buy?id=0001&productId=0001**.
- Mix of tap water with mud to provide a cloudy liquid (enough for 250ml per group approximately 1:10 ratio). Mix this in one batch so students all start with the same water to filter.
- Selection of beakers or equivalent for each group
- Student Handout #21: Water Run Clean

ACTIVITY

1. Remind the students that when we turn on the taps here in Canada (in most locations!), water comes out. But in many parts of the world, water doesn't come as easily or as safely. Climate change is impacting our world's drinking water by drying up our fresh water supplies, altering our rain water patterns (rather than falling overland, rain develops in the rising air above the warm ocean), and causing natural disasters that can contaminate our drinking water. It is becoming more challenging globally to access clean drinking water especially in developing countries where access to clean water is already an issue.

2. Explain that as the impacts of climate change affects our global water supply, it becomes important that we clean and reuse our water and not have to go on increasingly longer searches for clean water. (In developing countries, people, often young girls, walk 3km to get their water. Climate change can make this journey even longer.)

3. Discuss that testing water to ensure it is safe to drink requires several tests. Drinking water should be clear, odourless and colourless.

4. Give the students a scenario that a village in an African country has experienced a mudslide, which has contaminated the local drinking water. Explain to students that there are several tests that need to be

performed before you can determine if water is safe to drink, and one test is the total dissolved solids (TDS). Challenge students to devise a system to clean the TDS from the water.

5. According to the World Health Organization (WHO), the maximum TDS is 1,000ppm (parts per million) and in the US, according to the Environmental Protection Agency (EPA), it is 500ppm. The TDS Meter will be used to measure ppm.

6. Arrange the students into groups of four and explain that they will be designing and testing a water filtration system. Set up stations of the various filtering materials for the students to access, or challenge students to create a design and collect their own materials.

7. Instruct groups to cut the water bottle in half and turn the neck end face down inside the base end of the bottle. The neck of the bottle should not touch the base.

8. Ask each group to design their filter system using the materials to create the most effective solution. Sketch the design on Student Handout #16: Water Run Clean illustrating the gradation and thickness of the striations of the chosen filtering materials.

9. Have each group follow the instruction on Student Handout #21: Water Run Clean starting with collecting 250ml of contaminated water (muddy) to filter and test.

Class Post-Experiment Discussion

- Have the groups share their results. The top group will be the one with the most effective filtering system, and hence, the lowest (post filtering) ppm reading.
- What materials worked best? Did the order matter?
- Was the quantity of water less after filtering? Why?
- How did the visual quality vary?
- Is clear water safe to drink? Discuss why not? What could be in the water? (Answer: living micro-organisms that can cause disease and harmful chemicals.

Keep the Discussion Going

How do we translate this experiment into a workable model for safely cleaning water in developing (and developed) countries?

*One example is a natural water filter that first filters the water through ceramic filters (it takes approximately one hour to filter 1 litre), removing all suspended solids including biological contaminants. The water then filters through activated carbon containing nano silver (which inhibits bacteria growth). Silica sand can be used to provide additional filtration and zealite can be used to remove heavy metals. This is only one example, and is a description of a filter system called Santevia (***www.santevia.com***). These, and similar filtering systems, are being used in developing countries to provide safe drinking water.*

What happens when we add plants to a filtration system? What do the plants do to help clean the water? Discuss natural and constructed wetlands.

Discuss rainwater collection and filtration systems for various water uses. For what water uses can we employ rainwater in our homes?

What standards does Canada have for drinking water, and how do they compare to those in developing countries? Test your tap water.

Tests can include pH, total hardness, free chlorine, total chlorine, nitrite, copper and iron. A testing kit can be obtained from ***www.safewater.org****. Remember that all children have the right to clean, safe drinking water.*

Kisesa Health Centre benefits from rainwater harvesting tank!

The Kisesa Health Centre, in Tanzania, provides health care for children and mothers, including treatment for diseases.

Before the rainwater harvesting tank was constructed, the centre had no choice but to buy water from a vendor. The amount they could purchase was insufficient to meet their needs, resulting in poor sanitation and the risk of infection for patients.

Flora Emmanuel was brought to the centre after a still birth. Because of a shortage of water, Flora recalled that "my mother had to ask for water from nearby homes for drinking, for my bath and for washing clothes." Now that construction of the rainwater harvesting tank has been completed, the centre will be able to provide better services and sanitation for its patients.

Adapted from story found at **http://www.unicef.org.nz/article/760/KisesaHealthCentrebenefitsfromrainwaterharvestingtank.html**.

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #18: Youth Take Action (page 77) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric (on page 103).

BACKGROUNDER WATER


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What are the issues?

Currently around 1.1 billion people in developing countries have inadequate access to water and 2.6 billion people lack basic sanitation.[2]

Climate change is exacerbating this water stress in the following ways:.

- Global warming results in the melting of ice caps causing sea levels to rise. It is estimated that if sea levels increase by about 40cm (roughly in the middle of the expected range for 2050), the number of people in danger of saltwater floods could grow from 75 million (today) to 200 million (2050). Salt water could pollute the drinking water in some of the largest urban centres on the coast such as Shanghai, Manila, Jakarta and Bangkok. According to some hydro-geologists, this could result in the cities being abandoned.[3] "At 1.5^{0}C or less (an increase in global temperature) an extra 400 million people are exposed to water stress." [4]
- Drought in southern Africa is closely related to the global warming of the Indian Ocean. Rather than falling overland, rain develops in the rising air above the warm ocean. Even a 10% drop in rainfall can reduce river flow by 50%.
- As a result of drought, water tables have not recovered and an increasing number of water points dry up in the summer.[5]

Impacts on health of unsafe water sources

Pollution and improper management of human waste threaten safe water sources. Each year, waterborne disease like diarrhoea, cholera and typhoid claim the lives of millions of children in the developing world. Diarrhoea spreads readily in environments where there is poor sanitation and where safe water is unavailable.

Irrigation and agriculture

Water is required for agriculture. Without water, crops will die resulting in loss of livelihood, malnutrition and starvation for the family.[6]

Access to safe drinking water

In many developing countries, the sources of safe drinking water are far from the villages. Often the children (primarily girls) are tasked with fetching the water. In southern Madhya Pradesh, India, tribal girls spend up to three hours a day collecting and arranging for water. The girls spend more time fetching water than being involved in education.[7]


©UNICEF/NYHQ2006-0200/Michael Kamber

Take action

UNICEF and partners have implemented a program called *Wise-Water Management*. This program includes water solutions such as rainwater harvesting, recycling of grey water, and pumping of water using a roundabout play pump (as children play at school they are pumping the water for later use). Tribal schoolgirls have formed a Water Safety Club and use a water safety plan taught by UNICEF to monitor these initiatives.[8]

Also, UNICEF has water, sanitation and hygiene (WASH) programs active in over 90 countries.

WASH is designed to help improve access to water and sanitation, as well as educating children about essential hygiene behaviours such as washing hands with soap to help stop the spread of disease.

Children take action

"We here in our community are suffering from a lack of drinking water. Where safe water is available, it is too far away; most times we have to walk 10-15 minutes to places where we can access safe drinking water. I think the solution would be for us to recycle our waste water, as I am told has been done in some countries of the world." Rasheeda, age 13, Nigeria [9]

To learn more about climate change connected to water, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* found at **http://www.unicef.org.uk/campaigns/campaign_sub_pages.asp?page=91**.

NOTES

1 UNICEF UK, *Our climate, our children, our responsibility*, 2008, p. 10.
2 Ibid., p. 15.
3 Monbiot, George, *Heat: How to Stop the Planet From Burning*, 2006, p. 8.
4 Ibid., p. 15.
5 UNICEF UK, *Our climate, our children, our responsibility*, 2008, p. 10.
6 Ibid.
7 Ibid.
8 Ibid.
9 Ibid., p. 28.

Student Handout #18

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. Research the environmental impact of disposal water bottles. Most water bottles are made with a petroleum-based plastic that uses a great amount of energy and water to make, and therefore add to climate change. Plus, according to David Suzuki, "the growing demand for bottled water undermines confidence in public drinking water systems." [1]

PROJECT: Lobby to remove plastic water bottles from your school and promote tap water instead. Follow the progress of school districts that are looking at whether or not to ban plastic water bottles in schools.

2. Learn what UNICEF is doing to ensure everyone's right to safe drinking water is realized. Research the water, sanitation and hygiene (WASH) program.

   The Water, Sanitation and Hygiene website (**http://www.unicef.org/wes/index_bigpicture.html**) and *The Right To Water* website (**http://www.righttowater.info/**), launched on Human Rights Day 2003, have been established by WaterAid and Rights and Humanity, in co-operation with Freshwater Action Network (FAN), as part of UNICEF's contribution to the International Year of Freshwater 2003.

PROJECT: Organize a fundraiser to raise money to support the WASH program. Start a competition (with an entry fee) and challenge students to develop a song promoting the WASH program.

3. Research The Tap Project, a campaign aimed at building awareness of clean, accessible water as a global child health issue. During World Water Day 2009, participating restaurants across Canada suggested patrons add a donation of $1 for the tap water they received. For more information see **http://www.tapproject.org/**.

PROJECT: Create a YouTube clip, PowerPoint presentation or a song/jingle/PSA to encourage actions to promote the Tap Project. Include the details of the project, as well as statistics such as how many restaurants participated, how much money was raised, etc.

Fraser Heights Secondary School – School District # 36 – Surrey
Students at Fraser Heights Secondary sold reusable water bottles and built a bio-sand water filter to address water issues locally and globally. They also work with local elementary schools to raise awareness of sustainability issues. They are a 2009 winner of the BC Green Games! For more information see **http://www.bcgreengames.ca.**

Lao primary school children working on the mural.

Vientiane, Lao People's Democratic Republic
To mark World Water Day 2009, Laotian school children worked together and let their creative sides shine to design a huge mural displayed at a central park. The young artists painted their own impressions and images of life along the Mekong River to raise local awareness about the sustainable management of water. For more information see **http://www.unicef.org.**

NOTES

1 Suzuki, David and David R. Boyd, *David Suzuki's Green Guide* (Toronto: Douglas & McIntyre, 2008), 68.

Student Handout #19

BIO-SAND FILTER

Jiuta Gupta draws water for her daughter through a new bio-sand filter, provided by UNICEF that helps eliminate arsenic.

For over 10 years, the Gupta family had been drinking water from a tube well dug right outside their door. Therefore, no member of the family had to walk great distances to gather water. Unfortunately, it was recently discovered that the well water was contaminated with arsenic.

"The symptoms started with nausea and weakness," said Mr. Gupta, a resident of Thulo Kunwar village in Nawalparasi District. "In time, my skin hardened and small nail-like warts emerged on my palms, and soon I developed tumours, too."

"There are a few solutions that can be adopted immediately after identification of contaminated wells," said UNICEF Nepal Project Officer Madhav Pahari. "The first, most reliable option is to find safe water from the nearest tube well for cooking and drinking. Secondly, people can drill a new well in the safe aquifers."

Due in part to the fact that climate change is creating a global shortage of potable water, finding an alternative safe, clean source is not always an option. If this is the case, a bio-sand filter can be installed to help remove arsenic particles or other sediments and pathogens from the water supply. Installation of the filters is one of the many initiatives supported by UNICEF to reduce the effects of arsenic contamination in Nepal.

Story adapted from *Diluting the Pain of Arsenic Poisoning in Nepal* found at **http://www.unicef.org/infobycountry/nepal_35975.html**.

Climate Change Connection

Like carbon, there are trace amounts of arsenic in all living matter. "Arsenic may enter lakes, rivers or underground water naturally, when mineral deposits or rocks containing arsenic dissolve. Arsenic may also get into water through the discharge of industrial wastes and by the deposit of arsenic particles in dust, or dissolved in rain or snow."[1]

Human activities that can add arsenic to our water are the same activities that are contributing to climate change and include burning fossil fuels; mining metals such as gold;, using pesticides in agriculture and burning waste.

Your Task!

Create a one-minute public service announcement or radio jingle to promote the purchase and use of bio-sand filters so children will have clean water. First, research bio-sand filters further by using the internet to search "bio-sand filters."

NOTES

1 Health Canada, "Arsenic in Drinking Water," **http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/arsenic-eng.php** (accessed May 2009).

Student Handout #20

UNICEF BASIC FAMILY WATER KITS

A boy in the Maldives carries collapsible water containers, which are included in UNICEF basic family water kits. UNICEF has distributed thousands of kits to tsunami-affected families.

In Yemen in 2008, thousands of people were affected by a tropical storm and the flooding that followed. Lives were lost and extensive damage to homes, crops and livestock were witnessed.

UNICEF estimated that 68 people are dead and nearly 3,300 households were destroyed in the floods. About 25,000 people have been forced to take refuge in shelters.

UNICEF and its partners were there with emergency aid. As water is essential to human existence, the aid included basic family water kits (items included buckets, soap, towels and purification tablets).

UNICEF representative Aboudou Karimou Adjibadé attributed the rare storm to the effects of climate change. He said this region of Yemen is not accustomed to flooding so many of the homes are made of mud and literally washed away in the flooding. "This kind of tropical storm has not hit Yemen for almost 600 years. It is something very unusual," he said.

Story adapted from
http://www.unicefusa.org/news/news-from-the-field/tens-of-thousands-displaced.html.

Climate Change Connection

The impact of climate change, is droughts, floods, storms, temperature changes and weather pattern changes. There is increasing evidence of changes in the climate system resulting in an increase in the frequency and severity of natural disasters. This, in turn, will put added pressure on the global supplies of clean, safe drinking water.

UNICEF needs our support to supply clean water in times of natural disasters. With a donation of $100, you allow UNICEF to distribute a basic family water kit for ten households, with detergent, soap, wash basin, towels, bucket and water purification tablets.

Your Task!

Create a one-minute public service announcement or radio jingle to promote the purchase of UNICEF's basic family water kits so children will have clean water.

Tens of thousands of Yemeni children have been affected by floods that followed a rare tropical storm.

Student Handout #21

WATER RUN CLEAN

Sketch your filter design. Provide dimensions and label the materials' striations.

Instructions for Testing

1. Prior to filtering
   - Collect 250ml of muddy (contaminated) water. Stir well.
   - Observe colour, clarity and odour of the water. Record your descriptions in the chart below.
   - Measure the TDS of the water and record in the chart below.

2. Pour your contaminated water into your filter.
   - Record how long it takes to completely filter.
   - Observe colour, clarity and odour. Record your results.
   - Measure the TDS of the water and record your results.

Water volume	Filtration Time (ml)	(in seconds)	Description of water sample			
			Colour	Clarity	Smell	TDS ppm
Water sample prior to filtering	250ml	0				
Water sample after filtering						

ENERGY

Cape Verde, 2008
Wind turbines generate electricity in the mountains of Praia, the capital of Santiago Island.

INTRODUCTION

Energy is vital to sustain our lives. We use energy in every aspect of our lives; growing, transporting food and cooking it, heating or cooling our homes, for light, in manufacturing and for powering our cars.

Currently most of the world's energy is from fossil fuels: coal, gas and oil. Burning of fossil fuels not only creates carbon dioxide, but affects our air quality and exacerbates climate change.

This effect particularly impacts children, and those most vulnerable are in developing countries. Youth in Canada are also affected; issues of asthma and breathing disorders are on the rise and quality of life is compromised.

Children have the right to clean air, and the **good news** is we **can** use renewable energy sources to help reduce our dependence on fossil fuels. We can start by understanding the issues and then doing our part to make a difference.

ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices A and B: Curriculum Links on pages 91 and 95, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec. .

Province	Course	Expectation/Learning Outcome
Ontario	SVN3M Environmental Science, Grade 11, University/College Preparation *Conservation of Energy*	F1. assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption; F3. demonstrate an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources.
Ontario	SNC1P Science 9 Applied *Physics*	E1. assess the major social, economic, and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources and propose a plan of action to reduce energy costs.
British Columbia	Science 9 *Physical Science: Characteristics of Electricity*	Relate electrical energy to power consumption.
British Columbia	Sustainable Resources 11	Describe the processes associated with the generation and use of energy resources.

Setting the Stage

Objective: Students discuss viable renewable energy sources.

Time: 15 minutes

Materials

- Renewable Energy Cards (optional)
- Renewable Energy Defined answer key
- Appendix G: Reflect and Act (page 105)

ACTIVITY

1. Distribute Appendix G: Reflect and Act (page 105) to each student and ask them to journal lessons learned during discussion and activities around the theme.

2. Arrange the class into six groups. Give each group a set of the Renewable Energy Cards. If the students have basic knowledge of the different renewable energy sources, play this game without the cards, or list of the answers.

3. Read to the class the first definition (only) from the Renewable Energy Defined answer key. Each group is to decide what renewable energy source matches the definition, and choose a renewable energy card from their deck. Once that card is played (or the answer is recorded if you did not use the cards), that card or answer cannot be used again.

4. Discuss the answers. You might want to discuss the advantages and disadvantages of each.

Nim Dolma is 18 and a grade 4 dropout because her parents could no longer afford her education. Today she is back at school thanks to the Non-Formal Education Programme (NFE), established by the government of Bhutan in 1992 with the support of UNICEF.

Classes are held in the evenings to accommodate students who have to work during the day, like Nim who is very busy collecting bamboo, weaving blankets, etc. during the day. In the evenings it is dark outside; since there is no electricity in the school, solar lanterns light the classrooms at Sakten Primary School. For more information see **http://www.unicef.org.**

Renewable Energy Defined

ANSWER KEY

Renewable Energy Source	Definition
Wind	This energy source works well in places like Kingston, Ontario. This source emits no carbon dioxide. We have an unlimited supply, and it works if set up on a flat expanse with no barriers in its way.
Geothermal	This energy source uses the heat from the interior of the earth.
Solar	This energy source uses a certain radiation. This source is extremely powerful and a perpetual resource.
Heat recovery	This energy source collects the warmth from sewer waste, drainwater, landfills and ventilation air.
Biomass	This energy source is an organic material that can be burned or converted to other energy forms like methane gas or transportation fuels.
Water from rivers and dams	The energy from this source is captured falling from a vertical distance. The higher the fall, the greater potential for energy.
Off shore tidal	The energy from this source harnesses the power of the ocean. This is a large underwater 'farm' remote from the shoreline.
Hydrogen	A colorless, highly flammable gaseous element, the lightest of all gases and the most abundant element in the universe, used in the production of synthetic ammonia and methanol, and in petroleum refining.

RENEWABLE ENERGY CARDS

Wind	Biomass
Geothermal	Rivers and dams
Solar	Off shore tidal
Heat recovery	Hydrogen

Solar Cafe

Objective: To learn about and construct a simple solar oven and discover how using solar technology helps in the fight against climate change.

Time: 60 minutes (or longer)

Materials

- A reflective accordion-folding car sunshade (6)
- A cake rack (or wire frame or grill) (6)
- 12 cm (4 ½ in.) of Velcro
- Black pot (6)
- Bucket or plastic wastebasket (6)
- A plastic baking bag (6)
- Scissors (6)
- Needle and thread (6)

According to the World Health Organization, in 23 countries, more than 10% of deaths are due to two environmental risk factors: unsafe water and indoor air pollution due to solid fuel use for cooking. Around the world, children under five are the main victims and make up 74% of these deaths. For more information see **http://www.who.int/indoorair/publications/indoor_air_national_burden_estimate_revised.pdf**.

ACTIVITY

1. Arrange the class into six groups.

2. Brainstorm with the class ways in which people who cook creating indoor pollution can develop a healthier way to cook.

3. Explain that one solution is a solar oven, which cooks food using only the power of the sun. Tell students that they will work together to build solar ovens.

4. Here are the instructions written by Kathy Dahl-Bredine from Oaxaca, Mexico or, you can visit **http://solarcooking.wikia.com/wiki/Kathy_Dahl-Bredine** or **Solar Cookers International at http://solarcookers.org/** for more details:
   - Lay the sunshade out with the notched side toward you.
   - Cut the Velcro into three pieces, each about 4 cm long.
   - Hand sew one half of each piece, evenly spaced, onto the edge to the left of the notch; sew the matching half of each piece onto the underneath side to the right of the notch, so that they fit together when the two sides are brought together to form a funnel.
   - Press the Velcro pieces together, and set the funnel on top of a bucket or a round or rectangular plastic wastebasket.
   - Place a black pot on top of a square cake rack placed inside a plastic baking bag. A standard size rack in the U.S. is 25 cm (10 in.). This is placed inside the funnel, so that the rack rests on the top edges of the bucket or wastebasket. Since the sunshade material is soft and flexible, the rack is necessary to support the pot. It also allows the suns rays to shine down under the pot and reflect on all sides. If such a rack is not available, a wire frame could be made to work as well. Note: the flexible material will squash down around the sides of the rack.
   - The funnel can be tilted in the direction of the sun.

If you want to add a challenge to the solar oven construction, you might want to give the students the supplies only, with no directions. The group must work together and construct an oven that works. This is best done on a sunny day so groups can test the oven.

The other option is to give students a project to research solar ovens, draft plans and construct the oven. You could make it into a solar challenge with the winning group being the first to bring water to a certain temperature.

4. If there is time, share other examples of solar ovens:
   - PBS — Nova Teachers has detailed plans, with follow-up resources, on how to build a sophisticated solar oven at **http://www.pbs.org/wgbh/nova/teachers/activities/3406_solar.html#materials**.
   - Try to construct an oven from a pizza box and aluminium foil.

Keep the Discussion Going

Besides reducing indoor air pollution, why else would people want a solar oven?

Using solar power eliminates the need for fossil fuels. Also, in some countries it is a matter or personal safety. In Darfur, for example, women who have solar ovens don't need to leave the camp to collect firewood, helping keep them safe from attack.

How can we further use solar power in every part of the world to lessen the effects of climate change on children?

Solar water pumps help with water collection from wells. Learn about Somali villages investing in solar-powered pumps at **http://www.unicef.org/wash/somalia_44827.html**.

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #22: Youth Take Action (page 88) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action, or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix E: Culminating Task Rubric (on page 103).

BACKGROUNDER ENERGY

What are the issues?

The world's primary source of energy is fossil fuels. Not only are they a finite fuel source (non-renewable), but using fossil fuels also creates carbon dioxide, a major contributor to climate change. As we cut down trees faster than they can replenish in many parts of the world, we are also losing the valuable carbon sinks to store the excess CO_2 created when we burn fossil fuels.

Energy facts in developing countries:

- The burning of fossil fuels is accelerating climate change.
- 80% of the population that has no access to electricity lives in developing countries, mainly in South Asia and sub-Saharan Africa.[1]
- Many people in developing countries do not have electricity.
- It is estimated that currently 1.6 billion people do not have access to electricity, and 2.4 billion people are lacking the modern fuels necessary for cooking and heating their homes safely.
- More than 3 billion people must use wood, crop waste and/or dung to cook with and heat their homes. One of the immediate issues related to these energy sources is that they produce large quantities of smoke inside buildings, which contributes to the deaths of 800, 000 children annually, due to their immature respiratory systems. In addition to the health effects of these energy choices, communities are affected on a long-term basis by the fact that their local resources and natural environment are being degraded. [2]

Renewable Solutions

We need to find ways to provide people in developing countries (and developed countries) with renewable energy sources such as wind, solar, biomass, geothermal, etc. instead of burning solid fuels. Not only would the immediate concerns of air pollution and associated health issues be eliminated, but the planet would also benefit from the reduction in carbon being released into the atmosphere. We need to end our world dependency on fossil fuels and this is starting to happen in parts of the world. For instance, China has programs to support affordable solar energy to pump water, produce electricity and heat water. The government is also promoting household biogas plants to treat human excreta.[3]

"Yes, I do agree that trees shouldn't be cut down unnecessarily, but we should think about those people who have to cut down trees so that they may survive. The major cause of excess tree abuse is the cutting of trees for fuel. People around the world lack basic necessities such as fuel and need to chop down trees if they want heat and warmth. Every government needs to make an effort in providing alternative resources for our mission to succeed." Amre, age 18, Somalia[4]

To learn more about climate change connected to energy, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* at **http://www.unicef.org.uk/campaigns/publications/pdf/climate-change.pdf**.

NOTES

1 UNICEF UK, *Our climate, our children, our responsibility*, 2008, p. 17.
2 Ibid.
3 Ibid.
4 Ibid.

Student Handout #22

YOUTH TAKE ACTION

Challenge for Change Action Items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

1. People-powered transit is the most environmentally friendly way to travel! If we can walk, run, or bike to our places of destination, we drastically reduce the use of fossil fuels in our lives.

PROJECT: Organize a commuter challenge for both students and teachers with a Bike to School Day in May (or any other time of year)! Make it a fun event with refreshments for all the cyclists. Look into having a lunch demonstration of music and/or bike tricks.

2. Youth need to spread the message on how to get our planet out of our energy crisis.

PROJECT: Partner with an elementary school in your area. Develop a 'Save Energy ' board game or storybook and share this with the elementary students.

3. Research solar ovens that can be purchased and distributed to places in the world that primarily cook indoors using fossil fuels. Check out **http://www.solarovens.org/** to learn more.

PROJECT: Get your school involved in a fundraiser to sponsor a family for a solar oven, or organize a Solar Oven Cook-Off at the school. Teams enter their solar oven design and have to cook a simple recipe. The judges decide on the best solar meal!

King David Secondary School, Vancouver, BC
For the past few years, students at King David Secondary School have raised money to support The Solar Cooker Project, which supplies solar ovens to women in Darfur, a region of Sudan. The ovens allow women to stay close to their families to prepare meals instead of leaving the camp to collect firewood for cooking. Leaving the camp can result in danger to women and children in this area of the world. For more information see **http://www.jewishworldwatch.org.**

Mount Kilimanjaro, Tanzania
Ten amazing youth from impoverished urban centres in Kenya, Tanzania and Ghana will soon be challenged even further! They will join a team that will attempt to climb Mount Kilimanjaro. The purpose of this adventure is to draw attention to the global effects of climate change due to our dependency on fossil fuels and how it can devastate urban centres as it deals with increased population, unemployment, and unacceptable health care systems. For more information see **http://www.un.org.**

FURTHER RESOURCES

Advocacy Guide presented by the World Health Organization highlights the decade between 2005 and 2015 as critical years to focus global attention on water. This guide shares ways we can demonstrate our personal commitment to organizing events around World Water Day (WWD), so that we can ensure that everyone is aware of the urgency of the goals to be achieved between 2005 and 2015.
http://www.who.int/water_sanitation_health/en/2005advocacyguide.pdf

Association for Canadian Educational Resources (ACER) offers a program that enables students, clubs, groups, or individuals to accurately collect data to monitor tree growth.
http://www.acer-acre.org/html/projects/SchoolYard/index.htm

Campus Climate Challenge is the largest youth mobilization to stop global warming. This international effort is taking place on more than 600 campuses in the US and Canada. Through the Challenge, youth are leading the world toward clean energy solutions. Students are working to transform their campuses into models of sustainability by passing climate neutrality, efficiency, transportation, green building and clean energy policies.
http://ssc.sierraclub.org/get-involved/campaigns/index.html

ClimateChange.org unites 42 organizations and over 629 local groups in 56 states and provinces. Together, they have passed hundreds of local and regional climate policies. **http://www.climatechallenge.org/**

Climate Change: Connections and solutions
Download this 2-week unit for grades 9-12 from the organization *Facing the Future*.
www.facingthefuture.org/Curriculum/DownloadFreeCurriculum/tabid/114/Default.aspx

Climate Change North
This Web site offers resources and information specific to how climate change is affecting Northern Canada. Resources include backgrounders, lesson plans and Web links for grades K-12.
www.climatechangenorth.ca

Evergreen Canada has a wealth of sustainability related initiatives to support teachers and students in schools across Canada, such as the Toyota Evergreen Learning Grounds
http://www.evergreen.ca

Food and Agriculture Organization (FAO) of the United Nations is developing resources, activities and the mechanisms to enhance awareness, access to information and participation of children and young people in a range of environmental, social and sustainable development issues, including climate change.
http://www.fao.org/climatechange/youth/en/

Green Learning Canada
Help your students participate in their own learning while gaining a more holistic and hopeful understanding of today's complex energy and environmental issues.
http://www.greenlearning.ca/

International Climate Champions (ICC) program, established by the British Council, unites global youth on the subject of climate change. Each of the G8+5 countries selected three students (aged 16-18) in 2008 to represent the ICC at the G8 Environment Ministers' Meeting in Kobe, Japan. **http://www.iccommit.org/about.php**

Kick the Habit: A UN Guide to Climate Neutrality
This online book talks about our dependence on carbon-based energy and how this "addiction" has caused a significant build-up of greenhouse gases in the atmosphere. This is a guide for everyone who wants to embark on the path to climate neutrality.
http://www.grida.no/publications/vg/kick/ebook.aspx

MuchMusic's media education website examines the working conditions of "sweatshop" employees in Mexico and Bangladesh and provides an updated perspective on this controversial issue. Students watch a video entitled *Inside Your Threads* and discuss.
http://www.muchmusic.com/mediaed/guidepage_much.asp?studyID=142

Natural Resources Canada – Climate Change Posters
A series of posters depicting risks, regional climate changes, and the effects on sectoral industries. Posters and teaching guides can be ordered from 1-800 O Canada.
http://adaptation.nrcan.gc.ca/posters/index_e.php

Ontario EcoSchools has resources that relate to climate change developed for Grades 1-12. These resources are linked to different courses offered in grades 9-12.
http://ontarioecoschools.org/curriculum_resources/

Ontario Ministry of Education. Education Minister Kathleen Wynne has introduced a new progressive **environmental education policy**.
http://www.edu.gov.on.ca/curriculumcouncil/action.html

Pembima Institute
Research up-to-date information on climate change.
http://climate.pembina.org/

Read **United Nations Environment Programme (UNEP)'s press release** on how the atlas of Africa is changing due to climate change. See satellite images and graphs detailing landscape changes such as the evaporation of Lake Chad.
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=538&ArticleID=5834&l=en

Teaching about Climate Change: Cool schools tackle climate change
This book uses practical ideas to tackle the intangibles of climate change with experiments, waste audits and hands-on explorations. To order, visit:
www.greenteacher.com/tacc.html

UNICEF-themed units for grades 3-5, 6-8 and 9-12 are based on UNICEF's annual assessment of the world's most vulnerable children: The *State of the World's Children* report (SOWC).
http://youth.unicefusa.org/teachunicef/units-and-lesson-plans/

UNICEF UK's Climate Change Campaign. UNICEF UK is advocating for urgent support to help the most vulnerable children adapt to and develop within their changing climate.
http://www.unicef.org.uk/campaigns/campaign_detail.asp?campaign=23&nodeid=campaign23&section=9

UNICEF UK's Climate Change Report 2008: *Our climate, our children, our responsibility* details the effects of climate change on our global children.
http://www.unicef.org.uk/campaigns/campaign_sub_pages.asp?page=91&nodeid=campaign_subpage91

United Nations Economic Commission for Europe (UNECE) offers concrete examples of successful implementation of "Good Practices in Education for Sustainable Development" in different areas, including the school setting. This is a collection of experiences from governments, international organizations, research institutions, NGOs and other stakeholders.
http://www.unece.org/env/esd/GoodPractices/index.html

Sandwatch develops awareness of the fragile nature of the marine and coastal environment and the need to use it wisely. It is an educational process through which school students and community members from various countries learn and work together to critically evaluate the problems and conflicts facing their beach environments and to develop sustainable approaches to address these issues.
http://www.sandwatch.ca/climate_change.htm

The Stern Review: The Economics of Climate Change explains that climate change has resulted in very serious global risks, and it demands an immediate response from all citizens globally. Read the Executive Summary.
http://news.bbc.co.uk/2/shared/bsp/hi/pdfs/30_10_06_exec_sum.pdf

UNICEF Canada's Climate Change Resources
http://globalclassroom.unicef.ca/climate_change_resource_guide

FRENCH RESOURCES:

Environnement Jeunesse:
http://www.deficlimat.qc.ca/deficlimat/index.php?page=3_effetdeserre

Environnement Canada:
http://www.ec.gc.ca/cc/default.asp?Lang=Fr

Wikipedia:
http://fr.wikipedia.org/wiki/Changement_climatique

Notre-Planète.info:
http://www.notre-planete.info/actualites/actu_2089_changements_climatiques_Sahara_vert.php

APPENDIX A

CURRICULUM LINKS FOR BRITISH COLUMBIA

Course	Selected PLO	Related Themes
Science 9	*Physical Science: Characteristics of Electricity* • relate electrical energy to power consumption C R E	Energy
	Processes of Science • demonstrate ethical, responsible, cooperative behaviour	Energy
Science 10	*Energy Transfer in Natural Systems* • evaluate possible causes of climate change and its impact on natural systems	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Sustainability of Ecosystems • explain various ways in which natural populations are altered or kept in equilibrium	Natural Disasters, Health,
	Processes of Science • demonstrate ethical, responsible, cooperative behaviour	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Earth Science 11	*Surface Processes and the Hydrosphere* • describe the function of the hydrologic cycle	Water
	Earth Materials (Rocks and Minerals) • assess the extraction and use of geological resources	Energy
Biology 11	*Ecology* • analyze the functional inter-relationships of organisms within an ecosystem	Natural Environments
Sustainable Resources 11	• analyze the environmental, social, and economic significance of forestry and related industries at the local, provincial, and global levels • describe the processes associated with the generation and use of energy resources	Natural Environments, Energy Energy
Science and Technology 11	*Agriculture* • describe elements of agricultural systems found locally, provincially, and globally • describe the role of genetics in agriculture • evaluate different methods, including those from Aboriginal cultures, of food production, processing, and preservation • analyze the effects of changing technology in agriculture on society	Food Security
	Natural Resources and the Environment • discuss the impact of society on natural resource management and the environment	Water, Energy

CURRICULUM LINKS FOR BRITISH COLUMBIA

Course	Selected PLO	Related Themes
Sustainable Resources 12	*Components of Sustainable Agricultural Systems* • investigate the role of climate in agricultural production	Natural Disasters
	Agriculture 12 *Components of Sustainable Agricultural Systems* • debate the concept of sustainability as it relates to agriculture • analyze the use of water, fertilizers, pesticides, and pharmaceuticals in agricultural activities • investigate the role of climate in agricultural production	Food Security
	Forest Resources and Society • analyze current forest management practices	Natural Environments
	Forest Ecology • examine the components of forest ecosystems • investigate the interactions found within a forest environment • assess the impact of environmental components and changes on a forest ecosystem	
Socials 11	*Human Geography* • assess environmental challenges facing Canadians, including – global warming – ozone layer depletion – fresh water quality and supply	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Civics 11	*Informed citizenship* • describe organizations that govern relations among nations, including those dealing with: – peace and security – trade and economics – international justice – social and environmental issues	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Civic Deliberation • analyze the domestic and international effects of Canada's record with respect to issues and events in one or more of the following categories: – environment – trade – foreign aid – peace and security – human rights	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Geography 12	*Weather and Climate* • analyze interactions between human activity and the atmosphere, with reference to: – global climate change – ozone depletion – acid precipitation	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Resources and Environmental Sustainability • assess the environmental impact of human activities, including: – energy production and use – forestry – agriculture – waste disposal – water use	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy

CURRICULUM LINKS FOR BRITISH COLUMBIA

Course	Selected PLO	Related Themes
Geography 12	*Biomes* • analyze the interactions between human activity and biomes, with reference to: – deforestation – desertification – soil degradation – species depletion	Natural Environments
Social Justice 12	*Defining Social Justice* • apply critical thinking skills to a range of social justice issues, situations, and topics • analyze selected social justice issues from an ethical perspective • assess how belief systems can affect perspectives and decisions in relation to social justice issues • conduct a self-assessment of their own attitudes and behaviours related to social justice	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Recognizing and Analyzing Injustice • analyze social justice issues related to globalism and globalization	Natural Disasters, Food Security, Health, Natural Environments, Water
	Moving Toward a Socially Just World • assess various methods and models of promoting social justice • apply systemic analysis to propose solutions to specific cases of social injustice • implement a plan for action on a selected local, provincial, national, or international social justice issue • assess lifelong opportunities related to social justice	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Visual Arts 9	• create images that: – support or challenge personal and societal beliefs, values, traditions, or practices – demonstrate an awareness of the styles of various artists, movements, and periods – respond to historical and contemporary images or issues – reflect a sense of personal and social responsibility	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Visual Arts 10	• create images that: – support or challenge personal and societal beliefs, values, traditions, or practices – reflect an understanding of responsibility to the context of a specific audience	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Visual Arts 11	• create/perform a work of art that reflects an understanding of the impact of social/cultural/ historical contexts	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Visual Arts 12	• use a variety of media arts technologies to create images that: – support or challenge beliefs, values, and traditions – incorporate characteristics of other artists, movements, and periods in personal style – reflect historical and contemporary issues	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	• create/perform a work of art that communicates specific beliefs/ traditions in response to historical/contemporary issues	Natural Disasters, Health, Natural Environments, Water, Energy

CURRICULUM LINKS FOR BRITISH COLUMBIA

Course	Selected PLO	Related Themes
Drama 11: Theatre	Encourage students in drama to use sustainability topics in their drama performance. During set design, challenge students to use environmentally friendly materials.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
Dance 12	• Create compositions for a variety of purposes: – to respond to or represent a range of stimuli for a variety of settings – to represent different points of view	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
English Language Arts 9-12	Educators can include environmental topics in many English Language PLOs to allow students to understand the connection between them and the environment.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy

APPENDIX B

CURRICULUM LINKS FOR ONTARIO

Course	Overall Expectations	Related Themes
SNCID Science, Grade 9 Academic	*Biology* **B1.** assess the impact of human activities on the sustainability of terrestrial and/or aquatic ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impacts; **B2.** investigate factors related to human activity that affect terrestrial and aquatic ecosystems, and explain how they affect the sustainability of these ecosystems; **B3.** demonstrate an understanding of the dynamic nature of ecosystems, particularly in terms of ecological balance and the impact of human activity on the sustainability of terrestrial and aquatic ecosystems.	Natural Disasters, Food Security, Natural Environments, Water
	Physics **E1.** assess some of the costs and benefits associated with the production of electrical energy from renewable and non-renewable sources, and analyze how electrical efficiencies and savings can be achieved, through both the design of technological devices and practices in the home.	Energy
SNC1P Science, Grade 9 Applied	*Biology* **B1.** analyze the impact of human activity on terrestrial or aquatic ecosystems, and assess the effectiveness of selected initiatives related to environmental sustainability; **B2.** investigate some factors related to human activity that affect terrestrial or aquatic ecosystems, and describe the consequences that these factors have for the sustainability of these ecosystems; **B3.** demonstrate an understanding of characteristics of terrestrial and aquatic ecosystems, the interdependence within and between ecosystems, and the impact humans have on the sustainability of these ecosystems.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Physics **E1.** assess the major social, economic, and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources, and propose a plan of action to reduce energy costs.	Energy
SNC2D Science, Grade 10	*Earth and Space Science* **D1.** analyze some of the effects of climate change around the world, and assess the effectiveness of initiatives that attempt to address the issue of climate change; **D2.** investigate various natural and human factors that influence Earth's climate and climate change; **D3.** demonstrate an understanding of natural and human factors, including the greenhouse effect, that influence Earth's climate and contribute to climate change.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
SNC2P Science, Grade 10 Applied	*Earth and Space Science* **D1.** analyze effects of human activity on climate change, and effects of climate change on living things and natural systems; **D2.** investigate various natural and human factors that have an impact on climate change and global warming; **D3.** demonstrate an understanding of various natural and human factors that contribute to climate change and global warming.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy

CURRICULUM LINKS FOR ONTARIO

Course	Overall Expectations	Related Themes
SBI3U Biology, Grade 11	*Diversity of Living Things* **B1.** analyze the effects of various human activities on the diversity of living things.	Natural Environments
	Plants in the Natural Environment **F1.** analyze the roles of plants in ecosystems, and assess the impact of human activities on the balance of plants within those ecosystems.	Food Security, Natural Environments
SCH3U Chemistry, Grade 11	*Solutions and Solubility* **E1.** analyze the origins and effects of water pollution, and a variety of economic, social, and environmental issues related to drinking water.	Water
	Gases and Atmospheric Chemistry **F1.** analyze the cumulative effects of human activities and technologies on air quality, and describe some Canadian initiatives to reduce air pollution, including ways to reduce their own carbon footprint.	Natural Environments, Energy
SVN3E Environmental Science, Grade 11, Workplace Prep	*Human Impact on the Environment* **B1.** analyze selected current environmental problems in terms of the role human activities have played in creating or perpetuating them, and propose possible solutions to one such problem; **B2.** investigate air, soil, and water quality in natural and disturbed environments, using appropriate technology; **B3.** demonstrate an understanding of some of the ways in which human activities affect the environment and how the impact of those activities is measured and monitored.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Human Health and the Environment **C1.** analyze the effects on human health of environmental contaminants and a significant environmental phenomenon; **C2.** investigate how different environmental factors can affect people's health and their lifestyle choices; **C3.** demonstrate an understanding of the ways in which environmental factors can affect human health and how their impact can be reduced.	Food Security, Health, Water, Energy
	Energy Conservation **D1.** evaluate initiatives and technological innovations related to energy consumption and conservation, and assess their impact on personal lifestyles, social attitudes, and the environment; **D2.** investigate various methods of conserving energy and improving energy efficiency; **D3.** demonstrate an understanding of the basic principles of energy production, with reference to both renewable and non-renewable sources, and of various methods of energy conservation.	Energy
	Natural Resource Science and Management **E1.** assess the environmental impact of the harvesting and/or extraction of resources, including ways of reducing this impact, and analyze threats to the sustainability of natural resources; **E2.** investigate methods scientists use to classify and monitor natural resources, and conduct investigations using those methods; **E3.** demonstrate an understanding of the sustainable use of resources and its relationship to the biodiversity and sustainability of ecosystems.	Natural Environments

CURRICULUM LINKS FOR ONTARIO

Course	Overall Expectations	Related Themes
SVN3M Environmental Science, Grade 11, University/College Preparation	**B1.** analyze social and economic issues related to an environmental challenge, and how societal needs influence scientific endeavours related to the environment; **B2.** investigate a range of perspectives that have contributed to scientific knowledge about the environment, and how scientific knowledge and procedures are applied to address contemporary environmental problems; **B3.** demonstrate an understanding of major contemporary environmental challenges and how we acquire knowledge about them.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
	Human Health and the Environment **C1.** analyze initiatives, both governmental and non-governmental, that are intended to reduce the impact of environmental factors on human health; **C2.** investigate environmental factors that can affect human health, and analyze related data; **C3.** demonstrate an understanding of various environmental factors that can affect human health, and explain how the impact of these factors can be reduced.	Food Security, Health, Water
	Sustainable Agriculture and Forestry **D1.** evaluate the impact of agricultural and forestry practices on human health, the economy, and the environment; **D2.** investigate conditions necessary for plant growth, including the soil components most suitable for various species, and various environmentally sustainable methods that can be used to promote growth; **D3.** demonstrate an understanding of conditions required for plant growth and of a variety of environmentally sustainable practices that can be used to promote growth.	Food Security, Natural Environments, Water
	Conservation of Energy **F1.** assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption; **F2.** investigate various methods of conserving energy and improving energy efficiency; **F3.** demonstrate an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources.	Energy
SPH4C Physics, Grade 12	*Electricity and Magnetism* **D1.** analyze the development of selected electrical and electromagnetic technologies, and evaluate their impact on society and the environment.	Energy
SNC4M Science, Grade 12	*Biotechnology* **F2.** investigate various techniques used in biotechnology and how they are applied in the food industry and the health and agricultural sectors; **F3.** demonstrate an understanding of biological processes related to biotechnology and of applications of biotechnology in the health, agricultural, and environmental sectors.	Food Security, Health
HFN10 and HFN20 Social Sciences and the Humanities: Food and Nutrition, Grades 9 and 10	*Diversity, Interdependence, and Global Connections* Complete an investigation of current global issues related to food (e.g., food distribution, food shortages, gene manipulation), using current social science research methods.	Food Security
	Social Science Skills Demonstrate effective collaborative group skills.	Natural Disasters, Food Security Health, Natural Environments, Water, Energy

CURRICULUM LINKS FOR ONTARIO

Course	Overall Expectations	Related Themes
HIF10 and HIF20 Social Sciences and the Humanities: Individual and Family Living, Grades 9 and 10	*Social Science Skills* Demonstrate effective collaborative group skills.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
HPW3C Social Sciences and the Humanities: Living and Working with Children, Grade 11	*Growth and Development* Demonstrate an understanding of the multifaceted nature of and the various influences on child development.	Food Security, Health, Water
	Socialization of Children Evaluate various global influences on children and families.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
HIR3C Social Sciences and the Humanities: Managing Personal and Family Resources, Grade 11	*Preparing for the Challenges of the Future* Analyze how families are affected by global disparities in wealth and resources.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
HF4AM Social Sciences and the Humanities: Food and Nutrition Sciences, Grade 12	*Personal and Social Responsibilities* Determine the relationship among nutrition, lifestyle, health, and disease.	Natural Disasters Food Security, Health, Water
	Diversity, Interdependence and Global Connections • identify the economic, political, and environmental factors that affect food production and supply throughout the world; • identify the factors that are critical to achieving and maintaining food security and eliminating hunger.	Natural Disasters, Food Security, Health, Water
ADA10 Dramatic Arts, Grade 9	*Analysis* Explain how role playing in dramatic arts can function as a catalyst for learning about self, others, and the world.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy
ADA3M Dramatic Arts, Grade 11	*Analysis* • explain how dramatic arts represent, influence, and contribute to culture and society; • explain how the study of dramatic arts can foster self-development and global awareness.	Natural Disasters, Food Security, Health, Natural Environments, Water, Energy

APPENDIX C

GLOSSARY

Biodiversity: having many different species of plants and animals in one area.

Biomass: an organic material that can be burned or converted to create other energy types such as methane gas or fuels for transportation. Examples are wood waste, municipal solid waste, ethanol and biodiesel.

Carbon footprint: a measure of the CO_2 produced as a result of human activities including work, transport and food choices.

Carbon sink: is a natural or manmade area that stores carbon. Forests and oceans are examples of natural carbon sinks as they absorb carbon.

Cholera: a severe diarrhoeal infectious disease. It is caused by enerotoxin-producing strains of the bacterium Vibrio Cholerae and transmitted through food or drinking water.

Cyclone: a storm characterized by severe winds and possibly heavy rains rotating about a lower pressure point.

Diarrhoea: a symptom of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms. Severe diarrhoea leads to fluid loss, and may be life-threatening, particularly in young children and people who are malnourished or have impaired immunity.

Ecological Footprint: a measure of human impact on the Earth's resources; it is usually a metric of the number of 'earths' we need to meet our human demands.

Flashfloods: short duration heavy rains resulting in large volume localized flooding.

Forest Stewardship Council (FSC): a third-party forestry certification system designed to protect our environment (both people on the land and the land itself) to ensure our forests remain a renewable resource.

Geothermal Energy: using the heat from the Earth as an energy source. Examples are the surface at hot springs or geysers, recovered deep layers of hot water and shallow recovery of warm water (most common in building projects).

Gigatonnes: metric unit of mass, a gigatonne = 1,000,000,000 tonnes.

Global Carbon Cycle: the whole Earth's balance of carbon.

GM (Genetically Modified): organisms with genetically altered DNA; the majority of GM foods are plant-based but GM animal products are now being produced.

Greenhouse Gas Emissions (ghg): a collection of gases (largest contributor is carbon dioxide) that are being trapped in the atmosphere. This is considered a cause of climate change.

Hygiene: adopting habits of cleanliness to promote health.

IPCC: Intergovernmental Panel on Climate Change; it is a scientific-based United Nations body formed to assess the effects of climate change on humans.

Land Degradation: a human-related destruction of land so its biological value is down-graded.

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Land Desertification: a human-related degradation of arid or dry sub-humid land. Often it is caused by overpopulation due to depletion of groundwater and farming.

Life Cycle Analysis (LCA): a science-based measurement system. An LCA looks at products/systems, and provides numbers for environmental impacts.

Malnutrition: is due to insufficient or imbalanced consumption of food or nutrients.

Millennium Development Goals (MDG): developed by the nations who met at the Millennium Summit at UN headquarters in New York. These goals aim to improve the wellbeing of everyone on the planet by committing to end poverty, improve the health of children and their families and by ensuring the sustainability of the planet.

Ozone Layer: filters dangerous ultraviolet light to prevent it from penetrating the Earth's upper atmosphere and arriving at the surface.

Potable Water: water fit for human consumption.

Sanitation: providing good hygiene and preventing spread of disease. Providing sanitary conditions include safely treating drinking water and sewage and removing garbage.

Typhoid: an infectious disease caused by the bacterium Salmonella typhi. Food or water carrying the bacteria is eaten; the bacteria spread fast and enter the blood stream within 24-72 hours causing blood poisoning.

Typhoon: is a hurricane.

Vector-Borne Diseases: diseases spread to humans via the vector: non-human organisms such as mosquitoes and ticks that carry pathogens.

Vibrio Cholerae: a bacterium causing cholera that affects the gastrointestinal tract.

Waterborne Diseases: microorganisms with pathogens found in water cause it to become contaminated; transmitted by consuming the contaminated water.

West Nile: a vector-borne disease; the vector being a mosquito.

Zoonoses: diseases transmitted by vertebrate animals (can be a vector) to humans, though normally they would only infect other animals.

APPENDIX D

THE UN CONVENTION ON THE RIGHTS OF THE CHILD IN CHILD-FRIENDLY LANGUAGE

Article 1
Everyone under 18 has these rights.

Article 2
All children have these rights, no matter who they are, where they live, what their parents do, what language they speak, what their religion is, whether they are a boy or girl, what their culture is, whether they have a disability, whether they are rich or poor.
No child should be treated unfairly on any basis.

Article 3
All adults should do what is best for you. When adults make decisions, they should think about how their decisions will affect children.

Article 4
The government has a responsibility to make sure your rights are protected. They must help your family to protect your rights and create an environment where you can grow and reach your potential.

Article 5
Your family has the responsibility to help you learn to exercise your rights, and to ensure that your rights are protected.

Article 6
You have the right to be alive.

Article 7
You have the right to a name, and this should be officially recognized by the government. You have the right to a nationality (to belong to a country).

Article 8
You have the right to an identity an official record of who you are. No one should take this away from you.

Article 9
You have the right to live with your parent(s), unless it is bad for you. You have the right to live with a family who cares for you.

Article 10
If you live in a different country than your parents do, you have the right to be together in the same place.

Article 11
You have the right to be protected from kidnapping.

Article 12
You have the right to give your opinion, and for adults to listen and take it seriously.

Article 13
You have the right to find out things and share what you think with others, by talking, drawing, writing or in any other way unless it harms or offends other people.

Article 14
You have the right to choose your own religion and beliefs. Your parents should help you decide what is right and wrong, and what is best for you.

Article 15
You have the right to choose your own friends and join or set up groups, as long as it isn't harmful to others.

Article 16
You have the right to privacy.

Article 17
You have the right to get information that is important to your wellbeing, from radio, newspapers, books, computers and other sources. Adults should make sure that the information you are getting is not harmful, and help you find and understand the information you need.

Article 18
You have the right to be raised by your parent(s) if possible.

Article 19
You have the right to be protected from being hurt and mistreated, in body or mind.

Article 20
You have the right to special care and help if you cannot live with your parents.

Article 21
You have the right to care and protection if you are adopted or in foster care.

Article 22
You have the right to special protection and help if you are a refugee (if you have been forced to leave your home and live in another country), as well as all the rights in this Convention.

Article 23
You have the right to special education and care if you have a disability, as well as all the rights in this Convention, so that you can live a full life.

Article 24
You have the right to the best health care possible, safe water to drink, nutritious food, a clean and safe environment, and information to help you stay well.

Article 25
If you live in care or in other situations away from home, you have the right to have these living arrangements looked at regularly to see if they are the most appropriate.

Article 26
You have the right to help from the government if you are poor or in need.

Article 27
You have the right to food, clothing, a safe place to live and to have your basic needs met. You should not be disadvantaged so that you can't do many of the things other kids can do.

Article 28
You have the right to a good quality education. You should be encouraged to go to school to the highest level you can.

Article 29
Your education should help you use and develop your talents and abilities. It should also help you learn to live peacefully, protect the environment and respect other people.

Article 30
You have the right to practice your own culture, language and religion or any you choose. Minority and indigenous groups need special protection of this right.

Article 31
You have the right to play and rest.

Article 32
You have the right to protection from work that harms you, and is bad for your health and education. If you work, you have the right to be safe and paid fairly.

Article 33
You have the right to protection from harmful drugs and from the drug trade.

Article 34
You have the right to be free from sexual abuse.

Article 35
No one is allowed to kidnap or sell you.

Article 36
You have the right to protection from any kind of exploitation (being taken advantage of).

Article 37
No one is allowed to punish you in a cruel or harmful way.

Article 38
You have the right to protection and freedom from war. Children under 15 cannot be forced to go into the army or take part in war.

Article 39
You have the right to help if you've been hurt, neglected or badly treated.

Article 40
You have the right to legal help and fair treatment in the justice system that respects your rights.

Article 41
If the laws of your country provide better protection of your rights than the articles in this Convention, those laws should apply.

Article 42
You have the right to know your rights! Adults should know about these rights and help you learn about them, too.

Articles 43 to 54
These articles explain how governments and international organizations like UNICEF will work to ensure that the rights of children are protected.

Source: UN Convention on the Rights of the Child, Child-Friendly version, UNICEF website.
Available from: **www.unicef.ca/portal/SmartDefault.aspx?at=1451.**

To access the complete version of the UNCRC and/or to learn more about the UN Convention on the Rights of the Child, visit **http://www.unicef.org/crc/.**

APPENDIX E

CULMINATING TASK RUBRIC

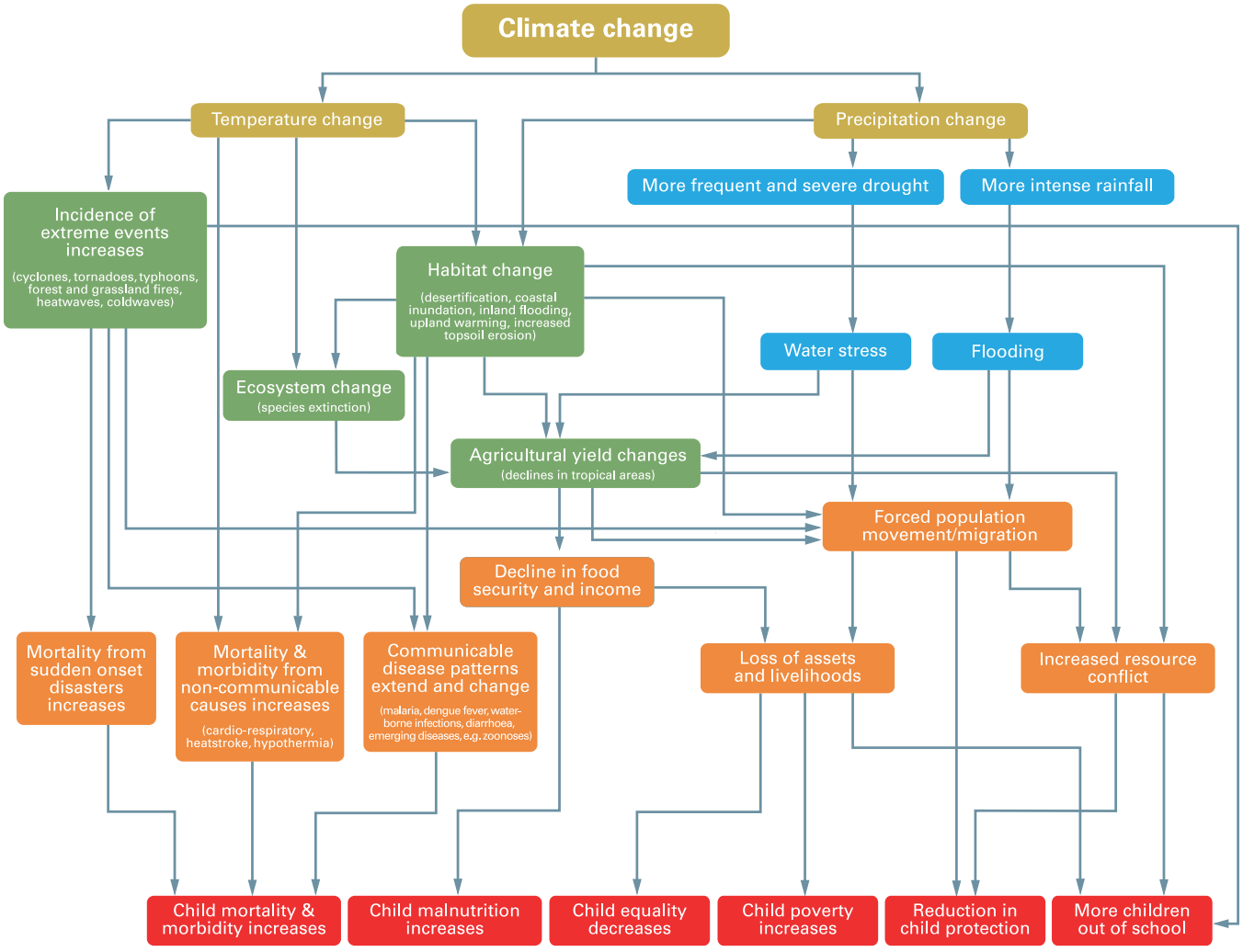
Name: _____ Date: _____

Expectations	Level 4	Level 3	Level 2	Level 1
KNOWLEDGE/ UNDERSTANDING Demonstrates a thorough understanding of the issues raised connecting climate change to children and provides an explanation of why it is a concern	Demonstrates a high degree of understanding of the issues raised connecting climate change to children and provides a thorough explanation of why it is a concern	Demonstrates considerable understanding of the issues raised connecting climate change to children and provides considerable explanation of why it is a concern	Demonstrates some understanding of the issues raised connecting climate change to children and provides some explanation of why it is a concern	Demonstrates limited understanding of the issues raised connecting climate change to children and provides a limited explanation of why it is a concern
THINKING/ INQUIRY Uses planning skills to generate ideas and gather information on issues raised connecting climate change to children	Uses planning skills with a high degree of effectiveness	Uses planning skills with considerable effectiveness	Uses planning skills with some effectiveness	Uses planning skills with limited effectiveness
COMMUNICATION Expresses ideas, perspective and recommendations on issues raised connecting climate change to children in oral, visual and written formats Uses clear language and presents point of view effectively, using an appropriate style and tone for the specific audience	Expresses ideas, perspective and recommendations with a high degree of effectiveness Uses clear language, point of view, style and tone with a high degree of effectiveness	Expresses ideas, perspective and recommendations with considerable effectiveness Uses clear language, point of view, style and tone with considerable effectiveness	Expresses ideas, perspective and recommendations with some effectiveness Uses clear language, point of view, style and tone with some effectiveness	Expresses ideas, perspective and recommendations with limited effectiveness Uses clear language, point of view, style and tone with limited effectiveness
APPLICATION Makes connections between personal and local concerns and global issues related to climate change and children	Makes connections between personal and local concerns and global issues with a high degree of effectiveness	Makes connections between personal and local concerns and global issues with considerable effectiveness	Makes connections between personal and local concerns and global issues with some effectiveness	Makes connections between personal and local concerns and global issues with limited effectiveness

Adapted from: Ministry of Education, The Ontario Curriculum.

APPENDIX F

HOW CLIMATE CHANGE AFFECTS CHILDREN



APPENDIX G

REFLECT AND ACT

Take 10 minutes and reflect on lessons learned.

REFLECT Theme: _____	
What did you LEARN?	
What issue GOT to you?	
What are you going to do NOW?	

ACT What actions can you take to be part of the solution?	
YOU	
YOUR SCHOOL	
YOUR COMMUNITY	
YOUR PLANET	

APPENDIX H

MILLENNIUM DEVELOPMENT GOALS

In 2000 the largest gathering of world leaders in history met for the Millennium Summit at United Nations headquarters in New York. The nations met to discuss how increased globalization promises better living for some countries, but means increased poverty, conflict, health concerns and a degraded environment for others. Collectively, the nations present at the summit drafted the **Millennium Development Goals** (MDG), which act as a blueprint for future actions.

Climate change has added a challenge to meeting the plan set out by the Millennium Development Goals (MDG). These goals aim to improve the wellbeing of everyone on the planet by committing to end poverty, improve the health of children and their families and by ensuring the sustainability of the planet. Here is how the MDGs are linked directly to climate change:

Millennium Development Goals	Examples of Links to the Environment
1. Eradicate extreme poverty and hunger	Livelihood strategies and food security of the poor often depend directly on healthy ecosystems and the diversity of goods and ecological services they provide.
2. Achieve universal primary education	Time spent collecting water and fuel wood by children, especially girls, can reduce time at school. Better lighting allows children to study outside of daylight hours and without putting their eyesight at risk.
3. Promote gender equality to empower women	Poor women are especially exposed to indoor air pollution and the burden of collecting fuel wood, and have unequal access to land, energy and other natural resources.
4. Reduce child mortality	Each year, more than 4 million children under the age of five die due to preventable environment-related disease. More than one-third of the global disease burden can be attributed to environmental factors falling on children below five years of age, who account for only about 10% of the world's population.
5. Improve maternal health	Indoor air pollution and carrying heavy loads of water and fuel wood adversely affect women's health and can make women less fit for childbirth and at greater risk of complications during pregnancy.
6. Combat HIV/AIDS, malaria and other major diseases	Over 24% of the total burden of diseases worldwide are associated with environmental risk factors and preventive environmental health measures are as important and at times more cost-effective than health treatments. Evidence now indicates that diminished immune systems caused by water-related intestinal worm infections, contribute to the HIV/AIDS pandemic.
7. Ensure environmental sustainability	Current trends in environmental degradation must be reversed in order to sustain the health and productivity of the world's ecosystem. The reliance on fuel wood can put considerable pressure on forests, particularly in areas where biomass is scarce and the demand for wood outweighs natural re-growth. Depending on the environmental context, deforestation is a driving force for **land degradation** and desertification.

Source: DFID/EC/UNDP/World Bank (2002), Linking Poverty Reduction and Environmental Management: Policy Challenges and Opportunities. Washington: The World Bank, p.11. Updated, WHO data, 2006 by UNICEF

To learn about the MDGs and to follow the progress to reach the goals, visit:
http://www.un.org/millenniumgoals/bkgd.shtml
http://www.unicef.org/mdg/.

APPENDIX I

CURRICULUM LINKS FOR ALBERTA, SASKATCHEWAN, MANITOBA, QUEBEC AND ATLANTIC CANADA

ALBERTA

Grade/Subject	Expectations	Related Themes
Grade 9 Science Unit A: Biological Diversity	Investigate and interpret diversity among species and within species, and describe how diversity contributes to species survival. • identify the role of variation in species survival under changing environment conditions. Identify impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making. • describe ongoing changes in biological diversity through extinction and extirpation of native species, and investigate the role of environmental factors in causing these changes. • investigate and describe the use of biotechnology in environmental, agricultural or forest management; and identify impacts and issues.	Natural Disasters Natural Environment
Grade 9 Science Unit C : Environmental Chemistry	Investigate and describe, in general terms, the role of different substances in the environment in supporting or harming humans or other living things. • Describe and illustrate processes by which chemicals are introduced to the environment or their concentrations are changed. • Identify questions that may need to be addressed in deciding what substances – in what amounts – can be released safety into the environment. Identify processes for measuring the quantity of different substances in the environment and for monitoring air and water quality. • Identify chemical factors in an environment that might affect the health and distribution of living things in that environment. Analyze and evaluate mechanism affecting the distribution of potentially harmful substances within the environment. • Investigate and evaluate potential risks resulting from consumer practices and industrial processes, and identify processes used in providing information and setting standards to manage these risks. • Identify and evaluate information and evidence related to an issue in which environmental chemistry plays a major role.	Health Natural Environment Water
Grade 9 Science Unit D: Electrical Principles and Technology	Describe and discuss the societal and environmental implications of the use of electrical energy. • Identify and evaluate alternative sources of electrical energy, including oil, gas, coal, biomass, wind, waves. • Describe the by-products of electrical generation and their impacts on the environment.	Energy Natural Environment

ALBERTA

Grade/Subject	Expectations	Related Themes
	• Identify concerns regarding conservation of energy resources, and evaluate means for improving the sustainability of energy use. **Attitude Outcome** Demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment.	
Science 10 **Unit D: Energy Flow in Global System**	Describe how the relationship among input solar energy, output terrestrial energy and energy flow within the biosphere affect the lives of humans and other species. • Explain how climate affects the lives of people and other species, and explain the need to investigate climate change. Relate climate to the characteristics of the world's major biomes, and compare biomes in different regions of the world. • Identify the potential effects of climate change on environmentally sensitive biomes. Investigate and interpret the role of environmental factors on global energy transfer and climate change. **Attitude Outcome** Demonstrate sensibility and responsibility. In pursuing a balance between the needs of humans and a sustainable environment.	Natural Disasters Health Natural Environment Energy
Science 20	**General Attitude Outcomes Science 20** Demonstrate sensibility and responsibility in pursuing a balance between the needs of humans and a sustainable environment. • Assume part of the collective responsibility for the impact of humans in the environment. • Encourage their peers and members of their communities to participate in a project related to sustainability. • Participate in the social and political systems that influence environmental policy in their community. • Promote actions that are not injurious for the environment.	Natural Environment
Unit D: Changes in living Systems	Explain that society and technology have both intended and unintended consequences for humans and the environment. • Assess habitat loss and the responsibility of society to protect the environment for future generations. • Discuss in terms of scientific principles how reforestation projects change the direction of secondary succession in a natural ecosystem.	Natural Environment

ALBERTA

Grade/Subject	Expectations	Related Themes
Science 20 **Unit D: Changes in Living Systems**	Explain that science and technology are developed to meet societal needs and expand human capabilities. • Contrast the diet of people in developing countries and that of people in developed countries in terms of energy efficiency and environment impact, and describe ways to address potential food shortage in the future.	Food Health
Science 20 **Unit D: Changes in Living Systems**	Explain that science and technology have both intended and unintended consequences for humans and the environment. • Discuss the use of water by society, the impact such use has on water quality and quantity in ecosystems, and the need for water purification and conservation, considering such things as manufacturing, the oil industry, agricultural systems, the mining industry and domestic water consumption.	Water
Science 14 **Unit D: Investigating Matter and Energy in the Environment**	Describe how the flow of matter in the biosphere is cyclical along characteristics pathways and can be disrupted by human activity. Analyze a local ecosystem in terms of its biotic and abiotic components, and describe factors of the equilibrium.	Water Energy Natural Disasters Natural Environment
Science 24 **Unit C: Disease Defense and Human Health**	Describe how human health is affected by societal and environmental factors, and describe the need for action by society to improve human health. • Describe how human diseases may arise from an interaction of variables, including poor nutrition, stress, pathogen and environmental contamination. • Analyze the relationship between social conditions and disease.	Health
Biology 20 **Unit A: Energy and Matter Exchange in the Biosphere**	Explain that science and technology have both intended and unintended consequences for humans and the environment. • Discuss the use of water by society, the impact such use has on water quality and quantity in ecosystems, and the need for water purification and conservation.	Water
Biology 20 **Unit A: energy and Matter Exchange in the Biosphere**	Explain that science and technology have both intended and unintended consequences for humans and the environment. • Describe how human activities can have a disrupting influence on the balance in the biosphere of phosynthetic and cellular respiratory activities: fossil fuel combustion, depletion of strathospheric ozone, forest destruction.	Natural Environment Natural Disasters
Social Studies 20 **Theme III: Quality of Life**	Quality of life is increasingly affected by issues of global concern. • Choose several examples and study their impact on human populations, deforestation, desertification, pollution, greenhouse effect. There are issues of common global concern.	Natural Disasters Natural Environment

ALBERTA

Grade/Subject	Expectations	Related Themes
Social Studies 20 **Theme IV** **Alternative Futures: Possibilities for Change**	• Study at least one issue of global concern in the following areas: food sources and distribution; energy sources, spread of disease. There are potential solutions to global concerns.	Health Food Energy
Environmental and Outdoor Education **JH** **Environmental Core**	• Students will develop lifestyle strategies that foster contact with the natural world, encourage responsibility for global and local environment and encourage living in harmony with others. Students will demonstrate the understanding that environments change over time, by identifying and describing examples of the following concepts: • Students will recognize changes that result from human use of environments, including: changes due to individual and group activity in the environment, changes that resut from extraction or harvesting of natural resources, changes that resut from addition of materials to the environments.	Natural Disasters Natural Environment

MANITOBA

Grade/Subject	Expectations	Related Themes
Senior 4: World Geography – A Human Perspective (Grade 12) Unit 3: World Food Supply: Production and Distribution	Unit III is designed for students to understand World Food Supply: Production and Distribution (4 weeks)	Food Security
Senior 2 Science (Grade 10) Unit 1: Dynamics of Ecosystems	S-0-2c-3b, 5c, 9c Students will understand the bioaccumulation of toxins and the harmful effects on consumers, both past and present.	Health Natural Environment
Senior 4 Biology 40S (Grade 12)	S4B-0-P4 Recognize that humans have impacted and continue to impact the environment.	Natural Disasters
Senior 2: Science (Grade 10) Cluster 4: Weather Dynamics	S-04-08: S will discuss potential consequences of climate change.	Natural Environment
Senior 4: World Issues (Grade 12) Unit 5: The World of the Future	Unit V is designed to help students speculate about the future if current trends continue.	Water
Senior 2: North America – A Geographic Perspective (Grade 10) Unit 8: Canadian, Continental and World Issues (Integrated)	To help students explore and better understand the following ideas: • interrelationship and interdependence of local, Canadian, Continental, and world issues.	Natural Environment
Senior 4: World Geography (Grade 12) Unit 4: World Resources, Energy, and Environment (4 weeks)	The major goals of the Senior 4 World Geography curriculum are to help students explore and better understand the following ideas with reference to a world view: population characteristics, distribution, growth, and challenges; environmental management and protection, and economic growth in the context of sustainable development.	Energy

SASKATCHEWAN

Grade/Subject	Expectations	Related Themes
History 20 (Grade 11) Unit Five: Global Issues	Consumption levels of the Industrialized Developed Nations Know that the consumption of energy per person in developed nations is more than 80 times greater than the consumption of citizens of the Sub-Saharan nations.	Food Security
Social Studies 20: World Issues (Grade 11) Unit Two – Population	Students will know how to determine both human Fertility Rate and the Death Rate of a country and understand their significance.	Health
History 20 (Grade 11) Unit Five: Global Issues	Arrogance of Humanism Perspective: Students will know that proponents of this perspective maintain that humans did not create and do not understand nature and have placed nature in jeopardy.	Natural Disasters
History 20 (Grade 11) Unit Five: Global Issues	Understand how the nature of the relationship between humans and their environment could define the nature and quality of human life in the future.	Natural Environment
Biology 20 Unit 2: Ecological Organization	During the course of this inspection, students will see how Saskatchewan is a part of the larger global ecosystem, and how diverse the life, and life-support system, in the province really is. Points to be stressed are that the quality soil, air, and water provide the basis for healthy life and that human action has a disproportionately large effect on populations and ecosystems.	Water
Physics 30 (Grade 12) Core Unit III: Electricity D. Electric Power and Energy	Identify the impact each main method used to produce electricity has on the environment.	Energy

QUEBEC CURRICULUM CONNECTIONS TO CLIMATE CHANGE

Secondary School Education, Cycle One

Social Sciences : Geography

COMPETENCY 1: *Understands the organization of a territory:* Grasps the meaning of human actions with regard to the territory, relates different geographic scales, uses cartographic language. The student identifies relevant elements of the organization of the territory by ensuring that they relate to the type of territory concerned correspond to the designated focus, are characteristic of the organization of the territory. The student represents his/her construction of the organization of the territory coherently by highlighting: connections among elements of the organization of the territory, connections among concepts, relationships between human actions and the organization of the territory. The student considers the organization of the territory as a whole by using scales of analysis appropriately to highlight: new phenomena and external influences.

COMPETENCY 2: *Interprets a territorial issue:* Describes the complexity of the territorial issue. The student cites elements that are relevant to the territorial issue by referring to: exact and specific elements, appropriate concepts. The student describes the dynamics of the territorial issue by showing: how the basic elements of the issue interact, connections between the concepts, power struggles. The student expresses a well-founded opinion when it is based on: several points of view, the relation among several scales of analysis, consideration of the consequences of the proposals for the territory consideration of individual and collective interests.

COMPETENCY 3: *Constructs his/her consciousness of global citizenship:* Evaluates solutions to global issues, Examines human actions in terms of the future to be able to considers the impact of human actions on the future of the planet by taking into account the consistency of these human actions with their underlying values, the relationship between these human actions and sustainable development the need for concerted action to solve global problems, the contribution of international rules, conventions and organizations The student defends his/her opinion by basing it on the effectiveness of the solutions proposed.

Social Sciences – History and Citizenship Education

COMPETENCY 1: *Examines social phenomena from a historical perspective.* Contemplates the past of social phenomena, Considers social phenomena in terms of duration. Looks at social phenomena in their complexity.

COMPETENCY 2: *Interprets social phenomena using the historical method.* Establishes the factual basis of social phenomena, explains social phenomena, puts his/her interpretation of social phenomena in perspective

COMPETENCY 3: *Constructs his/her consciousness of citizenship through the study of history.*

Languages – Secondary English Language Arts

COMPETENCY 1: *Uses language/talk to communicate and to learn.* Interacts with peers and teachers in specific learning contexts. Explores the social practices of the classroom and community in specific contexts.

Secondary School Education, Cycle Two

Social Sciences: Contemporary Economic Environment

COMPETENCY 1: *Interprets a problem of the contemporary world.* To encircle the problem, to analyze the problem, to envisage the problem in its entirety, to carry a glance criticizes on its approach. From the point

of view of the rigor of the reasoning, the student: leans on facts bound to the problem; puts in relation of the facts in the explanation of the problem, use concepts in a appropriate way. From the point of view of the precision of the overview, the student: puts in relation of the constituent elements of the problem; find resemblances and differences in the manners the problem of which shows itself in the world, kick away world tendencies.

COMPETENCY 2: *Take position on a stake in the contemporary world.* Examine points of view relative to the stakes. The student: establishes connections between the points of view of the actors, their interests and their values.

Languages : Secondary English Language Arts

COMPETENCY 1: *Uses language/talk to communicate and to learn.* Interacts with peers and teacher in specific contexts.

ATLANTIC CANADA

Grade/Subject	Expectations	Related Themes
Grade 9 **Atlantic Canada and the Global Village** **Unit 1: Physical Setting**	Link human activity to the natural resources of the Atlantic region. Students will be expected to research the issue of sustainability in one resource industry and suggest the steps that are necessary to achieve this. (1.4.9)	Natural resources (Fishery/Farming/ Forestry) Sustainable Development
Grade 9 **Atlantic Canada and the Global Village** **Unit 4: Technology**	Analyse the effect of technology on resource industries in Atlantic Canada Students will be expected to evaluate the environmental effects of technology in the resource Industries. (4.6.6)	Water (dams); Tree and potato harvesting
Grade 9 **Atlantic Canada** **And the Global Village** **Unit 5: Interdependence**	Examine and analyse how Atlantic Canadians are members of the global community through different interconnected systems. Demonstrate an understanding that global interdependence and technological change affect sustainable living and cultural understanding. Students will be expected to discuss an environmental issue that impacts directly on Atlantic Canada and the global village. (5.2.6)	Global warming; Global Village and Natural disasters
Grade 10 Science **Unit 1: Sustainability of Ecosystems**	Explain how a paradigm shift can change scientific world views in understanding sustainability. Students will be expected to: • explain how biodiversity of an eco-system contributes to its sustainability; (318-6) • plan changes to, predict the effects of, and analyse the impact of external factors on an ecosystem. (331-6; 213-8; 212-4) Attitude Outcome Statement: Students will be expected to: • have a sense of personal and shared responsibility for maintaining a sustainable environment; • project the personal, social, and environmental consequences of proposed action; • want to take action for maintaining a sustainable environment.	Human impact; industrialization; urbanisation

ATLANTIC CANADA

Grade/Subject	Expectations	Related Themes
Grade 11 Biology **Unit 2: Biodiversity**	Analyse how individuals, society, and the environment are inter-dependent with scientific and technological endeavours. (117) Evaluate social issues related to the applications and limitations of science and technology, and explain decision in terms of advantages and disadvantages for sustainability, considering a variety of perspectives. (118) Evaluate relationships that affect the biodiversity and sustainability of life within the biosphere. (318) Students will be expected to: • debate the merits of funding specific scientific or technological endeavours and not others; (117-4) • provide examples of how science and technology are an integral part of their lives and their community; (117-5) • propose courses of action on social issues related to science and technology, taking into account an array of perspective, including that of sustainability; (118-10) • evaluate Earth's carrying capacity, considering human population growth and its demands on natural resources. (318-10) Attitude Outcome: Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.	Ecosystems; Global Resources

ATLANTIC CANADA

Grade/Subject	Expectations	Related Themes
Grade 12 **Global Geography** **All units**	Acknowledge that individually and collectively each person makes choices that have an impact upon the natural environment, locally and globally.	Gaia Hypothesis; plant and animal species decline; deforestation; desertification; natural disasters; climate change
	Recognize, examine, and explain changing world conditions, and to identify and discuss emerging global trends.	Greenhouse effect; ozone depletion; acid rain; management of resources; pollution
Unit 1: Our Fragile Planet	Students will be expected to appreciate the potential of critical situations facing the planet.	
Unit 2: Perilous Processes: Our Planet at Risk	Students will be expected to recognize human-made perils and that these create problems that threaten the capability of our planet to sustain life.	
Unit 5: Global Resources: The Good Earth	Students will be expected to examine methods of managing consumption that enhance the conservation and preservation of renewable and non-renewable resources.	
Unit 6: Global Factory: For Whose Benefit?	Students will be expected to explain the evolving pattern of industrialization, global inequalities of production, consumption, and wealth, and their combined impact on the environment.	
Unit 8: The Future Planet: Under New Management	Students will be expected to reflect upon previous learnings in this and other courses in order to identify resources and processes that help us to understand the biosphere, humanity's role as part of it, and our responsibility to protect it.	
Grade 12 **Global History** **Unit 5: Acknowledging Global Interdependence: The Legacy of the 20th Century**	Students will be expected to: • analyse and discuss the concept of global interdependence; • assess their own roles, responsibilities, and commitments in an interdependent world.	