



CLIMATE CHANGE and HEALTH

Grade 5



A project by:



With support from:



Learning Expectations

Health and Physical Education Curriculum Strand: Active Living

Overall Expectations:

A3. Safety

Demonstrate responsibility for their own safety and the safety of others as they participate in physical activities.

Specific Expectations:

A3. Safety

A3.2 Demonstrate an understanding of proactive measures that should be taken to minimize environmental health risks that may interfere with their safe participation in and enjoyment of outdoor physical activities (*e.g., drinking fluids to avoid dehydration, before, during, and after vigorous activities; applying sunscreen and wearing a hat and sunglasses to protect the skin and eyes from sun damage; checking weather reports for the humidex, wind chill, air quality index, and UV index to determine what preparations may be needed to be safe and comfortable outdoors; bringing inhalers and epinephrine autoinjectors if needed; reading warning signs posted in recreational areas*) [PS, CT]

Science and Technology Curriculum Strand: Understanding Life Systems

Overall Expectations:

1. Analyse the impact of human activities and technological innovations on human health.

Specific Expectations:

1. Relating Science and Technology to Society and the Environment

1.1 Assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful effects of these factors and take advantage of those that are beneficial.

Learning Goal

Students will identify climate change as a factor influencing health. Students will learn how to maximize their health and safety by adapting behaviours to the changing climate.

Success Criteria:

- ✓ Students can define climate change.
- ✓ Students can list the causes of climate change.
- ✓ Students can identify ways to protect health against Lyme disease, air pollution, extreme heat, and ultraviolet radiation.
- ✓ Students can interpret the Air Quality Health Index (AQHI).
- ✓ Students can identify items that should be included in an Emergency Preparedness Kit.
- ✓ Students can plan outdoor activities that protect their health, and minimize climate change health risks.

Lesson Outline

Topic	Activity	Materials	Time
Introduction			5 minutes
Climate Change and Health	Bazinga Game*	<ul style="list-style-type: none">• Bazinga board and cards• Team cards• Trivia cards• Climate Change and Health Power Point presentation	20 minutes
Emergency Preparedness Kit	Building a Kit	<ul style="list-style-type: none">• Kit materials	10 minutes
Conclusion	Review Questions		5 minutes
Optional Active Learning	Beautiful Earth	<ul style="list-style-type: none">• Earth list• Earth cards	10 minutes

Preparation Checklist

- ✓ Review the lesson plan, glossary, and the teacher resource booklet, *Climate Change and Health*.
- ✓ Set up Bazinga game board; have trivia cards, team cards, and Power Point presentation ready.
- ✓ Have emergency preparedness bag available (if using).
- ✓ Post Earth cards at front of classroom or on four walls and have Earth list available (if using).

* This game has been adapted from <http://simplifyingradicals2.blogspot.ca/2012/05/bazinga.html> and Jasmine McClain of <http://buzzthreetimes.blogspot.ca>

Introduction (5 minutes)

(slide 1)

In today's presentation we will learn about how climate change affects our health. We will also learn how we can protect our health from the effects of climate change.

Explain to students that the information is not meant to scare them, but rather to help them come up with solutions so that they can be safe and healthy.

Ask students: *What is climate change?*

Explain: (slide 2)

- Describes big changes in weather patterns around the world. Changes include:
 - temperature,
 - changes in rainfall patterns (more or less rain),
 - more severe storms (blizzards, hurricanes, tornadoes, etc.),
 - heat waves,
 - and changes in wind patterns.¹

Ask Students: *What causes climate change?*

Explain: (slide 3)

- Although there are some natural causes of climate change (e.g. volcano eruptions and changes in heat from the sun), humans are the main cause of the climate change.²
- When we burn fossil fuels like coal, oil, and gas to make electricity and power our cars, carbon dioxide and other greenhouse gases are released into the atmosphere.
- Greenhouse gases warm the Earth by trapping heat from the sun like a blanket. This is called the "greenhouse effect."
- Trees and plants use carbon dioxide to make their own food. Cutting down trees also contributes to climate change because less carbon dioxide is being removed from the air.¹

- Note: Greenhouse gases can occur naturally in the atmosphere. Without greenhouse gases the earth would be too cold for humans, plants, and animals to survive. The problem is that humans are releasing so much greenhouse gases that too much heat is being trapped. This is leading to global warming and climate change.

(slide 4)



Briefly introduce health impacts of climate change

Air Pollution and Climate Change (slide 5)

- Climate change is causing temperatures to increase, and stronger rays of sunlight to reach the Earth's surface.
- This can make air pollution worse because heat and sunlight mix with gases from cars and factories to make ground-level ozone. Unlike the ozone layer that protects the Earth, ground level ozone is a type of bad air pollution.
- Air pollution can:
 - make your eyes itchy,
 - make your nose and throat feel sore,
 - make it hard to breathe,
 - trigger asthma attacks and allergies, and
 - lead to serious heart and lung problems.^{3,4}



Extreme Heat and Climate Change (slide 6)

- With climate change, we will experience more very hot days, and heat waves.
- Extreme heat can cause your body to get too hot. This can lead to:
 - nausea and vomiting,
 - headaches,
 - muscle cramps,
 - dizziness or fainting,
 - dehydration,
 - and even death.



Disease and Climate Change (slide 7)

- More rain and warm temperatures helps bugs, like ticks and mosquitoes, to survive longer throughout the year and to move to new areas that were once too cold for them.⁵
- This can lead to diseases being spread because some ticks and mosquitoes can carry germs that can make us sick.
- These germs can get passed to us if the bugs bite us.
- Lyme disease is an illness caused by a germ (bacteria) carried by deer ticks.
- Deer ticks are very common in our area, especially in grassy and wooded areas, so it is important to be aware of Lyme disease.



Bazinga Game (20 minutes)

This trivia style game allows students an opportunity to further their knowledge and understanding of climate change and health in a fun, interactive manner.

Objectives:

- Students will learn about the impacts that climate change can have on health.
- Students will understand proactive measures that can be taken to protect health.
- Students will work cooperatively with their peers.

Materials:

- Bazinga game board
- 27 Bazinga game cards
- Team cards (if playing with 3 or more teams)
- Trivia cards (30 questions in total)



Instructions:

1. Set up the Bazinga board, placing three Bazinga game cards in each of the nine pockets.
2. Divide students into teams; between 2 to 6 teams, depending on your preference and class size.
3. Draw a scoreboard on the blackboard to keep track of the score.
4. Each team will begin the game with 5 points.
5. Begin the game by asking the first team a question from the trivia cards.
6. If a team answers correctly, they earn 1 point, and draw a Bazinga card from any of the numbered pockets on the Bazinga board.
7. The team must then follow the instructions displayed on the card. The card is then returned to the pocket.
8. If a Bazinga card is drawn which indicates exchanging or deducting points from another team, have students draw a card from the “team cards” provided, to determine which team is chosen.
9. If a team answers a trivia question incorrectly, they do not receive a point and do not draw a card from the Bazinga board.
10. The team with the most points at the end of the game wins.

Cards:

- (3) Erase one point from all other teams.
- (3) Double your score.
- (3) Take away two points from another team and give them to your team.
- (6) Add two points to your score.
- (3) Erase two points from another team
- (2) Switch points with another team.**
- (1) Team with the least points must do 10 jumping jacks.
- (1) Team with the most points must do 10 jumping jacks.
- (1) Team with the least points must stand on one leg for 10 seconds.
- (1) Team with the most points must stand on one leg for 10 seconds.
- (1) Team with the least points must do 5 frog hops on the spot.
- (1) Team with the most points must do 5 frog hops on the spot.
- (1) Bazinga! Take all of one team’s points!

Trivia Questions (Teacher Reference)

General Questions:

1. True or False: *Human activity is making the earth warmer.*

Answer: True. Activities such as driving a car, turning on lights, and using the furnace or air conditioner, contribute to greenhouse gas pollution. The buildup of greenhouse gases traps heat, causing the Earth's temperature to increase. This is known as global warming, and it is one part of climate change.^{6,7}

2. True or False: *Driving less will improve our health and will help to reduce climate change.*

Answer: True. Driving less helps to reduce greenhouse gases.⁷⁻⁹ Walking or biking, instead of driving also improves physical fitness.⁹

3. Question: *Besides driving less, name two other things we can do to decrease the effects of climate change.*

Answer: Turning off the lights in a room, turning down the air conditioner in the summer, and the heat in the winter, recycling, planting trees, unplugging electronics, etc.

Climate Change and Disease:

1. True or False: *Climate change can allow diseases to spread.*

Answer: True. Climate changes like increased rain and warm temperatures can allow bugs that carry germs, like mosquitoes and ticks, to live longer and to move to areas that were once too cold for them, helping them to spread diseases.⁵

2. True or False: *Both ticks and mosquitoes carry a disease called Lyme disease.*

Answer: False. Only ticks carry the germ (bacteria) that causes Lyme disease. In our area, about 1 in 5 ticks have these bacteria.

3. True or False: *Lyme disease is contagious (contagious means you can catch it from someone else).*

Answer: False. You cannot "catch" Lyme disease from someone else. You can only get Lyme disease if you are bitten by a tick that has the Lyme disease bacteria.

4. Question: When are you more likely to be exposed to a tick that carries Lyme disease?

- A) On a hike.
- B) Swimming in a lake or river.

Answer: A. On a hike. You are more likely to be exposed to Lyme disease when hiking since ticks like to live in grassy and wooded areas. To protect yourself on a hike:

- Wear long sleeves and pants tucked into socks.
- Wear insect repellent.
- Walk in the centre of the trail.
- Check your body for ticks when you come inside.

(Option: show slide 8 of the Climate Change and Health Power Point Presentation.)



5. Question: You find a tick on your leg. You should:

- A) Leave it on until you see a doctor.
- B) Put ice on it.
- C) Have an adult remove it with a pair of tweezers.

Answer: C. Have an adult remove it with tweezers. The longer a tick stays attached to you, the greater the chance it will be able to spread the germs that cause Lyme disease. Having an adult remove the tick as soon as possible can help prevent Lyme disease.

6. Question: What are the early signs and symptoms of Lyme disease?

- A) Itchy hands and feet.
- B) Rash and fever.
- C) Sore throat.

Answer: B. Rash and fever. Lyme disease can cause a rash known as a “bull’s-eye” rash. A person may also get a fever, have body aches, or feel tired.

(Option: show slide 9 of the Climate Change and Health Power Point Presentation.)



7. Question: An adult deer tick is the size of:

- A) A sesame seed.
- B) A house fly.
- C) A sesame seed bun.

Answer: A. A sesame seed. Checking for ticks can be tricky since they are SO small. A baby deer tick, called a nymph, can be even harder to spot since it is only about the size of a poppy seed. You might even mistake one for a speck of dirt or a tiny freckle! So remember to look closely and have an adult help.

(Option: show slide 10 of the Climate Change and Health Power Point Presentation.)



Climate Change and Disease, cont'd:

8. Question: *You are enjoying the outdoors at a cottage, how often should you do a tick check?*

- A) *Never, ticks don't live near cottages.*
- B) *Daily.*
- C) *Once a week.*

Answer: B. Daily. Ticks are not like mosquitoes that bite and then fly away. A biting tick can actually stay on your skin for days without you even feeling it; this is why it is really important to do a daily tick check if you have been in an area where ticks might live.

Climate Change and Air Pollution:

1. True or False: *A warmer climate is better for people with allergies.*

Answer: False. A warmer climate is likely to increase the growth of mold, weeds, grasses, and trees. This may cause problems for people with allergies and/or asthma.⁵

2. Question: *What is the most common name for ground-level ozone pollution?*

- A) *Fog.*
- B) *Smog.*
- C) *Smoke.*

Answer: B. Smog. Smog is like a dirty fog. It is made of ground-level ozone mixed with tiny bits of dust, dirt, smoke, soot, and/or chemicals (particle pollution).^{10, 11}

3. Question: *Which of the following can cause smog?*

- A) *Plants and trees.*
- B) *Bicycles and skateboards.*
- C) *Cars and factories.*

Answer: C. Cars and factories. The burning of coal, gasoline, and oil used in cars and factories is a major contributor to smog.

4. True or False: *Wind helps to decrease/break up smog.*

Answer: True. Wind helps to push pollutants in the air around, causing them to spread out. When there is little or no wind, pollutants tend to build up, making the air dirtier.¹²

5. True or False: *Children are more at risk to air pollution than healthy adults.*

Answer: True. Although air pollution can affect everyone's health, babies and children are especially at risk because their lungs are still developing. They also breathe faster than adults and tend to breathe in relatively more air (on a per-body-weight basis). Children are also more likely to breathe through their mouths (breathing through our noses helps to filter out particles before they reach the lungs).¹³

6. True or False: *The Air Quality Health Index (AQHI) is a scale from 1-10+ that helps you understand how clean the air is and the health risk. It also gives advice about what you can do to protect your health. .True or False: The AQHI is only important for people who have asthma or other breathing problems. (Option: show slide 11 of the Climate Change and Health Power Point Presentation and check today`S AQHI.)*



Answer: False. Although people with asthma, or other breathing problems, can be at a higher risk to air pollution, the Air Quality Health Index (AQHI) is important for everyone.¹⁴

7. Question: *To protect your health when the air is dirty, you should:*

- A) *Wear a hat.*
- B) *Change your outdoor activities.*
- C) *Drink plenty of water.*

Answer: B. Change your outdoor activities. It is a good idea to check the Air Quality Health Index (AQHI) before you go outside so you know how clean the air is. If the air quality is bad, you may need to spend more time inside, play outside in the morning when the air is better, or take it easy when playing outside (such as walking instead of running).¹⁵

- 1. True or False:** *Over the past 60 years, Canada has warmed at a higher rate than in most other parts of the world.*

Answer: True. Canada has warmed by 1.6 degrees Celsius, and the Earth's average temperature has increased by 1 degree Celsius, so Canada has warmed faster than other places around the world.¹⁶

- 2. True or False:** *As our climate continues to change, extreme heat events (e.g. heat waves and very hot days) are expected to become hotter, to last longer, and to happen more often.*

Answer: True.⁸

- 3. True or False:** *Extreme heat can cause dehydration, fainting, and the flu.*

Answer: False. Extreme heat does not cause the flu. Extreme heat does cause dehydration, dizziness and fainting, muscle cramps, headaches, vomiting, and heat stroke.¹⁷

- 4. Question:** *Spending time in extreme heat can cause heat illness. Which of the following is NOT a sign of heat illness:*

- A) *Cool pale skin.*
- B) *Dizziness.*
- C) *Fainting.*

Answer: A. Cool pale skin. Cool pale skin is not a sign of heat illness. In heat illness, skin is often hot to the touch and red. Other signs and symptoms of heat illness are dizziness, fainting, extreme thirst, nausea, vomiting, dark urine (pee), fast heartbeat, fast breathing, and a headache. If you are feeling these signs and symptoms, move to a cool place and drink water. Seek medical help if things do not improve.¹⁸

- 5. Question:** *Heat stroke can cause a person's body temperature to become dangerously hot and is an emergency! The person may become very confused, stop sweating, or even lose consciousness (not wake up). If we think that someone is suffering from heat stroke, what emergency number should we call?*

Answer: 9-1-1. While waiting for help move the person to a cool place, apply cool water (not ice) to large areas of skin and clothing and fan the person as much as possible.¹⁸

6. Question: *When it is hot outside, what are 2 ways you can protect your health?*

Answer:

- Check the forecast.
- Hit the shade.
- Find cool spaces.
- Drink water.
- Take a rest.
- Use sun protection (e.g. sunscreen, wide brim hat).
- Cool off with a swim.
- Wear light coloured, loose clothing.
- Know the signs of heat related illnesses.^{17,18}

7. True or False: *Spending too much time in the sun can lead to sunburns, early wrinkling of the skin, skin cancer, and eye damage (e.g. cataracts).*

Answer: True.

8. Question: *Having a sunburn can put you more at risk for heat illnesses (e.g. heat cramps or heat stroke).¹⁹*

Answer: True. When you have a sunburn, your body does not cool off properly, which can cause you to overheat. To protect yourself from the sun:

- seek shade,
- limit time in the sun from 11:00 am to 4:00 pm,
- wear sunglasses with UV protective lenses,
- wear a wide brim hat,
- wear clothing to cover your skin,
- and use sunscreen with SPF 30 or higher.^{17,20}

(Option: show slide 12 of the Climate Change and Health Power Point Presentation and check today's forecast.)



Emergency Preparedness

- 1. True or False:** *Climate change has been linked to an increase in extreme weather events (e.g. severe thunderstorms, blizzards, ice storms, tornadoes, flooding, etc.).*

Answer: True.

- 2. Question:** *Creating an emergency preparedness kit will keep us safe and healthy before emergency services arrive (e.g. firefighters, hydro services). A kit should have enough supplies to support your family and pets for how many days?*

- A) One day
- B) Seven days
- C) Three days

Answer: Three days (72 hours).^{21,22}

- 3. True or False:** *Only adults in the home should know where the emergency kit is kept, and should be able to reach it.*

Answer: False. In case of an emergency, children should know where the kit is kept and be able to reach it.²³

- 4. Question:** *Families can create an emergency plan to include in their emergency kits. A plan includes information that can help your family in an emergency.²⁴ Which of the following pieces of information should NOT be included in the emergency plan?*

- A) Safe exits from the home and neighbourhood. ²⁵
- B) A list of your favourite foods.
- C) Contact information for family and friends.
- D) Location of your home fire extinguisher.²⁵

Answer: B. A list of your favourite foods.

Building an Emergency Preparedness Kit

(optional activity, 10 minutes)

Climate change has been linked to an increase in extreme weather events such as flooding, ice storms, tornadoes, and severe thunderstorms. Because of the power outages and hazards that can occur with these events, an emergency preparedness kit can help families to stay safe and healthy. In this activity, students will identify items to include in an emergency preparedness kit.

Objectives:

- Students will understand the contents of a basic emergency preparedness kit.
- Students will use critical thinking skills to identify items of an emergency preparedness kit.

Materials:

- A backpack
- A water bottle
- Plastic can food
- A manual can opener
- A Flashlight
- A battery powered or wind up radio
- Extra batteries
- Extra keys for the car and house
- Cash
- Pill box
- An emergency plan
- Fresh food and produce
- Headphones
- A bracelet
- A video game

Instructions:

1. Have students form pairs or small groups.
2. Provide students with 5 to 7 minutes and ask them to write down a list of essential items they think would be included in a home emergency preparedness kit.
3. Have groups share their ideas, and discuss.
4. Go through the emergency preparedness backpack provided and highlight the essential and non-essential items. Alternatively, you may ask for student volunteers to pull an item out of the bag, and explain why the item should or should not be included in the kit.
5. At the end of the activity, encourage students to discuss making an emergency preparedness kit with their families.

Basic Emergency Kit Items

(Teacher Reference)

- **Back pack**
In an emergency, you may need to leave your home, so choose a backpack that is easy to carry, and that fits all of the kit items. All of the emergency kit items in one backpack may be too heavy to carry, so consider separating all of the kit items into a few backpacks.²²
- **Water bottle**
In an emergency, your taps may stop running, and it may be difficult to get clean drinking water. Pack two litres of water, per person, per day. Include small water bottles that can be easily carried, in case you leave your home.²²
- **Food**
Include food that will not spoil, like granola bars and canned fruit. Replace the food and water in your kit once a year.²²
- **Manual can opener**
Choose a manual can opener to open can foods without electricity.²²
- **Flashlight**
Pack a flashlight in case the electricity goes out.²²
- **Battery powered or wind up radio**
If the electricity goes out, a battery powered or wind up radio help you learn more about the emergency and emergency services.²²
- **Extra batteries**
Include batteries to power the radio, flashlight, and any other essential devices.²²
- **Extra keys for the car and house**²²
In case you need to leave your home in a hurry, save time by including extra keys for the car and house in your kit.
- **Cash**
In your kit include small bills, like \$10 bills. It is important to include cash in your kit because bank, and debit machines may not be working in an emergency. You also may need to contact someone on a pay phone, or travel to keep safe, so pack coins for the payphone, and include traveller's cheques.²²
- **Pill box**
If you have a medication prescription, include your medication (pills) in the kit. ²²
- **Emergency plan**
An emergency plan will help you and your family know what to do in an emergency. The plan will save time, and decrease stress in real life emergencies.²⁵ On an emergency plan include:
 - Safe exits from your home and neighbourhood. ²²
 - Family meeting places if you are separated. ²²
 - A person who will pick up family members from school. ²²
 - Contact persons in and out of town²² (phone number, e-mail, and addresses).
 - Health and insurance information. ²²
 - Places for your pet to stay. ²²
 - Risks in your region²² (e.g. Ontario: floods and earthquakes²⁷).
 - The location of your fire extinguisher, water valve, electrical panel, gas valve, and floor drain.²²

Items to not include in an emergency kit:

- Video game
- Headphones
- Bracelet
- Fresh food

Only include the essential items in an emergency kit. Non-essential items like video games, and jewelry will take up space in your pack, and make the kit too heavy to carry. Avoid including foods that can spoil quickly (e.g. fresh produce).

Conclusion (5 minutes)

Today we learned how climate change can affect health and what we can do about it.

Ask Students: *What are some of the ways climate change can affect our health?*

Explain:

- Allow ticks and mosquitoes to spread disease.
- Lead to heat related illness (e.g. dehydration, heat stroke).
- Lead to heart or breathing problems from poor air quality (e.g. trigger asthma attacks).
- Cause severe storms.

Ask Students: *What are 3 ways we can protect our health from the effects of climate change?*

Explain:

- Use protective measures against ticks and mosquitoes (e.g. wearing long sleeves and pants tucked into socks, wearing insect repellent, walking in the centre of trails, and checking for ticks).
- Adjust outdoor activities when the air quality is poor and/or when it is very hot.
- On hot days, drink plenty of water and find cool spaces.
- Practice sun safety.
- Prepare a 72 hour emergency kit.

Ask Students: *There are many things that we can do every day to help conserve energy. What could we do to help reduce our contribution to climate change (or carbon footprint)?*

Explain:

- Turn off the lights
- Recycle and compost
- Walk or cycle instead of drive
- Reduce use of electronics (e.g. computers, cell phones)
- Litterless lunches
- Limit use of home heating, and air conditioning
- Buy local

Handouts: Distribute the handouts and discuss briefly. Encourage students to share the handouts with their families.

Optional Active Learning Activity

Beautiful Earth (10 minutes)

Formation	Whole class
Equipment	Wall signs (air, water, land, school), <i>optional</i>
Rules/Directions	<ul style="list-style-type: none">• Prior to the activity, label each wall of the classroom with wall signs (Air, Water, Land, and School)• Explain that each wall in the classroom is designated part of the Earth, and when an object is called out, the students will move to the wall where the object is found and perform an activity.• Begin by reviewing and practicing the following activities for each of the following commands:<ul style="list-style-type: none">• Air: Chicken Jacks: Modified Jumping Jack. Instead of wide arms, hands come into armpits making 'wings.'• Water: Swimmer Jog: Jog on the spot while pretending to do the front crawl.• Land: Mountain Climbers: Pretend to climb a mountain by stepping up with the left foot, knee high, while reaching up with right arm. Continue motion alternating between left and right sides of the body.• School: Jumping Rope: Jump up and down while pretending to use a skipping rope.• Call out 1 item from the Earth List.• Students must decide where that item is found (i.e. air, water, land, or school).• The students then move to the wall with the correct sign and do the corresponding activity. (E.g. If you call out "clouds," students would move to the wall labeled with the "clouds" sign and then perform Chicken Jacks).• Students perform the action for 15-20 sec and then call out another item.

Earth List

Air	Water	Land	School
Clouds	Shark	Ticks	Recycle Box
Bird	Coral	Tree	Water Bottle
Smog	Turtle	Lava	Gym
Sun	Whale	Soil	Litter less Lunch/Boomerang Lunch
Ozone	Seaweed	House	Eco Club

Alternative

Instead of students moving around the room, post signs at the front of the classroom and have students perform the activity at their desk.

Resource

OPHEA

Glossary

Air Quality Health Index (AQHI): A public information tool that helps Canadians protect their health on a daily basis from the negative effects of air pollution.¹⁴

Asthma: A respiratory condition marked by spasms in the bronchi of the lungs, causing difficulty in breathing. It usually results from an allergic reaction or other forms of hypersensitivity.

Atmosphere: The layer of gases surrounding a planet. Earth's atmosphere protects life on the planet.²⁶

Carbon Dioxide: A naturally occurring colourless, odorless, incombustible gas made up of two oxygen atoms bonded with a carbon atom.²⁷

Cataract: Clouding of the eye lens caused by over exposure to ultraviolet radiation. Cataracts are the leading cause of permanent blindness worldwide.²⁸

Climate Change: A long-term shift or alteration in the climate of a specific location, region or the entire planet. The shift is measured by changes in some or all of the features associated with average weather, such as temperature, wind patterns, and precipitation.⁸

Deer Tick: Also known as blacklegged ticks. Small biting arachnids (related to scorpions, spiders and mites) that feed on the blood of animals, including humans by attaching with their mouth parts.²⁹

Dehydration: The loss of water and salts essential for normal body function.

Extreme Heat: High temperatures and sometimes high humidex levels for the seasonal average of a region.¹⁸

Fossil Fuels: A fuel (such as coal, oil, or natural gas) that is formed in the Earth from dead plants or animals.³⁰

Global Warming: The sustained warming of the global average surface temperature. Global warming is one aspect of climate change, caused by a buildup of greenhouse gases in the Earth's atmosphere. Global warming will affect the climate of one region differently from another. Some areas will warm more, while others will warm less than the average. Some areas may even cool. An increase in average global temperature will cause changes in other aspects of the climate system, such as precipitation and winds, affecting weather patterns worldwide.⁶

Greenhouse Gas: Gases that trap heat in the Earth's atmosphere. The four main greenhouse gases are: carbon dioxide, methane, nitrous oxide, and fluorinated gases (e.g. chlorofluorocarbons, hydrochlorofluorocarbons, and halons).³¹

Greenhouse Effect: Insulates the planet from heat loss, like a blanket on our bed insulates our bodies from heat loss. Small concentrations of greenhouse gases within the atmosphere absorb much of the outgoing heat energy radiated by the Earth itself, and return much of this energy back towards the surface. This keeps the Earth much warmer than if these gases were absent. The greenhouse effect makes the Earth livable. Without it, the Earth would be too cold to support life as we know it.⁶

Ground-level Ozone (O₃): A colourless and highly irritating gas that forms just above the Earth's surface.³² It is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Emissions from industrial facilities and electric utilities, vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC.³³ Ground level ozone is a major component of smog³⁵ and can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.³³

Heat Illness: Overexposure to extreme heat and, or, high humidity. Signs and symptoms of a heat illness include: dizziness, fainting, nausea, vomiting, headache, rapid breathing and heart beat, extreme thirst, decreased urination, dark urine, and, or, changes of behaviour in children. Types of heat illnesses include: heat edema, heat rash, heat cramps, heat fainting, heat exhaustion, and heat stroke.¹⁸

Heat Stroke: A medical emergency resulting from overexposure to extreme heat. Characterized by the signs and symptoms of heat illness, with an elevated body temperature of 40 degrees Celsius or higher, and one of the following: unconscious, confused, or no sweating.¹⁸

Heat Wave: A heat wave is defined as three or more consecutive days with temperatures above 32 degrees Celsius.³⁵

Lyme Disease: An illness caused by the bacterium *Borrelia burgdorferi*, which can be spread through the bite of certain types of ticks. Lyme disease in humans can affect skin, joints, the heart, and the nervous system, but can be effectively treated. Lyme disease is the most common vector-borne disease in our region.³²

SPF: Sun protection factor or SPF rates the strength of a sunscreen. Sunscreen products range from SPF 2 to SPF 50+.³⁷ Sunscreens with higher SPF ratings block slightly more UVB rays, but none offer 100% protection. SPF 15 sunscreens block 93% of UVB rays and an SPF 30 and higher sunscreens block 97% of UVB rays. SPF 30 sunscreens are not twice as effective as SPF 15.³⁷

Ultraviolet radiation (UVR): A form of energy released by the sun which is invisible to the human eye. There are three types: UVA, UVB, and UVC. UVA radiation is the least energetic form, and can cause skin aging and wrinkles. UVA can also damage outdoor plastics and paint. UVB, which is stronger than UVA, is the most harmful. It can cause skin cancer and cataracts. Both UVB and UVA can cause suntans and sunburns. UVB also reduces the growth of plants, and may affect the health of wildlife and other animals. UVC, which is even stronger than UVB, is filtered out by the atmosphere and does not reach the Earth's surface.³⁸

UV Index: Measures the strength of the sun's ultraviolet radiation to give a daily prediction of the sun exposure risk. The index predicts the strength of the sun's rays on a scale of 0 to 11+. There is a low chance of overexposure to the sun when the UV index is 1 and there is an extreme chance of overexposure when the UV index is 11+. The UV index is in daily weather reports whenever it might reach 3 or more. Environment Canada has developed sun protection messages corresponding to the UV Index of the day.³⁹

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