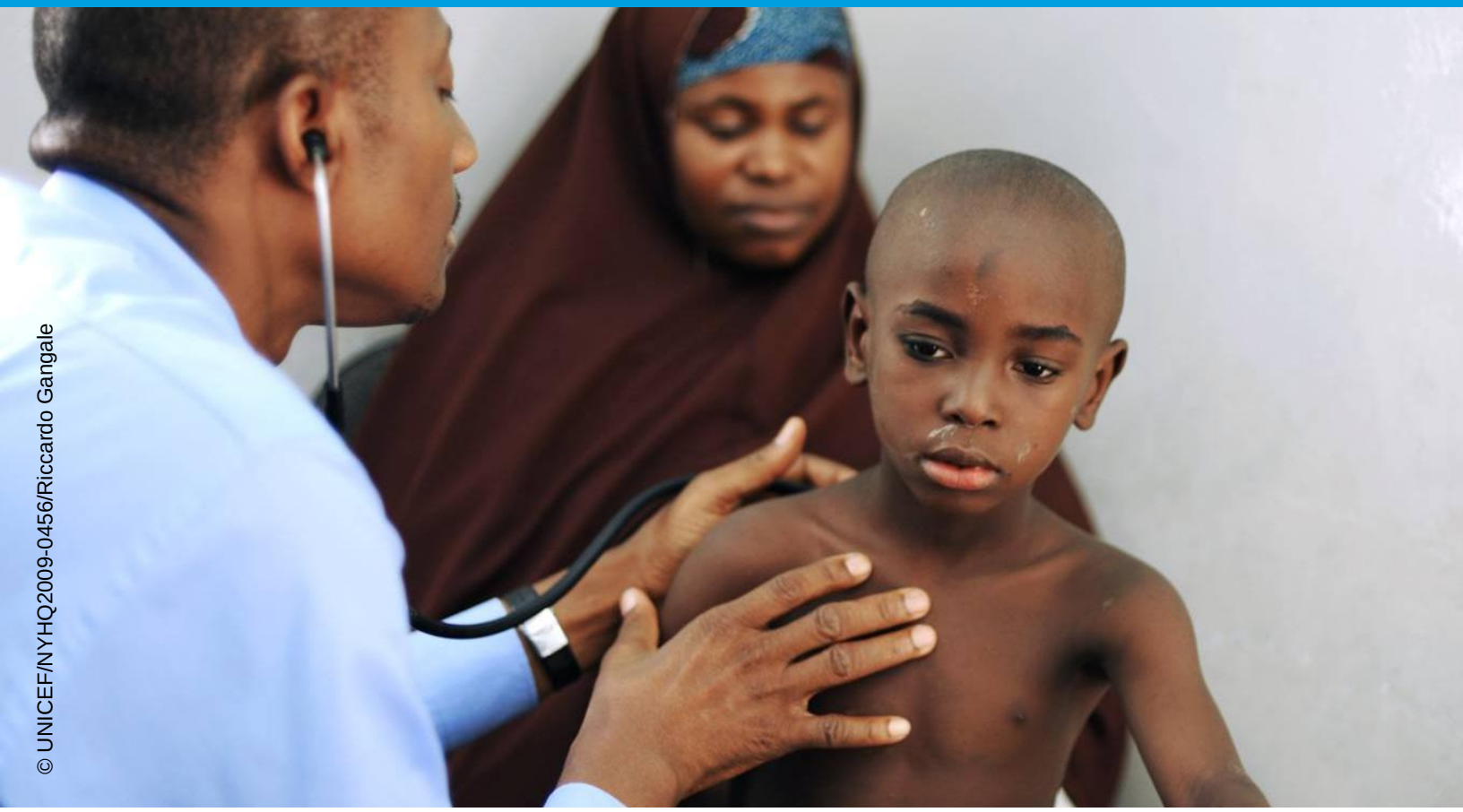
HEALTH



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 G and H: Curriculum Links on pages 142 and 146, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec.

Province	Course	Expectation/Learning Outcome
Ontario	SVN3M Environmental Science, Grade 1 , 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 E: Reflect and Act (page 139)

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://www.unicef.ca/en/teachers/article/climate-change-and-children%E2%80%99s-rights

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 E: Reflect and Act on page 139 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 #10, 11: 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 #10, 11: Information Sheets on Meningitis Belt and Cholera Outbreak (pages 56 and 57) 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 #12: Malaria Numbers
- You Tube clips and media set up: http://www.youtube.com/watch?v=IVbq2yQH52g

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 53 and 54, 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 #12: Malaria Numbers (page 58) 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. https://www.youtube.com/watch?v=dGbgye4soSQ (Note: this clip is Part 1 of a series of helpful videos. Check them all out for more information about malaria).

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. They can start by researching how international development organizations are currently working to stop the spread of malaria.

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?

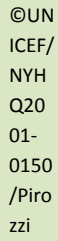
West Nile is transmitted from a bite from a mosquito that has fed on the blood of an infected bird; malaria is transmitted from a bite from a mosquito that has fed on the blood of an infected person. The death toll for each is quite a different picture; 10 Canadians died of West Nile in 2003[3] whereas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

YOUTH TAKE ACTION

Challenge for Change!

Distribute Student Handout #9: Youth Take Action (page 55) 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 C: Culminating Task Rubric (page 137).

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:

Impacts of malnutrition in children, due to food shortages are:

- High mortality rates
- Stunted growth
- Development leading to other health issues.

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]

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]

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/Latest/Publications/Climate-change-food-systems-and-children-a-case-for-greater-action-/

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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 #9

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.

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.uk/UNICEFs-Work/What-we-do/Issues-we-work-on/Climate-change/.

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 You Tube 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 #10

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.

Information Sheet 1
UNICEF AND PARTNERS PREPARE FOR MENINGITIS OUTBREAKS

The Global Alliance for Vaccines and Immunisation (GAVI) gave 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 #11

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.

Information Sheet 2
CHOLERA OUTBREAK IN SOUTHERN AFRICA

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 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 #12

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 NUMBERS

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

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 #13

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 NUMBERS
ANSWER KEY

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

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!