

# Facing the unexpected, be prepared.





Canadian Red Cross

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**Canadian Red Cross**  
170, Metcalfe Street, Suite 300  
Ottawa, Ontario K2P 2P2  
Telephone: 613-740-1900  
Fax: 613-740-1911  
Web site: [www.redcross.ca](http://www.redcross.ca)

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# Facing the unexpected, be prepared.

*Expect the Unexpected*<sup>™</sup> Emergency Preparedness Program  
for students aged 9-11

## Facilitator's Guide

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# Introduction

The Canadian Red Cross plays an essential part in emergencies. It provides numerous services to people affected by disasters to fulfill part of their essential needs such as food, clothing and shelter. It also provides personal services for moral support and first aid. During evacuations, it is often responsible for registering and informing evacuees.

The Canadian Red Cross has developed a resource to help teachers educate their students about natural disasters and other emergencies: *Expect the Unexpected*™. It is the only educational program in Canada that relates to provincial and territorial curricula, while also aiming to change attitudes and behaviours regarding disaster preparedness.

*Expect the Unexpected* is intended for youth, aged 7 to 13, their parents, as well as educators who work with them. The program consists of three kits, which include a facilitator's guide and an activity booklet: *It can happen, be ready*, for youth aged 7 and 8; *Facing the unexpected, be prepared*, for youth aged 9 to 11; and *Be ready, be safe* for youth aged 12 and 13. An activity booklet is also available for parents: *Let's plan for the unexpected*.

This facilitator's guide is intended for educators of students aged 9 to 11. It is part of a series of teaching resources for this age group.

The guide is divided into four parts. The first part describes the overall preparedness program. The second part identifies specific concepts and the preferred teaching approach. The third part pertains to activities corresponding to the sheets provided in the activity booklet intended for students, and the fourth part provides additional information that will be useful in implementing the program.

# Facing the unexpected, be prepared.

## Program objectives

This section of the preparedness program intended for 9- to 11-year-old students is designed to provide them with skills and information required to face unexpected situations that could occur in their daily life.

More specifically, students will:

- Learn about natural or human-made disasters and hazardous materials releases that could occur in their community;
- Become familiar with climate changes and their role in the increased frequency of natural disasters;
- Learn about actions to take to be better prepared for an emergency;
- Know what attitudes and behaviours to adopt during unexpected situations;
- Learn the school evacuation plan;
- Learn what emotions may be experienced as a result of certain emergencies.

## Links to the study programs

Educators are asked to teach a variety of programs from the Ministry of Education and must take into consideration a great number of teaching objectives. This program can be linked to the objectives of some provincial and territorial programs across Canada, and helps complement class teaching and learning.

## Tools


This section of the preparedness program includes six teaching and communication tools:

### • Facilitator's guide

The guide is intended for teachers. It provides information that allows the educator to lead students through the learning process. It encourages use of the various teaching and communication tools developed for the program.

The facilitator's guide includes answer keys that allow the teacher to correct participants' answers. Educators can also create transparencies from the activity booklet, which simplifies the review of answers in a large group.

### • Activity booklet

The booklet is intended for students. It facilitates learning and the development of attitudes and skills by reading information, recording observations from research results, answering questions, playing games (some of which are interactive) and using the Internet, among other approaches. It ensures that information is permanently available as well as being a reference tool. Several of the activities can be carried out with the assistance of parents. These activities, identified by this symbol , were modified to become preparedness

activities intended for families and they are combined in a special booklet, available on the Red Cross Web site at: [www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected).

The activity booklet was designed as a series of activities from which teachers can choose exercises that best suit their students' needs. These activities can be conducted on theme days, on half days and can also be integrated in the daily planning. They can be linked to other activities or be done independently from one another.

- **Activity booklet and certificate of participation for parents and students**

The activity booklet *Let's plan for the unexpected*, is intended for parents as a reference and simulation resource. It offers preparedness activities for the whole family to do at home. The activity booklet is available on the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)), in the section devoted to teaching materials for parents. It can be printed or consulted online.

The certificate of participation is found at the end of the activity booklet intended for families. Parents and their children can fill it out as soon as they have completed the suggested activities.

- **Video**

This video is used to introduce situation scenarios for a number of activities. It will pique the students' curiosity, arouse their interest, prompt questions and encourage group discussions and exchanges. The video is available on the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)), in the section devoted to teaching materials for educators. Participants should be encouraged to watch the video with their families.

- **Mini-posters**

The facilitator's guide includes four small posters that are detachable and can be used as part of simulations within certain activities. They stimulate curiosity and interest, and facilitate questions and group discussions. (Please note that mini-posters are only included in facilitator's guides which have activities that reference them.) The mini-posters are also available on the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)), in the section devoted to teaching materials for educators. They can be printed or consulted online.

- **Poster**

The poster can be consulted or downloaded from the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)), in the section devoted to teaching materials for teachers. The poster can be placed on walls in the school or classroom. It will make students more aware of the need to prepare for emergency situations. It can also be used as a trigger to introduce activities in the preparedness program.

## **Program evaluation**

An evaluation form is provided at the end of this facilitator's guide and on the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)), in the section devoted to teaching materials for teachers. It allows the teacher or facilitator to comment on the program. Student comments can also be obtained by asking them to write a collective letter to the Red Cross.



# General orientation

## Content

Throughout the entire preparedness program, the content is presented in sequence, in order to suit the levels of the various target groups. Thus, the 7- to 8- and 9- to 11-year-old students are faced with unexpected situations that are simple and of a local nature. On the other hand, the 12- to 13-year-olds are asked to deal with more complex situations, on an international scale.

For the 9- to 11-year-old students, the activities cover the following topics:

Red Cross – natural disaster – extreme heat emergency – earthquake – tornado – electrical storm – flood – forest fire – hurricane – ice storm – landslide – climate change and natural disasters – technological accidents – security rules – smoke detector – hazardous materials release – safety rules – preparation – emergency situation – evacuation – evacuation plan – smoke detectors – emergency call – attitude – behaviour – needs – feelings.

As students become more familiar with the natural and human elements in their environment, they are taught to distinguish the benefits and dangers associated with some of these natural elements. The notion of a safety rule is discussed and linked to the natural elements. It is then discussed more generally in relation to unexpected events such as power failures, lightning storms, snowstorms and heat or cold waves. Participants are then sensitized to climate change and its impact on natural disasters. Next, students learn about their own preparation to enable them to react effectively in emergencies. They will again examine attitudes and behaviours to adopt in emergencies, as well as reflect on the emotions that can be experienced when an unexpected event occurs. Finally, emphasis is placed on fire prevention at school and at home.

## Teaching approach

### For each activity

Each activity in the first section of the preparedness program is designed according to the three steps of the teaching approach: situations, research and objectives.



#### • Situations

In this first step, students become familiar with the content and teaching objectives linked to the activity. The teacher makes the content meaningful by linking it to their experience and prior knowledge.



#### • Research

In the second step, students learn the contents of the activity using diversified and adapted teaching strategies. They collect data, organize and record information.



#### • Recap
































In this last step students recap the activity. They summarize what they have learned, compare it to their initial understanding and evaluate their degree of success.

## In each section



























Each section of the preparedness program features three types of activities that correspond to the three steps of the teaching approach.

- Questions related to the situation;
- Research;
- Summary and review of learning.

# Activities

Sheet	Type of activity	Objective	Means	Method	Intellectual and technical skills	Duration
1		Know Red Cross Fundamental Principles and use of the Red Cross emblem.	Multiple choice and puzzle.	In teams of two.	Analyze and summarize.	 45 min.
2		Distinguish natural disasters that occurred in Canada.	Analyzing newspaper articles.	In pairs.	Identify and establish relationships.	 45 min.
3		Recognize the definition of the various natural or other types of disasters.	Association activity.	Individual or in teams.	Identify and establish relationships.	 15 min.
4		Locate disasters on a map of Canada.	Activity to locate the areas on a map.	Individual or in teams.	Identify and locate.	 20 min.
 5		Locate disasters on a time frame.	Activity to locate on a time frame.	Individual or in teams.	Identify and locate.	 20 min.
6		Know disasters that have occurred.	Investigation.	In pairs or individual.	Identify and establish relationships.	 30 min.
7		Identify the disaster hazards in one's environment.	Association activity.	By teams of four.	Identify, establish relationships and summarize.	 25 min.
 8		Explain the relationship between natural disasters and climate change.	Research, location on a map, reading and interactive games.	In teams of two.	Identify and establish relationships and summarize.	 60 min.
 9		Identify role and behaviour in an emergency evacuation.	Viewing a video on the Internet/questions pertaining to the video.	Individual or with parental help.	Identify and establish relationships and summarize.	 25 min.
 10		Prepare a list of essential objects for an emergency.	Analysis & selection of important items.	Alone or with parents.	Identify and establish relationships and summarize.	 25 min.
 11		Develop skills for an emergency call.	Simulation.	Individual or with parental help.	Identify, establish relationships and summarize.	 25 min.
12		Know the school evacuation plan.	Locating on a plan.	In pairs or with parental help.	Identify, establish relationships and summarize.	 25 min.
13		Describe the risks of human-made accidents.	Situational analysis.	Individual.	Identify, establish relationships and summarize.	 30 min.

# Activities

 14		Awareness of hazardous materials warning; review of shelter-in-place.	Lists.	Individual.	Identify, establish relationships and summarize.	 20 min.
 15		Describe one's contribution and role during an emergency.	Case studies.	Individual.	Identify, establish relationships.	 35 min.
16		Describe the feelings and needs felt after a disaster.	Crossword puzzle.	In pairs.	Identify, establish relationships.	 20 min.
17		Become familiar with the concept of extreme heat as a natural hazard and raise the student's awareness of its effects on human health.	Discussion, drawing, questions and answers.	Class; individual (with help of parents).	Identify, establish relationships.	 60 min.
18		Describe heat by referring to the four variables that constitute heat: temperature, radiant heat, humidity and wind.	Myths and facts; experiments.	Groups, class.	Identify, establish relationships.	 45 min.
19		Describe how the human body regulates itself when exposed to heat.	Research, presentation, discussion, experiments.	Groups.	Identify, establish relationships.	 20 min.
20		Recognize heat-related illnesses and name preventive and response measures.	Scenarios.	Groups.	Identify, establish relationships.	 30 min.
21		Identify amongst families and friends people who are most vulnerable to heat.	Discussion, brainstorm, interviews.	Individual (with help of parents).	Identify, establish relationships.	 75 min.
22		Prepare an extreme heat kit.	Scenarios.	Groups.	Application.	 60 min.
23		Identify correct behaviours in different disasters.	Blanks to fill in.	Individual.	Identify, establish relationships.	 45 min.
24		Review the content on disasters.	Blanks to fill in.	Individual.	Identify, establish relationships and summarize.	 20 min.
25		Review the attitudes and behaviours to adopt if a disaster occurs.	Blanks to fill in.	Individual or with parental help.	Identify, establish relationships.	 20 min.



The activities identified with this symbol can be carried out with the parents' help. These activities have also been modified for preparedness activities to be done by the whole family and are part of a special activity booklet available on the Red Cross Web site at: [www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected). The teacher is encouraged to refer parents to the educational materials for them on the Red Cross Web site.



The activities identified with this symbol indicate that the educator can use internet resources to lead the activity.

# The Red Cross emblem



## Task description

Through group discussion and reading, students become familiar with the Red Cross emblem and its use.

## Method suggested

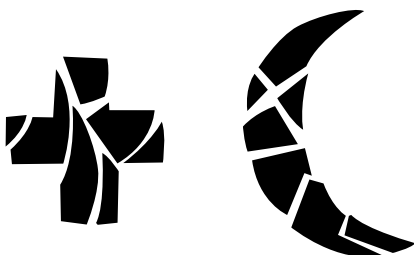
1. Ask students if they know the Red Cross. Ask them if they have previously had contact with this organization (Babysitter's course, first aid course, water safety course, etc.).

2 Ask them if they recognize the Red Cross emblem and its meaning. Encourage them to tell what they know. Complete their comments using the texts from Annex 1 and sheet 1.

3. Tell students that the Red Cross is an international movement and that it operates in every country in the world, in accordance with seven rules or principles. Distribute the list of the Red Cross's seven principles and definitions (simplified version for youth) and ensure that they correctly understand the new vocabulary. Refer to the complete definitions provided at the end of the trainer's handbook.

4. Encourage them to form teams of two. Read the instructions for sheet 1 with them. Participants should complete the sheet by identifying use of the Red Cross emblem as CORRECT or INCORRECT for each case, circling their answers.

5. Once they have completed the sheet, students will return to their places to check their answers. Using the pieces of the puzzle on sheet 1, ask them to put together the emblem of the Red Cross or the Red Crescent.



6. Tell students that the Red Cross prepared these activities for this preparedness program.


7. Answer any questions.

## Materials required

- Sheet 1 from the activity booklet.
- Annex 1 – The International Red Cross and Red Crescent Movement.
- Definitions of the basic principles of the Red Cross at the end of the trainer's manual and the activity booklet.

## Answer key

Activity 1



1. Indicate in each case whether the use of the Red Cross emblem is CORRECT or INCORRECT by placing an X in the appropriate box.

1. A Red Cross volunteer goes to the scene of a fire to help the families in the street. He is wearing a Red Cross vest so that firefighters and police can easily identify him and give him access to the site.

Correct       Incorrect

2. A Red Cross volunteer uses the van belonging to his local committee to help a friend move.

Correct       Incorrect

3. A medical clinic uses the Red Cross emblem to indicate that sick people can get care there.

Correct       Incorrect

4. A company that manufactures sportswear also offers first aid kits bearing the Red Cross emblem.


Correct       Incorrect

5. A group of young people get together to send food packages to a region affected by famine. To show that this is a charitable action, they place a Red Cross sticker on every package.

Correct       Incorrect

6. Red Cross volunteers use trucks identified with the Red Cross emblem to safely travel to the assistance of populations that have been displaced in a combat zone.

Correct       Incorrect



+ Canadian Red Cross

# What are possible disasters?



## Task description

After having read and analyzed various newspaper articles, students learn about natural disasters that have occurred in Canada

## Method suggested

1. Ask students to pair up. Give each team a copy of one newspaper article among the four you photocopy before the activity begins (Annex 2).

2. Read the instructions and questions on sheet 2 with them. Ask them to answer the questions on the newspaper article.

3. Once the questionnaire is filled out, suggest that the teams who studied the same type of disaster get together to validate their information. Ask each group to name a speaker who will summarize the information gathered during the meeting.

4. After a few minutes of discussion, review the subject as a group. Ask each speaker to present the information validated. Summarize the information provided by the students.

5. Answer any questions.

## Material Required

- Sheet 2 of the activity booklet
- Four photocopies of four newspaper articles from Annex 2

## Answer key

Next page



Activity 2

### What are possible disasters?

1. After reading the newspaper article, answer the following questions:

a) What disaster are we talking about in this newspaper article?

**Forest fires.**

b) When did this disaster occur?

**August 2003.**

c) What city or region was struck?

**The Kelowna, Kamloops and Chase regions in British Columbia.**

d) How did the disaster occur?

**Nearly 2,500 forest fires ravaged the forests.**

e) What damage did the disaster cause?

**The forest fires covered an area of 2,650 square kilometres, and 334 houses were destroyed by fire.**

f) How many disaster victims were there? How did the Red Cross help them?

**In total, 50,000 individuals were forced to leave their homes, and three pilots died while fighting the flames. The Canadian Red Cross collected several millions of dollars to help the victims. The Red Cross also supported the provincial government by registering the evacuees and setting up a bureau for reuniting families that had been separated by the fires.**



Canadian Red Cross



Activity 2

### What are possible disasters?

1. After reading the newspaper article, answer the following questions:

a) What disaster are we talking about in this newspaper article?

**A hurricane.**

b) When did this disaster occur?

**September 29, 2003.**

c) What city or region was struck?

**The city of Halifax, Nova Scotia, and Prince Edward Island.**

d) How did the disaster occur?

**Hurricane Juan was a category 2 hurricane, and swept Nova Scotia with sustained winds of 158 km/h and gusts of over 185 km/h.**

e) What damage did the disaster cause?

**Lots of material damage: electric lines were torn up, properties were flooded, sidewalks lifted, marinas and ports were entirely destroyed. There were also 100 trees lost all over the province that are irreplaceable.**

f) How many disaster victims were there? How did the Red Cross help them?

**When the storm was at its peak, nearly 300,000 residents were without electricity in Nova Scotia and on Prince Edward Island. The Red Cross intervened quickly after the hurricane passed by opening shelters and distributing food and hygiene kits. The Red Cross currently also distributes water and packaged food to centres for the elderly in Halifax.**



Canadian Red Cross



Activity 2

### What are possible disasters?

1. After reading the newspaper article, answer the following questions:

a) What disaster are we talking about in this newspaper article?

**A flood.**

b) When did this disaster occur?

**August 4, 2003.**

c) What city or region was struck?

**The Bois-Francs region of Quebec.**

d) How did the disaster occur?

**Due to violent storms, nearly 130 mm of torrential rain fell in two hours, swelling the levels of several rivers.**

e) What damage did the disaster cause?

**Damage is considerable: houses and cottages were carried off by the water, roads covered by water and bridges were destroyed.**

f) How many disaster victims were there? How did the Red Cross help them?

**Six families were evacuated by helicopter and at least 300 residents were forced to leave the area. The Red Cross supplied aid in various forms: food, clothing and health care. The organization also helped with the cleanup.**



Canadian Red Cross



Activity 2

### What are possible disasters?

1. After reading the newspaper article, answer the following questions:

a) What disaster are we talking about in this newspaper article?

**An epidemic.**

b) When did this disaster occur?

**From March to mid-June 2003.**

c) What city or region was struck?

**Toronto, Ontario.**

d) How did the disaster occur?

**There was a SARS epidemic, a highly contagious disease which, for certain people, can worsen and result in death.**

e) What damage did the disaster cause?

**A state of emergency was declared. Tourists, visiting film production teams and business people fled the city. The monetary loss was estimated to be over \$1.5 billion.**

f) How many disaster victims were there? How did the Red Cross help them?

**Many individuals were quarantined. Nearly 375 people were affected and 44 people died. The Red Cross assisted by delivering medical supplies. Supplies of surgical masks, a thermometer, information and sterilization kits were delivered to individuals impacted by the virus and who were quarantined in their homes.**



Canadian Red Cross

# What is it?



## Task description

Using statements, students associate various natural disasters with their definitions.

## Method suggested

1. Ask students to discuss some natural disasters (earthquake, flood, landslide, tornado, forest fire, lightning storm, snowstorm, other) and to prepare a short definition for each.

2. Read the instructions on sheet 3 with them and ask them to fill it out individually or in teams by associating the natural disasters shown with their definition.


3. Once the sheets are filled out, review them as a group to check the students' answers.

4. Answer any questions.

## Material required

- Sheet 3 of the activity booklet

## Answer key







**Activity 3**

## What is it?

1. Read the following definitions. Match the disasters to the corresponding definitions by writing the correct letter in the space provided.

a) Tornado	b) Lightning storm	c) Snowstorm
d) Forest fire	e) Landslide	f) Earthquake
g) Flood	h) Hurricane	i) Heat wave or cold snap

1. Lightning bolts followed by a lightning flash and thunder, able to break windows, set off a fire, set off an explosion or cause a power failure. Answer: **B**
2. A sudden movement of the earth's crust. Answer: **F**
3. A whirlwind in the shape of a funnel which points towards the ground, moves rapidly in an unpredictable way and can destroy everything in its way. Answer: **A**
4. Immense tropical storm with very high winds and a great deal of rain, originating in the oceans. Answer: **H**
5. Movement of clay type soil saturated with water. Answer: **E**
6. A rise in the water level caused by a rapid thaw in spring or by heavy rainfalls, which threatens people and their homes. Answer: **G**
7. A natural phenomenon characterized by violent winds and heavy snowfalls. Answer: **C**
8. Phenomenon caused by the arrival of a mass of cold or warm air causing a considerable rise or fall in the temperature. Answer: **I**
9. A fire caused naturally by lightning or by human negligence that can destroy large areas of forests. Answer: **D**

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# Where did it occur?



**Task Description**

Students locate various natural disasters on a map of Canada.

**Method suggested**

- Using the table in the annex, ask students to name a few disasters that have occurred in Canada, including the city or region that was struck. Write their answers on the board.
- Read the instructions on sheet 4 with them and ask them to fill it out individually or in teams by writing the number corresponding to the area struck inside the symbol.
- Once the sheets are filled out, review them as a group to check their answers. Highlight the fact that certain regions of Canada are more subject to some types of disasters than others. Ask them to explain why some regions have a higher risk than others do and analyze the physical characteristics of these regions with them.
- Answer any questions.

**Material required**

- Sheet 4 of the activity booklet
- Annex 3 – Summary table of some disasters that have occurred in Canada

**Answer key**

Activity 4

## Where did it occur?

1. Look at this map of Canada. Find the symbols that identify the various disasters.
2. Inside the symbols, place the number that corresponds to the area affected.

**Earthquake:**  
1. Baffin Bay  
2. British Columbia  
3. Quebec

**Forest fire:**  
1. Manitoba  
2. Ontario  
3. British Columbia

**Tornado:**  
1. Saskatchewan  
2. Ontario  
3. Alberta

**Flood:**  
1. Newfoundland and Labrador  
2. Quebec  
3. Manitoba



# When did it occur?



## Task description

Students locate the various natural disasters that occurred in Canada on a time frame.

## Method suggested

1. Ask students to name some natural disasters that have occurred in Canada and when they happened. Write their answers on the board.

2. Read the instructions on sheet 5 with them and ask them to fill it out individually or in teams by locating the disasters mentioned on the time frame.


3. Once the sheets are filled out, review them as a group to check the answers. Highlight the fact that some disasters have always struck certain regions in Canada. (Web site: [www.ecoaction.gc.ca](http://www.ecoaction.gc.ca)).

4. Answer any questions.

## Material required

- Sheet 5 of the activity booklet
- Annex 3 – Summary table of some disasters that have occurred in Canada
- Web site [www.ecoaction.gc.ca](http://www.ecoaction.gc.ca)

## Answer key





**Activity 5**

## When did it occur?


Here is a list of some natural disasters that occurred in Canada during the last century

a) Earthquake:	1929 - 1949 - 1988
b) Landslide:	1903 - 1971 - 1981
c) Tornado:	1912 - 1987 - 2000
d) Flood:	1996 - 1997 - 2003
e) Extreme heat event:	1936 - 2001 - 2010

1. By using the letters a, b, c, d and e, locate these disasters on this time frame:

8

 Canadian Red Cross

# What happened in the past?



### Task description

Using a questionnaire, students ask their grandparents or an older person for information on a natural disaster that happened in the past.

### Method suggested

1. Ask students if they know about one or more disasters that occurred in the past. Suggest that they ask their grandparents or an older person to find out when and where it occurred. Ask them if they were prepared to deal with an emergency and if they would know what to do if an emergency arose again.

2. Ask them to pair up and to prepare a questionnaire with four questions. Give them a few days to carry out their investigation with their grandparents or other older persons they know. Suggest that they use the natural disasters listed in Activity 6.

3. Once their investigation is completed, get together as a group to let them recount their grandparents' or other older persons' stories. Compare the natural disasters given. Discuss how these people lived through these events and how they were prepared for them. Highlight the importance of being well prepared to avoid panic and to react safely.

4. Answer any questions.

### Material required

- Sheet 6 of the activity booklet
- Annex 3 – Summary table of some disasters that have occurred in Canada

### Answer key

Activity 6

## What happened in the past?

1. Write down four (4) questions that you would like to ask your grandparents or an older person in your community to find out more about the natural disasters they remember. For example, you can ask : "What happened?", "Who asked you to evacuate?". Write down the information gathered and use the natural disasters given on sheet 3 as a reference.

Question 1: \_\_\_\_\_

Answer 1: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Question 2: \_\_\_\_\_

Answer 2: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Question 3: \_\_\_\_\_

Answer 3: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Question 4: \_\_\_\_\_

Answer 4: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Answers will vary

Canadian Red Cross

# What can happen in my environment?



## Task description

Following an association activity pertaining to the natural or human-made disasters and the factors involved, students identify the possible natural disaster risks in their environment.

## Method suggested

1. Ask students to name the natural or human-made disasters likely to occur in Canada. Write their answers on the board.
2. Ask students to get together in teams of four. Read the instructions on sheet 7 with them. Suggest they fill it out by selecting four natural or human-made disasters found on annex 3. Ask them to identify one natural element related to these disasters and to justify their answers briefly.
3. Once the sheets are filled out, review them as a group to check the students' answers. Ask them to explain their associations. Then ask them if these factors and disasters are in their environment.
4. Answer any questions.

## Material required

- Sheet 7 of the activity booklet
- Annex 3 – Summary table of some disasters that have occurred in Canada

## Answer key

Activity 7

### What can happen in my environment?

1. Select four (4) natural disasters from the list presented on the sheet. Associate one natural element with each of the disasters chosen. Explain your reasons.

Natural or human-made disaster 1: \_\_\_\_\_

Natural or other element: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

Natural or human-made disaster 2: \_\_\_\_\_

Natural or other element: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

Natural or human-made disaster 3: \_\_\_\_\_

Natural or other element: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

Natural or human-made disaster 4: \_\_\_\_\_

Natural or other element: \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_

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Answers will vary

# What could happen in Canada?



## Task description

Students locate various natural disasters on a map of Canada.

## Method suggested

1. Encourage students to research the terms “climate change” and “greenhouse effect”. Afterwards, ask them to explain the concepts in their own words. Ask them to name some natural disasters that could occur in Canada due to climate change.

2. Have students form pairs. Give each team sheet 8 and read the instructions for the activity. Ask them to complete the activity by connecting the natural disasters with the correct place on the map of Canada.

3. When they have completed the activity, have the entire group check the location of the natural disasters on the map. Discuss each of these disasters. Point out that some regions or provinces of Canada could be more affected by certain types of natural disasters. Through geophysical analysis of these regions or provinces, ask them to explain why certain regions or provinces are at greater risk than others. Help students to realize that these natural disasters could be more frequent due to climate changes.

4. Make students aware that they can play an important role regarding climate change by reducing their greenhouse gas emissions. Suggest that they read Annex 1 – *Climate change: What can you do?* and discuss it with them.

5. Be available to answer their questions.

## Material required

- Sheet 8 from the activity booklet
- Annex 1 – *Climate change: What can you do?* from the activity booklet

## Answer key

**Activity 8**

## What could happen in Canada?

1. Look carefully at the map of Canada. Locate the pictures of natural disasters that could occur as a result of climate changes.

2. Using arrows, connect each of the natural disasters to the drawing that depicts it on the map.

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# How can I prepare at home?



### Task description

After viewing the video, students know the steps to properly prepare for these emergencies.

### Method suggested

1. Show the video. After viewing it, ask them if they have any questions or comments. Then ask them to summarize the content and to relate it to what they have learned.
2. Read the instructions on sheet 9 with them and ask them to fill it out individually.
3. Once the sheets are filled out, review them as a group to check their answers.
4. Answer any questions.

### Material required

- Video *Teddy Bear Boudou Saved from the Waters* (available on the Canadian Red Cross Web site at [www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected))
- Sheet 9 of the activity booklet

### Answer key

Activity 9

## How can I prepare at home?

1. After viewing the video, answer the following questions:

a) In your own words, summarize the content of the video.  
**The video shows how preparing properly enables you to react effectively in case of an emergency.**

\_\_\_\_\_

\_\_\_\_\_

b) What is the first reaction to adopt when an evacuation is necessary?  
**You must remain calm.**

\_\_\_\_\_

\_\_\_\_\_

c) What must someone do to react safely in case of an emergency?  
**You must be well prepared.**

\_\_\_\_\_

\_\_\_\_\_

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Activity 9

d) What role could I assume in an emergency?  
**I could listen to my parents, follow the instructions, take care of my brothers and sisters, etc.**

\_\_\_\_\_

\_\_\_\_\_

e) What must your family and you prepare in the event of an evacuation?  
**An emergency kit and emergency provisions.**

\_\_\_\_\_

\_\_\_\_\_

f) If you are asked to evacuate, can you stay at home and wait until everything is back to normal? Explain your answer.  
**No. I must leave the house immediately and follow the instructions.**

\_\_\_\_\_

\_\_\_\_\_

2. Discuss this video with your parents. Encourage them to watch it with you on the Canadian Red Cross Web site ([www.redcross.ca/expecttheunexpected](http://www.redcross.ca/expecttheunexpected)).

Canadian Red Cross

# What would be useful for me?



## Task description

Students prepare a list of essential objects for an emergency.

## Method suggested

1. Ask students to name a few objects that they have in their luggage when they travel. Write their answers on the board. Among these objects, ask them to circle which ones would be useful in case of an emergency.

2. Read the instructions on sheet 10 with them. Ask them to fill it out individually by grouping the items written on the board according to essential needs, such as clothing, food, personal care and safety equipment. Explain that 3 days of provisions will enable them to carry on should an earthquake, hurricane, snowstorm or any other natural disaster leave them without food, water or electricity for several days. In the event of an evacuation, they could gather the items they're likely to need: a change of clothing, blanket, water, non-perishable food, personal hygiene articles, flashlight and batteries, etc.

3. Once the sheets are filled out, review their answers as a group. Ask them to bring the sheet to their parents to check if they have these objects at home.

4. Answer any questions.

## Material required

- Sheet 10 of the activity booklet

## Answer key

Activity 10

### What would be useful for me?

1. Write down the essential articles in an emergency for each category. Circle in red the articles you could easily carry in a backpack if you had to leave home.

a) Clothing:  
 warm sweater, T-shirt, slacks, stockings, jacket, raincoat, spare clothes for each person, hat/tuque, gloves/mittens, etc.  
 \_\_\_\_\_

b) Food:  
 water, canned food (soup, vegetables, etc.), crackers and Melba toast, salt - sugar, instant beverages, etc.  
 \_\_\_\_\_

c) Personal care:  
 soap, shampoo, toothbrush and toothpaste, toilet paper, towel, facecloth, medication, etc.  
 \_\_\_\_\_

d) Safety equipment:  
 blanket, utensils, glass, plate, can opener, bottle opener, little heating stove and fuel, flashlight and batteries, radio, candles, matches, backpack, whistle, etc.  
 \_\_\_\_\_

2. Check with your parents to see if you have these items at home. Prepare your survival kit and provisions for 72 hours.

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# What must I say on the telephone?



## Task description

Students simulate an emergency call.

## Method suggested

1. Ask students to name the places where they can call for help in case of an emergency.
2. Ask them what they should say when they make an emergency call. Note their answers on the board.
3. Ask participants to form pairs and to fill out sheet 11.
4. Once the sheet is filled out, suggest that they simulate an emergency call. To do this, ask them to get together in pairs back to back. One will be the telephone operator and the other, the caller. Then reverse the roles.
5. Suggest that they bring this reminder home and post it near the telephone.
6. Answer any questions.

## Material required

- Sheet 11 of the activity booklet

## Answer key

Activity 11

## What must I say on the telephone?

1. Write down the telephone number to dial in case of an emergency.

2. Fill in the following sheet to find out what you must say when you make an emergency phone call. Keep it in your home close at hand.

Answers will vary

Hello, \_\_\_\_\_

My name is \_\_\_\_\_

My address is \_\_\_\_\_

My telephone number is \_\_\_\_\_

Explain what happened, give as many details as possible.

\_\_\_\_\_

\_\_\_\_\_

I need help to \_\_\_\_\_

- Can you repeat the message?
- Do you need more information?

Hang up **after** the operator.  
Stay calm.  
Follow the instructions.

# Safe evacuation of the school



## Task description

From reading an e-mail, students become familiar with the directions to follow and route to take to exit the school in an emergency.

## Method suggested

1. Ask students to give the reasons why they would have to leave their classroom or school quickly (natural or other disaster). Write their answers on the board.

2. Ask students to form pairs. Distribute a photocopy of the school floor plan to each participant.

3. Ask them to identify on the floor plan the exits they could use in an emergency: the main entrance, the door to the schoolyard, the side door, etc. Using various starting points, ask them to determine some routes for exiting the school. Suggest that they use coloured pencils to trace three different routes from the classroom, the gym and the library.

4. Read the directions for sheet 12 with them. Ask them to complete it by reading the e-mail and answering the questions.

5. Answer any questions.

## Material required

- Sheet 12 of the activity booklet
- Photocopy of a school plan for each participant
- Annex 9 – Checklist

## Answer key

Activity 12

## Safe evacuation of the school

1. Your friend Anna has sent you an e-mail telling you about the evacuation of her school. Carefully read what she wrote and then answer the questions.

*Hi,  
Today I got home from school earlier than expected. Do you believe there was a fire in the cafeteria! Lucky that the fire alarm warned us quickly! Anyhow, I knew what to do! We practiced evacuating the school a lot of times. I stayed calm and didn't panic. I followed the teacher's directions quietly. You understand that I wanted to cooperate to keep order and discipline. Outside, our class met on the soccer field. Later, my parents came to get me from the school bus parking lot. I was happy to get the afternoon off! And how's everything with you?*

Anna

1. Why was Anna's school evacuated?  
**Anna's school was evacuated due to a fire in the cafeteria.**

2. Write down three (3) instructions Anna followed to exit the school rapidly.  
**1 : She remained calm and didn't panic.**  
**2 : She quietly followed the teacher's instructions.**  
**3 : She cooperated to keep order and discipline.**

3. Where was the class's meeting place outside the school?  
**The class met on the soccer field.**

4. Where did Anna's parents come to pick her up?  
**They came and got her in the school bus parking lot.**

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# What could happen?



## Task description

Using an illustration and simple questions, students become familiar with human-made accidents.

## Method suggested

1. Ask students if they know what a human-made accident is, what causes this type of accident and how it happens. Explain to them that certain industries, the transportation of hazardous materials and new technologies (e.g. nuclear) may result in accidents that endanger health or even life.

2. Read the instructions for sheet 13 with them and ask them to complete it in teams of two, identifying the 6 human-made hazards and answering the questions.


3. When they have completed the activity, check their answers in the group as a whole. Have them explain what they would do if the authorities told them to take shelter indoors or to leave their homes.

4. Answer any questions.

## Material required

- Sheet 13 of the activity booklet

## Answer key



**Activity 13**


## What could happen?


1. Carefully examine the picture and place an X on the six (6) items that could result in human-made accidents.

<ul style="list-style-type: none"> <li>• Nuclear plant</li> <li>• Tanker truck containing oil</li> <li>• Train carrying dangerous products</li> </ul>	<ul style="list-style-type: none"> <li>• Toxic product factory</li> <li>• Water filtration plant</li> </ul>
---	---

2. In your own words, explain how these six (6) items could result in technological accidents and threaten your safety.

1. An explosion or fire in a nuclear plant could expose me to radioactive materials that could endanger my health.
2. An oil tanker truck could spill near a watercourse and contaminate my drinking water.
3. If a train carrying hazardous materials derailed near my home, I could be asked to leave the house.
4. Burning tires can release toxic gases into the atmosphere and force me to leave my home.
5. A fire in a toxic chemical plant could make me stay indoors because the wind carries toxic chemicals.
6. The water I drink could be contaminated and cause an epidemic.



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# Shelter-in-Place



## Task description

After completing activity sheet 14, students learn about accidents involving hazardous materials.

## Method suggested

1. Ask students to name products they think may be hazardous. When they provide an answer, ask what that material is used for. Many of them, if burned during a fire, can form toxic clouds. Explain that, if not handled properly, some products are hazardous.

Example :

- Chlorine is used for water purification but can cause serious burns if not handled properly.
- Anhydrous ammonia is used for fertilizer and for refrigeration systems but can cause serious burns if not handled properly.
- Natural gas is used to heat homes and businesses but can cause large fires if not handled properly.
- Propane is also used to heat buildings, fire barbeques and operate some automobiles but can cause large fires if not handled properly.
- Gasoline is used to power our cars and trucks but can cause water and land pollution or large fires if not handled properly.
- Pesticides are used to control insects and weeds but if not handled properly can pollute land and water.

2. Ask them to complete sheet 14. Review the answers with the entire class.

3. Once the sheets are filled out, return to the group to verify the answers. Ask the students to explain how the radio, etc., can warn us about the effects of hazardous materials.


4. Answer any questions.

## Material required

- Sheet 14 of the activity booklet


## Answer key

Activity 14




## Shelter-in-Place


1. Write down how each of these can warn you about a hazardous materials release.




a) Radio



b) Nose



c) Cloud



d) Emergency Vehicle


2. Write down the four (4) steps for "Shelter-in-Place".


1. **Go indoors.**

2. **Close all windows and doors.**

3. **Turn off ventilation systems.**

4. **Turn on radio and TV.**



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# How to react in case of an emergency?



## Task description

In a class discussion, students describe how they should react and intervene in case of an emergency.

## Method suggested

1. Ask students to describe their role in case of an emergency. To stimulate the discussion, ask them the following questions:

- What can you do to help your parents in case of an emergency?
- Can you prepare your luggage?
- Can you take care of your little brother or sister?
- What would you do if you were alone?
- What would you do if you were babysitting your little brother or sister?
- Other.

2. Read the instructions on sheet 15 with them. Ask them to fill it out individually by writing down how they would react in case of an emergency.

3. Once the sheets are filled out, review them as a group. Ask them to explain what their reactions and involvement would be in various emergencies. Compare their answers.


4. Answer any questions.

## Material required

- Sheet 15 of the activity booklet

## Answer key

Activity 15



## How to react in case of an emergency?

1. Read the following case studies. Write down a few words about what you would do in each situation.

a) On a lovely Saturday afternoon, you are playing in the house while your family is at the grocery store. Suddenly, the earth shakes.


**Remain calm.** \_\_\_\_\_

**Go indoors.** \_\_\_\_\_

**Close all windows and doors.** \_\_\_\_\_

**Turn on radio.** \_\_\_\_\_

**Wait for instructions from authorities.** \_\_\_\_\_



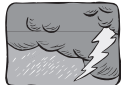
b) It is nighttime. It is raining and a lightning storm is starting. Suddenly, there is a power failure. What do you do?

**Remain calm and reassure my younger brother or sister.** \_\_\_\_\_

**Stay away from windows and metal objects.** \_\_\_\_\_

**Get a flashlight.** \_\_\_\_\_

**Go to the neighbors' house.** \_\_\_\_\_




c) In the spring during the thaw period, the river floods onto your lot. Your family and you have to leave the house for safety. What do you do?

**Remain calm.** \_\_\_\_\_

**My parents turn off power and gas supplies.** \_\_\_\_\_

**Move our valuables to the upper floor of the house.** \_\_\_\_\_

**Remain on the upper floor of the house and wait for instructions from authorities.** \_\_\_\_\_



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# How do I feel after an emergency?



## Task description

Students fill out a crossword puzzle using words to express the needs and feelings experienced after a disaster.


## Method suggested

1. Have students identify the needs and feelings that may be experienced after a disaster. Write their answers on the board.
2. Have students form pairs. Read the instructions on sheet 16 with them. Ask them to fill in the blanks which express the needs and feelings experienced after a disaster.
3. Once the sheets are filled out, review them as a group. Check their answers by asking them to read their answers out loud. Ask them if they have ever experienced these needs and feelings in the past.
4. Answer any questions.

## Material required

- Sheet 16 of the activity booklet

## Answer key





**Activity 16**

## How do I feel after an emergency?

1. Fill out this crossword puzzle and remember the needs and feelings that you may have experienced after an emergency.

anger	fear	joy	sadness
anxiety	friendship	love	safety
attention	happiness	patience	suffering
calm	help	trust	
	helplessness	worry	



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# What does heat mean to you?



## Objective of assignment

The objective of this assignment is to introduce the topic of extreme heat as a natural hazard and to raise the student's awareness of its effects on human health.

## Task description

This activity is a take-home assignment. Based on their own past experiences, ask the students to think individually about heat and what it means to them. The students may start this assignment in the classroom by drawing a picture of what heat represents to them. Ask them to bring the assignment home, and encourage them to discuss the concept of heat with their family. They will be asked to share their answers with the class.

## Method suggested

1. Inform the students that they will be discussing heat.
2. Ask the students what comes to mind when they think about the concept of heat. Give a few ideas if no one speaks (i.e. summer vacation, the beach, camping, melting ice cream, sun, pool, water, shade, etc.).
3. Write the students' answers on the board.
4. Once the students have had the opportunity to share and sufficient examples are on the board, instruct the students to turn to Activity 17 in their booklets.
5. Instruct them to draw what heat represents to them. Let them know that they can use one of the ideas on the board or come up with something else.
6. Allow the students 15 minutes to start their drawings. Encourage them to make their drawings colourful.
7. Once the time is up, ask the students to bring their booklets home to finish the drawing and also to discuss extreme heat with their families.
8. Continue reading the instructions with them and ask them to answer the questions with their families.
9. Let the students know that the drawings and the results of their discussions at home will be presented to the class.
10. Answer any questions.

## Discussion of assignment

1. Ask the students to present their drawings and to briefly explain what inspired their choices.
2. Review the answers to the questions by asking the students to share the discussions they had with their families.
3. Answer any questions.

## Duration


- Class time: 45 minutes
- Home: 15 to 20 minutes

## Material required

- Activity booklet
- Crayons or markers

## Answer key

Activity 17



2. Answer the following questions with help from your family. Be prepared to share your answers with your classmates.

a) Can you remember a time when it was very hot?

\_\_\_\_\_

\_\_\_\_\_

b) Where were you?

\_\_\_\_\_

\_\_\_\_\_

c) What were you doing?

\_\_\_\_\_

Answers will vary

d) How did you feel?


\_\_\_\_\_


\_\_\_\_\_

e) What did you do to cool down?

\_\_\_\_\_

\_\_\_\_\_





# What is heat?



## Objective of the activity

The objective of the activity is to have the students learn about heat by having them describe the four variables that constitute heat: temperature, radiant heat, humidity and wind.

## Task description

The activity consists of a game of myths and facts. This activity will help the students distinguish between commonly misunderstood details and facts related to the concept of heat.

## Method suggested

1. Introduce the topic by telling the students they will learn about heat by participating in a learning game of “heat: myths and facts”.

2. Ask the students if they know what a myth is. Ask them to give a few examples.

3. Ask the students if they know what a fact is. Ask them to give a few examples.

4. Group the students in teams of four(4). Ask each group to select a spokesperson to report back to the class.

5. Ask the students to turn to Activity 18 in their booklets and read the instructions with them.

6. Ask the teams to discuss the statements and to decide if they are myths or facts by completing the activity sheet.

7. Allow the students 10 minutes to answer the questions.

8. When the time is up, ask the group spokesperson to report the information noted on the activity sheet.

9. When reviewing the answers, have the spokesperson of each team provide you with the team’s answers and why each response was chosen.

10. Review statements 1 and 2 and explain that heat is more than the temperature they see on the thermometer or on the weather report. On a hot day, what the heat feels like is determined by a combination of a few different factors.

11. Review statements 3 and 4. Explain that heat is a combination of four different factors and that the temperature is one of them. There are three other factors to think about when we talk about heat: radiant heat, humidity and wind speed.

12. Review statement 5 and explain that the temperature tells you how hot or cold it is. It is measured with a thermometer. Temperature is measured in degrees Celsius in Canada and Fahrenheit in the United States.

13. Show a thermometer and demonstrate to the students how to read the ambient temperature. Inform the students that it is \_\_\_\_ °C in the classroom.

14. Have a few students work with the thermometer by having them take the temperature of cold water and then warm water so they can see how the temperature changes on the scale.

15. Review statements 6, 7 and 8 and explain that radiant heat is the thermal energy coming directly from the sun or from hot objects (e.g. oven, fire). Objects that do not naturally emit heat can also absorb and reflect radiant heat back into the environment (e.g. asphalt or roads, buildings, hot machinery). Give the following example: it is warmer in the direct sun versus the shade even though the temperature outside is the same.

16. Demonstrate radiant heat by asking a few students to place their hand near a light bulb. Explain that the light bulb is considered a direct source of heat. Students will feel the heat radiating from the light bulb.

17. Review statements 8 and 9 and explain that humidity is the amount of water vapour in the air. The more water that is in the air, the higher the humidity levels which slows down the body's evaporative cooling mechanism. High humidity doesn't occur only after it rains. There could be high humidity levels when it is sunny.

18. Review statement 10 and explain that the wind is the movement of the air. Wind can provide relief in hot environments. It also helps the body to evaporate sweat faster, which increases comfort and cooling of the body.

19. Demonstrate the wind by turning on a fan.

20. Answer any questions.


**Duration**

Class time: 30 – 45 minutes

**Material required**

- Annex 4: Heat parameters
- Activity booklet
- Thermometer
- Cold water
- Hot water
- Light bulb
- Fan

**Answer key**




**Activity 18**

**What is heat?**

Read each of the following statements and determine if the statements are myths or facts.

	Myth	Fact
1. Heat and temperature are the same thing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. The four (4) variables of heat are: temperature, radiant heat, humidity and wind speed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Humidity is the amount of water vapour or moisture in the air.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. The speed at which the wind moves is called wind speed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Radiant heat can be reflected from different types of surfaces on the ground.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Temperature is the measurement of how cold or hot it is.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Wind can increase evaporative cooling and provide relief in a hot environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. The body can radiate heat to help cool itself.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. It only feels humid when the sky is cloudy.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Radiant heat is the heat coming directly from the sun.	<input type="checkbox"/>	<input checked="" type="checkbox"/>



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# How does the body regulate itself?



## Objective of the activity

The objective of the activity is to have the students describe how the human body regulates itself when exposed to heat.

## Task description

The learning will take place through research, presentation and class discussion.

## Method suggested

1. Tell the students that they will learn how the human body can cool itself down when it is very hot.

2. Ask the students if they know what their body temperature is.

3. Show that the body temperature of a human being is approximately  $37^{\circ}\text{C}/98.6^{\circ}\text{F}$  by taking the temperature of a couple of students.

*Note to the teacher: Please clean the thermometer with an ethanol swab before you begin, between each student and at the end of the activity.*

4. Ask the students if they have an idea how the body keeps its temperature at about  $37^{\circ}\text{C}/98.6^{\circ}\text{F}$  when it is very hot. Collect a few answers and write them on the board.

5. Explain that the body needs to maintain a constant core temperature. When it is very hot, the body uses different mechanisms to regulate its core temperature by absorbing or dissipating heat.

6. Introduce the mechanisms by showing the poster on the four (4) mechanisms: perspiration, conduction, convection and radiation. Illustrate each one by using the pictures of the poster.

7. Once you have presented the four (4) mechanisms, form groups of four (4) and assign one topic (thermoregularity mechanisms) per team.

8. Ask the students to turn to Activity 19 in their booklets and read the instructions with them.

9. Allow 20 minutes to complete exercise.

10. Once the time is up, review answers by having the students present their findings.

11. Ask the students to take notes in their activity booklets when listening to their classmates' presentation and encourage class discussion.

12. Provide feedback when needed.

13. Once the presentations are done, demonstrate how colder surfaces can help regulate body temperature when it is very hot by linking the demonstrations with the four (4) mechanisms of thermoregulation. For example:

- **Conduction:** Use cold water or ice cubes, and ask the students to observe how their skin feels (it should feel cooler).
- **Convection:** First, ask some students to stand in front of the fan and ask them how they feel (it should feel somewhat cooler). Second, ask the same students to put a little water on their skin and to approach a fan. Explain that the fan represents the wind. Ask the students how they feel (it should feel even cooler).

14. End the discussion by explaining that weather conditions play a big role in how the body regulates its temperature. Environment Canada can, for the most part through weather forecasting, help us prepare for in advance for extreme heat events.

15. Answer any questions.

## Duration

Class time: 20 minutes




## Material required

- Annex 5: Heat and the body
- Activity booklet
- Thermometer (ear – digital)
- Ethanol swabs
- Cold water
- Fan
- Ice cubes

## Answer key

Activity 19



### How does the body regulate itself?

The human body's temperature is about 37°C/98.6°F. In order to stay around 37°C/98.6°F, the body must regulate its temperature by absorbing and dissipating heat. To keep cool, the body uses four (4) mechanisms: evaporation, convection, conduction and radiation.

1. Research information on the mechanism that has been assigned to your group. Your teacher will provide you with information (Annex 4) that will help you complete this assignment. You can also search the Internet (if available to you).
2. Record your findings in your activity booklet and give examples that illustrate the mechanism you are working on.
3. Name someone in your group to present your findings.
4. Take notes when your classmates present their topics and be prepared to discuss with your classmates.

**Mechanism no. 1: evaporation**

Findings:

- The body can cool itself by the evaporation of sweat.
- Perspiration is the formation of sweat on the skin.
- Sweat is water that contains salt and minerals from the body.
- The evaporation of sweat is the most critical cooling mechanism because it always results in heat loss.
- Wind speed increases evaporative cooling but high humidity slows it down by increasing the amount of water vapour in the air. The more water in the air decreases the amount that can be absorbed from the body's sweat.


Examples that illustrate evaporation:


- Sweating from physical activity

**Mechanism no. 2: convection**


Findings:

- The body can cool itself through the transfer of heat from a warm object to a cooler object.
- Convection is a bi-directional mechanism. The body can dissipate heat by releasing it to the cooler air. However, it can also absorb heat through the same principles if the air is warmer.



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Activity 19



Examples that illustrate convection:

- The cooler air from opening the fridge or freezer door will cool your skin. At the same time, exposing the cooler fridge or freezer air to room temperatures will also warm the air inside the fridge or freezer.

**Mechanism no. 3: conduction**

Findings:

- The body can cool itself through the transfer of heat by direct physical contact providing the object has a cooler surface temperature than the skin.
- Conduction is also a bi-directional mechanism. The body can directly transfer its heat to a cooler object but heat can be gained if the surface contact is warmer than the skin.

Examples that illustrate conduction:

- By holding an ice cube, it will cool the skin while the heat from your hand will melt the ice.


**Mechanism no. 4: radiation**


Findings:

- The body can cool itself by radiating heat into the environment.
- The body emits heat in the form of infrared waves and can be absorbed into the air or by another object.

Examples that illustrate radiation:

- The body can absorb radiant heat from the natural environment, such as direct sunlight or fire.
- The body can also absorb radiant heat from artificial objects, such as light bulbs, candles or hot machinery (e.g. oven)
- Infrastructure such as buildings and asphalt can absorb radiant heat from the sun and then re-emit it back into the environment where the body can also absorb it.



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# How does the body regulate itself?

## Objective of the activity

The objective of the activity is to have the students review the content seen in activities 18 and 19.

## Task description

The review of the content will take place through a quiz game. The students are divided in small groups and are asked to answer questions. The team with the most points wins the game.

## Method suggested

1. Tell the students that they will play a quiz game.
2. Group the students in teams of 8. Ask the teams to give themselves a name.
3. Distribute a prop to each team. Explain that the props are to be used to get the right to speak.
4. Explain the rules of the game:
  - a. You are the moderator. You ask the questions.
  - b. The teams get 15 seconds to discuss the question and come up with an answer.
  - c. The first team ready to answer uses his/her prop to request the opportunity to speak.
  - d. Once the team gives its answer, the moderator decides if the answer is correct. If the answer is accurate, give 3 points. If the answer is wrong or incomplete, give another team the opportunity to respond. If the proceeding answer is correct, give 1 point. If two teams cannot come up with the correct response, give the answer and explain the content.
  - e. The game goes on until all questions are asked.
5. Keep the score on the board or a flip chart paper.
6. When the game is over, count the points and announce the winning team.
7. Answer any questions.

## Duration

Class time: 20 minutes

## Material required

- Annexes 4 and 5
- List of questions and answers
- Props
- Flip chart paper or board
- Markers

# Quiz game questionnaire

No.	Questions	Answers
1	Heat and temperature are synonyms.	False
2	What is ambient temperature?	The measurement of how hot or cold it is outside
3	Convection is the transfer of heat by direct physical contact.	False
4	What are the four factors of heat?	Temperature, radiant heat, humidity, wind
5	Humidity increases the acceleration of the evaporation of sweat.	False
6	Name one example of convection.	Release of the body heat to the cooler air
7	Wind speed is the speed at which air moves.	True
8	What are the 3 key mechanisms on which the body depends to absorb or dissipate heat?	Convection, conduction, radiation (the body cannot absorb heat through perspiration, only dissipate it)
9	Humidity is the amount of moisture in the air.	True
10	When it is windy, sweat evaporates faster.	True
11	How is temperature measured?	It is measured with a thermometer in degrees Celsius or Fahrenheit.
12	Normal body temperature is at 34.3°C.	False. Normal body temperature is about 37°C.
13	Name two examples of radiation.	Examples can be: direct sunlight, buildings that absorb heat and re-emit it into the environment, different types of hot machinery, asphalt, the human body.
14	The body can radiate heat to assist in cooling the body.	True
15	Name two examples of conduction that can cool the body.	Holding an ice cube, holding a cold glass of water
16	The weather conditions play a big role in how your body regulates its temperature.	True
17	Evaporative cooling is the most critical cooling mechanism at high temperature because it always results in heat loss.	True

# Heat-related illnesses



## Objective of the activity

The objective of the activity is to have the students recognize heat-related illnesses by learning the symptoms of each illness and naming several essential preventive and responsive measures when faced with heat-related illnesses.

## Task description

The learning will take place through scenarios.

## Method suggested

1. Tell the students that they will learn about heat-related illnesses, their symptoms and preventive and response measures to take.

2. Explain briefly under what circumstances heat-related illnesses can happen and relate it back to the previous section about the body's thermoregulatory principles. Refer to the following notes:

- Our bodies create a tremendous amount of internal heat and are normally cooled down through sweating and radiating heat through our skin.
- Under certain circumstances, such as high temperatures and/or high humidity, or during vigorous exercise in hot weather, the body will have to work harder in order to regulate its temperature. This is called heat strain.
- If the strain of maintaining a normal core body temperature becomes too difficult, the body's cooling system may begin to fail and the internal body temperature can reach dangerous levels. The result can lead to non-emergency heat-related illnesses, such as heat cramps, heat edema and heat rashes or to a serious heat illness, such as heat exhaustion or heatstroke.

3. Hand out copies of Annex 6, Heat-related illnesses, and review the materials with the students.

4. Group the students in teams of four (4).

5. Tell the students to turn to Activity 20 in their booklets and read the instructions of the activity with them.

6. Allow 15 minutes to complete the exercise.

7. Once the time is up, review answers by having the students present their answers.

8. Provide feedback when needed.

9. Answer any questions.


## Duration

Class time: 30 minutes

## Material required

- Annex 6: Heat-related illnesses
- Activity booklet

## Answer key



**Activity 20**


## Heat-related illnesses


- Read the following three (3) scenarios.
- Answer the questions.
- Your teacher will provide you with some additional information (Annex 6) that will help you complete the activity.
- Work as a team and write your answers in the space provided below.
- Be prepared to share your answers with your classmates.

**Scenario 1: A game of soccer**

Gregory and his friend Manuel, who are both 10 years old, play soccer every Saturday afternoon with their friends. Today, both are playing in the town's annual weekend youth soccer tournament, which is held in July and is typically the hottest time of the year. The weather forecast for the weekend is going to be hot and humid. On the first day of the tournament, the outdoor temperature is 30°C. The humidity level is very high and there is no wind. Gregory notices that Manuel has not been drinking water during the game. All of a sudden during a game, Manuel falls on the ground and starts to cry. He says that he has pain in his left leg.

- Could Manuel have a heat-related illness? Which is most likely?  
**Manuel has heat cramps.**
- How do you know?  
**Manuel has been running and playing an intensive sport on a very hot day. He has not been drinking much water and has muscle pain in his leg.**
- What should Gregory do to help him?  
**Get help from an adult or tell the coach about Manuel's symptoms.**
- What could Manuel have done to better prepare himself?
  - Bring a bottle of water and drink regularly.
  - Take longer rest intervals since it is very hot.
  - Sit in the shade when taking a break.





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Activity 20

### Scenario 2: A hike in the mountain

It is the middle of August. After a midday rain shower, Lucy and her older Aunt Mildred decide to go for a hike in the afternoon. The weather is very hot and humid from the rain and cloud cover. The two walk for about three (3) hours. When Aunt Mildred arrives home, she tells Lucy that she feels light-headed, hot and sick to her stomach. When Lucy asks if Aunt Mildred feels okay, she appears to be uncomfortable and cranky.

a) Could Aunt Mildred have a heat-related illness? Which is most likely?

**Aunt Mildred has heat exhaustion.**

b) How do you know?

**It's been very hot all day, and she has been active. She feels light-headed, hot and nauseous. She also appears to be uncomfortable and cranky.**

c) What should Lucy do to help her aunt?

**Lucy should bring her aunt to a cool place and have her rest. She should give her sips of water. If her aunt is wearing any tight restrictive clothing, she should loosen up the clothing. She could also put cold water on her skin and/or fan her.**

d) What could Aunt Mildred have done to better prepare herself?

- Check if the weather was appropriate for a walk in the mountain.
- Bring water and drink regularly, before you feel thirsty.
- Take breaks.
- Splash her face with cool water to cool off.
- Wear loose-fitting, breathable, light-colored clothing.
- Take a cool bath or shower when she gets home until she feels refreshed.



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Activity 20

### Scenario 3: An afternoon at the beach

It is the August long weekend and Tanya and Joe decide to go to the beach on the Saturday afternoon. The sky is blue, the sun is shining, the weather forecast calls for a high of 34°C and the level of humidity is high in the city. When they arrive at the beach, Tanya and Joe realize that it still feels humid and they have forgotten their beach umbrella at home. They don't really mind since there is a light, warm wind and both enjoy laying in the sun. As the afternoon goes on, Joe feels tired, weak and dizzy. Joe typically doesn't drink a lot of water and has not been drinking much at the beach. He also hasn't been swimming yet. Later in the afternoon, he starts having cramps in his stomach and feels like vomiting, but he is unable to walk to the washroom. He is sweating a lot and says that he is very tired and hot. When Tanya asks him what is wrong, he is very confused and cannot answer simple questions. Then Joe loses consciousness.

a) Could Joe have a heat-related illness? Which is most likely?

**Joe has heatstroke.**

b) How do you know?

- Joe has been out in very hot temperatures.
- He feels tired, weak and dizzy.
- He has not been drinking much water.
- He has cramps in his stomach and feels like vomiting.
- He is unable to walk to the washroom.
- He is sweating a lot and he is very tired and hot.
- He is very confused and cannot answer simple questions.
- He loses consciousness.

c) What should Tanya do to help him?

**Call 9-1-1 or the local emergency number.**

d) What should have Joe and Tanya done to be better prepared?

- Check the weather outside and make sure they are prepared for the heat.
- Bring an umbrella, avoid sun exposure and stay in the shade.
- Wear a wide-brimmed hat.
- Wear sunscreen lotion and sunglasses.
- Drink water and eat fruits that have high water content.
- Cool off by going for a swim.

Question

What is the first thing you should do when you are with someone who has heatstroke?

**Call 9-1-1 or the local emergency number.**



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# Heat and vulnerable groups



## Objective of the activity

The objective of the activity is to have the students identify amongst their families, friends and other people those who are the most vulnerable to heat.

## Task description

The learning will take place through a class discussion and an at-home assignment.

## Method suggested

1. Tell the students that they will learn about groups of people who are most vulnerable to heat.

2. Ask the students to name the people or groups they see as being vulnerable to heat.

3. Start the discussion with a brainstorming session and encourage the students to give more answers by providing clues. Examples include:

- I build houses.
- I sometimes live in a residence for the elderly or a nursing home.
- I work in the field all day to produce vegetables to feed you.
- I travel to your country or city to visit and learn about your culture.
- I take medicine to help control my blood-sugar level.
- I run for many kilometres to win a race.
- I moved to your country to work or to study or to have a better life.
- I jump, run and bark when I am happy.

4. Write the answers on the board as they are given by the students.

5. When the list is complete, hand out copies of Annex 7, Heat and vulnerable groups, and review it with them.

6. Tell the students to think about their family (parents, grandparents, siblings, relatives), pets, their friends and neighbours.

7. Ask the students if they can identify someone in their family who could be at risk of heat-related illnesses.

8. Tell the students to turn to Activity 21 in their booklets.

9. Ask the students to write the names of the individuals they are thinking about in their booklet.

10. Explain to the students that they will interview one of the individuals they have identified to learn more about how their habits, their health and why they are at risk when it is very hot. Do you think people are at risk from extreme heat? Would you consider yourself one of those individuals?

11. Group the students in teams of four (4).

12. Tell the students to think about four (4) questions they could ask to learn more information about the people at risk when it is very hot. Here are a few examples of questions:

- Do you think people are at risk from extreme heat? Would you consider yourself one of those individuals?
- Have you ever gotten sick because of the heat or were you ever uncomfortable because of the heat?
- Why do you think that you could be at risk of being sick when it is very hot outside (Are there health challenges for you when it is hot outside)?
- How did you feel when you were sick or uncomfortable? What were the symptoms?
- What did you do to feel better?
- Other questions.

13. Allow 15 minutes to complete the exercise.

14. Once the time is up, review the students' work by having them present some of their questions.

15. Provide feedback when needed. Tell the students to be prepared to share the results of their interview with their classmates.

16. Answer any questions.

**Review of homework**

1. Ask the students to present their work to their classmates.
2. Review the “vulnerable population groups”.
3. Answer any questions.


**Duration**

- Class time: 30 minutes
- Home time: 15 minutes
- Debrief time: 30 minutes

**Material required**

- Annex 7: Heat and vulnerable groups
- Activity booklet

**Answer key**



**Activity 21**

## Heat and vulnerable groups

In this activity, you will learn about groups of people that are most vulnerable to heat. Before starting the activity, think about your family (mom, dad, grandparents, siblings, aunts, uncles, cousins, pets), friends and your neighbours.

**1.** Write down the names of the people you think could be more at risk of feeling sick because of the heat.

- Is it grandma? Grandpa?
- Your mother? Father?
- Your sisters or brothers?
- An aunt or uncle?
- Or a neighbour? A friend?
- Maybe your dog or cat?

I think that \_\_\_\_\_ and \_\_\_\_\_ could be at risk of feeling sick when it is very hot.

**2.** Conduct an interview with one of the people you listed as being possibly more vulnerable to heat. Prepare yourself to interview that person by writing four (4) questions about their experience or knowledge of heat as a health risk and past extreme heat events in the space below.

Question 1:

\_\_\_\_\_

\_\_\_\_\_


Answer:


Answers will vary

Question 2:


\_\_\_\_\_

\_\_\_\_\_



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**Activity 21**

Answer:

\_\_\_\_\_

\_\_\_\_\_

Question 3:

\_\_\_\_\_

\_\_\_\_\_

Answer:

Answers will vary

Question 4:

\_\_\_\_\_


\_\_\_\_\_


Answer:

\_\_\_\_\_

\_\_\_\_\_

**3.** Be prepared to share the results of your interview with your classmates.



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# Being prepared for the heat



## Objective of the activity

The objective of the activity is to have the students prepare an extreme heat checklist and to present it to their classmates.

## Task description

The learning takes place through scenarios. The students team up in groups of four(4). Each group is a consultant firm. As a team, the students have to find solutions for their clients who would like to enjoy being active even though the weather outside is very hot. The students are invited to be creative and imaginative in their projects. They can use the Internet, if available.

## Method suggested

1. Introduce the activity by explaining the following:
  - Most heat-related illnesses can be prevented;
  - Since the weather is forecast in advance, you can be prepared by checking the Environment Canada or Weather Network Web sites;
  - It is important to give the body time to get used to the heat (i.e. to acclimatize);
  - Plan ahead if you want to stay cool!
2. Tell the students that they will be preparing an extreme heat kit checklist.
3. Explain to the students that they will be working as a team of consultants to find solutions for their clients who would like to spend the day outside even though the weather is very hot.
4. Explain to the students that they will be working on a scenario.
5. Ask the students to turn to Activity 22 in their booklets and read the instructions with them.

6. Assign one of the four scenarios to each team.

7. Hand out copies of Annex 8 and tell the students that they can use this information to resolve the scenarios. The students may have access to the Internet to come up with ideas, if possible.

8. Let the students know that they will be presenting their answers to their classmates. Have each group designate a spokesperson.

9. Allow 20 minutes to complete the exercise.

10. Answer any questions.

## Review of homework

1. Ask the teams to share their answers with their classmates.
2. Review the answers based on the content presented in Annex 8.
3. Answer any questions.

## Duration

Class time: 60 minutes

## Material required

- Activity booklet
- Annex 8: Being prepared for the heat

## Answer key

Answers will vary – refer to Annex 8.



# What are the correct behaviours to adopt?



## Task description

Through role playing, students demonstrate the attitudes and behaviours to adopt during a natural disaster.

## Method suggested

1. Ask students to get together in teams of four to five. Give each team a type of disaster: flood, lightning storm, tornado or hazardous material accident.

2. Ask each team to prepare a skit on the various attitudes and behaviours to adopt during a natural disaster.

3. After a few minutes of preparation, ask each team to present their skit in front of the class. After each presentation, review each of the situations as a group to analyze and highlight the correct attitudes and behaviours to adopt.

4. Suggest that they write down the correct attitudes and behaviours to adopt on sheet 23 and then to use this sheet as a reminder.

5. Continue presenting the situations.

6. Once the activity is completed, make a summary of the overall correct attitudes and behaviours to adopt during a natural disaster.


7. Answer any questions.

## Material required

- Sheet 23 of the activity booklet

## Answer key

Activity 23



### What are the correct behaviours to adopt?

I. Write down the correct behaviours to adopt during each one of the disasters below:

a) Flood

**Remain calm.**

Move your valuables to the upper floor of the house.

Remain on the upper floor of the house, wait for instructions from authorities.

Turn off power and gas supplies.

b) Lightning storm

**Remain calm.** Stay inside the house.

Stay away from windows and metal objects.

Turn off electrical appliances.

Avoid using the telephone.

c) Tornado

**Remain calm.**

Keep away from doors and windows.

Seek shelter in the basement or under a staircase under furniture or in a closet.

Avoid large rooms because the roof could collapse.

d) Earthquake

**Remain calm.** Go indoors.

Close all windows and doors.

Turn off ventilation systems. Turn on radio.

Wait for instruction from authorities.


e) Heat wave

**Stay in a cool place.**

Drinks lots of liquids.

Don't go out during the day.

Avoid sugary drinks.



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# Do you remember?



## Task description

Using sentences with blanks to fill in, students review the content on disasters.

## Method suggested

1. Review the concepts discussed in the various activities by asking students to summarize what they have learned in the preparedness program. Stimulate the discussion by asking them the following questions:

- What is a natural disaster?
- Name and describe a few natural disasters studied.
- Where and when did these disasters occur?
- What disaster risks have you identified in your environment?
- What are essential objects to have in case of an emergency?
- Other.

2. Read the instructions on sheet 24 as a group. Ask them to fill in the blanks individually.


3. Once the sheets are filled out, review them together. Ask them to read their sentences out loud.

4. Answer any questions.

## Material required

- Sheet 24 of the activity booklet

## Answer key



**Activity 24**

## Do you remember?

1. Fill in the sentences by using the following words:

• earthquakes	• whirlwind	• rise	• releases	• foods
• funnel	• prepared	• anywhere	• bolt	• thunder
• crust	• leak	• spill		

In Canada, various disasters can occur. At any time, we must be ready to face **floods**, tornadoes and hazardous materials releases.

Floods are caused by a sudden **rise** of the water level.



An **earthquake** is a sudden movement of the earth **crust**.


A **whirlwind** in the form of a **funnel** produces a tornado.

A lightning storm is characterized by a lightning **bolt** followed by **thunder**.

Hazardous materials **releases** may occur if there is an accidental **spill** when chemical products **leak**.

Disasters may occur **anywhere** in Canada. You must be well **prepared** to react.

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# Let's review



## Task description

Using sentences with blanks to fill in, students review the attitudes and behaviours to adopt in a disaster.

## Method suggested

1. Ask students if they remember which attitudes and behaviours to adopt during certain natural disasters. Stimulate the discussion by asking them the following questions:

- What are the attitudes to develop?
- What are the behaviours to adopt during an earthquake, a tornado, a lightning storm or a flood?

2. Read the instructions on sheet 25 with them and ask them to fill in the blanks individually.


3. Once the sheets are filled out, review their answers as a group. Ask them to read their texts out loud.

4. Answer any questions.

## Material required

- Sheet 25 of the activity booklet

## Answer key



**Activity 25**

## Let's review

1. Fill in the sentences by using the following words:

• patient	• fearful	• rescued	• furniture	• calm	• follow
• move	• windows	• shelter	• firmly	• lie	• cool
• Shelter-in-Place		• home	• closing	• inside	• liquids

During an earthquake, one must seek shelter under **furniture** or **move** to an open area. It is normal to be **fearful**.



During a tornado, it is better to stay away from **windows**, to hang on **firmly** to something solid and to remain **calm**.


During a lightning storm, you must be **patient**, stay **inside** and not **lie** on the ground outside.

During a hazardous materials release you must **Shelter-in-Place** by going inside your **home** and **closing** all windows and doors.

During a flood, it is suggested to seek **shelter** on the top floor of a house while waiting to be **rescued** and to **follow** the instructions.

During a heat wave, you should stay in a **cool** place and drink lots of **liquids**.

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# For more information

In this fourth part of the facilitator's guide, there is information on the main natural disasters that could occur in your province or in other parts of Canada, the measures to take to be well prepared for emergencies and the observable reactions students have in case of an emergency.

A natural disaster is a sudden event that threatens the life, health and living conditions of a community. They surpass the normal capacity of community institutions and individuals to deal with the situation. Therefore, an event or a fire becomes a disaster when:

- It involves an extreme phenomenon;
- The event occurs unexpectedly;
- The phenomenon affects a large number of people.

## Types of disasters

Disasters can be caused by nature or by human activity.

A natural disaster is caused by natural elements such as wind, rain, extreme temperatures or seismic activity, which become catastrophic by causing deaths, injuries and material damage. There are two types of natural disasters:

- Weather or climate-related disasters: storm (freezing rain, rainstorm, hurricane and tornado), heat or cold wave, drought, flood.
- Geological disasters: earthquake, landslide and tsunami.

Disasters deriving from human activity also have many types, including:

- Biological disasters: epidemic, infestation.
- Industrial or environmental accidents: fire, explosion, transportation accident (in the air, on earth or at sea), pollution, failure of civil engineering structures, etc.
- Armed conflicts: terrorism, civil war.

## Types of natural disasters

There are three types of natural disasters:

- Weather-related disasters: storms (hurricanes, tornadoes, cyclones, snowstorms) heat or cold waves, droughts, etc.
- Topographical disasters: floods, avalanches, landslides, etc.
- Geophysical disasters: earthquakes, volcanic eruptions, tidal waves, etc.

## A few natural disasters

Many natural disasters can lead to major damage when they occur close to residential areas. This section of the teaching guide provides a short list of these disasters.

### Lightning storms and lightning bolts

Lightning storms consist of lightning flashes (light) and thunder (bang). Lightning can smash windows, start a fire, cause power failures or explosions if it comes into contact with fuel. It can be dangerous to humans by causing serious burns or electrocution. This natural phenomenon occurs mostly in the summer, late in the afternoon.

Vertical air currents that carry humidity, water and ice in the clouds create electrical charges. Clouds then develop positive and negative charges. When these charges are too high, there is an electrical discharge. Discharges occur either between clouds to produce heat lightning or on touching the ground to produce a lightning bolt that may strike the same place several times. Astonishingly, lightning can also occur during a snowstorm.

A lightning bolt produces a tremendous amount of energy. It can reach temperatures up to five times that at the surface of the sun. If it strikes a tree, the electrical current reaches the water in the wood and changes it into steam which shatters the tree. This discharge usually occurs at only one point in the lightning bolt.

During a storm, you first see the flash of lightning and then hear the thunder. This can be explained by the fact that light travels one million times faster than sound.

You can measure the distance of a storm by counting the number of seconds between the time you see the flash of lightning and the time you hear the thunder. You then divide the time by 3 and you get the distance of the storm in kilometres.

## Power failures

Here are possible causes of power failures:

- Natural: Lightning bolts, freezing rain, frozen electrical wires, storms and trees that fall on power lines.
- Technical: Electrical power failure or breakdown.
- Human: Overloads, short-circuits, power cut-offs, person who brings an aluminum ladder or a metal antenna close to electrical wires, excavation work.

### What to do in case of a prolonged power failure?

In case of a power failure, you should first determine how extensive it is (a few houses, one entire street, a neighbourhood) and notify your electricity company to help them locate the failure. With their computers, they usually can quickly find the failures in a network because of the sudden lowered electricity demand.

If the power failure lasts, you should:

1. Listen to the radio station to know more about the failure;
2. Lower the thermostat so as not to overload the network when the power comes back on;
3. Disconnect electrical appliances that were in operation before the power failure, except for the refrigerator and freezer;
4. Leave a few lights on to know when the power comes back on;
5. Avoid opening the refrigerator and freezer: food can be kept for 24 to 48 hours. In winter, some food can be kept outside or along the windows;
6. Close water valves and open water faucets when you leave your home;
7. Avoid using the elevator after the electricity has come back.

When the power comes back on, you must gradually reconnect your electrical appliances and turn on the heating progressively to avoid overloading the circuit and causing other failures.

### Changing your habits temporarily

It is important to remember that people's habits completely change during a power failure. Everyday life changes altogether. It becomes more difficult to cook, heat the house, provide lighting and carry out activities.

## Heavy rains (or torrential rains)

Clouds are a collection of very small water droplets. Carried by the wind, they stick together and form larger droplets. When their size is greater than 0.1 mm, they fall as rain. Heavy rains last for a long period of time, accumulate and fall at a rate of about 7.6 mm per hour. If they are heavy enough, they can cause localized or generalized floods.

## Earthquakes

Earthquakes or seismic activity are sudden movements of the Earth's crust. The tremors usually occur suddenly and leave very little time to react. It is impossible to prevent or forecast earthquakes. A tremor that registers less than 3.5 on the Richter scale usually goes unnoticed. Tremors that have a magnitude of 5.5 to 6 can cause moderate damage to neighbouring buildings. When the earth trembles at a magnitude of 7 or more, it is considered a major earthquake that can cause large-scale damage.

## Floods

In Canada, floods are natural disasters that cause the most material damage. Floods are the overflow of rivers and lakes caused by an excessive rise of the water level. This rise can be caused by heavy precipitation, sudden thawing of snow, ice jams or ice breakups.

## Snowstorms

This natural phenomenon is characterized by abundant snowfall and strong winds. Visibility is thereby reduced and it becomes hard to walk or travel outside. Thus, it is better to stay at home. Schools are usually closed and traffic on the highways is limited. During a snowstorm, the air temperature is usually higher because snowfalls are more abundant when the temperature is slightly below 0°C.

Snowstorms are most common in December, January, February and March. It does not snow everywhere in the world. In some countries, the snow falls only at the top of high mountains. In other countries, there is never any snow. At the North Pole and the South Pole, the snow never melts.

**Freezing rain**

Freezing rain is caused by raindrops freezing upon impact on earth or on an object. It then forms a layer of ice. The thickness of the ice depends on the amount of time the freezing rain lasts and on its intensity. When ice accumulates on electrical wires it can result in severe damage and large-scale power failures. In addition to damaging trees and houses, freezing rain also makes it dangerous to travel.

**Hail**

Hail is precipitation consisting of ice particles that are formed during a storm and can impact the ground at speeds of 130 km/hour. Hailstones can sometimes measure more than 10 centimetres, that is, the size of a grapefruit. Hail can cause severe damage to crops, houses and vehicles. It can also wound people and animals.

**Tornadoes**

Tornadoes are whirlwinds shaped like a funnel that points towards the ground. They can destroy everything in their path. This type of phenomenon can uproot trees, turn cars over and tear the roofs off houses.

**Forest fires**

Most fires that destroy our forests are caused by human negligence, campfires that are not properly put out, or a cigarette tossed by a hiker, for example. However, fires that occur naturally, such as those caused by lightning bolts, are more devastating and burn over larger areas. Forest fires progress very rapidly, especially when it is windy and the weather is dry. In Canada, there are about 9,000 forest fires every year.

**Landslides**

Landslides are movements of clay type soil saturated with water. These ground movements occur very rapidly and leave people very little time to react. Risks associated with landslides come from the impact of rapidly moving debris or from the ground caving in.

**Volcanic eruptions**

Volcanoes can be understood as the Earth's chimneys that allow magma to be released. You can easily conclude that there are no volcanoes in Canada but in fact, there are many dormant volcanoes in Western Canada. Therefore, the possibility of a volcanic eruption still exists.

**Tsunamis**

Tsunamis or tidal waves are huge ocean waves caused by an undersea disturbance such as underwater volcanoes, earthquakes and landslides. These waves can reach up to 30 metres high and cause major damage to houses along the shores.

**Hurricanes**

Hurricanes are huge tropical storms that can cause great damage. They are also called "tropical cyclones" or "typhoons". They originate in the ocean, usually near the equator. Violent winds and heavy rains accompany them.

**Extreme heat or cold waves**

Climate change causes extreme meteorological phenomena such as extreme heat and cold waves. These events flow from the development of a mass of hot or cold air that provokes a sharp increase or decrease in temperatures. Heat or cold waves can be devastating for people's health, especially those who are vulnerable, such as young children or older individuals.

## Fire

It is important to be aware that a fire can start anywhere in the house. However, bedrooms, kitchens or living rooms are more subject to fire. It can also start in the basement.

The causes of fires are varied. They can be caused by human error or mechanical failures. Most fires start in the kitchen, usually when cooking oil is overheated. Other causes are: heating devices, negligent smokers, children playing with matches, fires lit voluntarily, electrical fires and clothes dryer fires.

Firefighters are constantly carrying out prevention work and suggest being careful to avoid fires. Over the last few years, it has been highly recommended and in some cases compulsory to have smoke detectors in each home. This prevention device is essential to warn the occupants that there is smoke in the house.

To make sure the smoke detector is in good working condition:

- Check it each month to make sure it works properly;
- Replace the batteries (with new ones) twice a year, at fall and spring time changes;
- Be more careful when the smoke detector is connected to the home power supply, especially when there is a power failure;
- Install the smoke detector close to the bedrooms;
- Install one smoke detector on each floor.

It is essential to know how to react in case of a fire or simply when to evacuate your home. You must:

- Remain calm;
- Avoid panicking;
- Yell out to alert your neighbours;
- Leave your home quickly;
- Not get dressed or take your toys along;
- Not try to put out the fire;
- Move on hands and knees to escape if there is smoke; but avoid crawling as some toxic gases that are heavier than air linger close to the ground;
- Avoid touching any doors;
- Close the doors to avoid any drafts;
- Call emergency services;
- Get help from your neighbours;
- Go to the designated meeting place;
- Do not go back into the house.

Remind children they must not hide (under the bed or the covers, in the closet, in the clothes dryer, in the bathtub) when they detect a fire at home, because they will not be safe there. The best reaction is to alert other people in the home, then go outside to be visible, breathe fresh air and yell for help.

## A few words about hazardous materials releases

Hazardous materials releases are incidents that involve an accidental spill or leak of hazardous chemical products that are dangerous to humans and the environment.

These hazardous products can contaminate the soil or water or can spread in the air. If they become airborne, they may or may not be visible as a toxic cloud. Sometimes, you can smell or taste the hazardous product. Inhaling toxic fumes or drinking contaminated water can be hazardous to your health. The risk depends on the toxicity of the substance in question, its concentration and how long you're exposed to it.

In case of a hazardous materials release, the authorities may ask that you remain inside your home and use Shelter-in-Place techniques:

- Go inside your home and remain there;
- Close all windows and doors;
- Turn off all ventilation systems;
- Listen to the radio or watch television to be aware of the authorities' instructions.

# Natural disasters and climate change

Extreme meteorological events such as violent rainstorms, tornadoes and hurricanes are all part of nature. However, over the past 30 years, these phenomena have become more frequent and more, importantly, carry greater intensity. They have tragic effects on all peoples of the world.

## **Why are natural disasters more frequent and causing more damage to materials and humans?**

In fact, it is thought that the increase in natural disasters is caused by a phenomenon that has been observed over the years: the increased temperature of the Earth's surface. Human activity is considered to be partly responsible for this global warming. Through the emission of "greenhouse gases", human activity enhances the natural greenhouse effect on the planet.

## **What is the natural greenhouse effect?**

The Earth is like a huge greenhouse. The planet is surrounded by a layer of air called the atmosphere, which is made up of a mixture of gases. These gases, by trapping the sun's heat, help keep the Earth warm, which is why we call them "greenhouse gases". They also act as a thermostat by protecting the Earth from wide variations in temperature. Without these gases, all of the sun's heat would escape in space and life would not be possible.

## **What are greenhouse gases?**

Nitrogen, oxygen, water vapour, carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) are natural greenhouse gases that can be found in the atmosphere. In normal amounts, they trap enough heat to warm the Earth just as it needs to be. But when gases are present in large quantities, they trap more heat and reflect it back on the Earth. Then the temperature increases and creates global warming.

## **How do human activities increase greenhouse gases?**

It is mainly through burning what are called "fossil fuels" that human beings contribute to increasing the concentration of greenhouse gases in the atmosphere. Oil, gas and coal are examples of fossil fuels. They are used to drive our cars, heat our homes and operate our mills and plants. Over the past 150 years, greenhouse gas emissions caused by human activities have accumulated in the atmosphere. In Canada, they have increased by 26% between 1990 and 2007.

## **What will be the consequences of global warming on natural disasters around the world?**

Forecasts estimate that the Earth's temperature will increase from 1.8 to 4.0 degrees Celsius over this century. Scientists believe that this increase could reach up to 8 degrees, especially in the northernmost parts of Canada and Alaska.

Warmer temperatures will cause many climate changes. For example, the melting of the Arctic ice cap will increase sea levels. All over the world, floods and erosion will threaten people who live near coastal areas. Some islands may even be wiped out. The increased evaporation of ocean waters will cause a greater number of hurricanes, cyclones and tropical storms.

The interior of continents or countries will experience more frequent droughts and the danger of forest fires will increase because of drier climates. Evaporation and changes in precipitation will mean that water sources will no longer meet the needs of the population in some places. Some regions of the globe will be exposed to more food shortages and famines. Finally, tropical diseases such as malaria will increasingly threaten more vulnerable populations.

## **What will be the consequences of global warming on natural disasters in Canada?**

Because Canada is a country that is located at high latitude, temperature increases will be larger. Increases in temperature will vary in the country overall and warming will be greater in some regions, namely in the North and in the Central and Southern Prairies.

Warmer temperatures will also cause a significant rise in extreme meteorological phenomena such as hurricanes, tornadoes, torrential rains resulting in floods, blizzards, snowstorms, hail and freezing rain.

Higher temperatures will augment water evaporation and, in Southern Ontario, some communities could face water shortages. The Atlantic provinces could be affected by more hurricanes and flooding from rising sea levels. Droughts will be more frequent in the Prairies. Because of dry and warm temperatures, there will be more risks of forest fires. The danger of floods will be more significant throughout the year as a result of more frequent, heavy rainfall.

In addition, there will be more frequent and intense heat waves; they could cause many deaths, especially among older people and young children.

*For more information on climate change in relation to natural disasters, please visit the Government of Canada Web site at [www.ecoaction.gc.ca](http://www.ecoaction.gc.ca) or the Red Cross/Red Crescent Climate Centre Web site at [www.climatecentre.org](http://www.climatecentre.org).*



# To prepare for emergencies

Nature's sudden mood swings can strike at any moment without warning. Prevention and preparation for such events can help us to better react and to limit the damage. The following steps are required to plan for the unexpected. Use them to encourage students to be prepared.

- Analyze and study the risk of disasters in your area and help them learn what to do should they occur.
- Teach them to prepare their homes for disasters.
- Teach them to prepare a survival kit, a first aid kit and a car emergency kit with their families.
- They should have enough food and water to last them and their families at least 72 hours in case of an emergency.
- They should make an action plan with their parents:
  - Make a list of all emergency and telephone numbers, and keep it close at hand;
  - Plan on two meeting places ahead of time in case an evacuation is necessary (one that is close to their house in case of a sudden emergency like a fire; another one outside their neighbourhood in case they cannot return home right away);
  - Make sure each family member knows the phone number of someone who lives out of town in case they get separated;
  - Arrange for other places where they could stay temporarily (with other family or friends for example);
- Practice their evacuation plan at home and techniques to remain sheltered in their homes in case there are hazardous materials released.
- Teach them to recognize emergency exits and smoke detectors at home, in school and public places.
- Never use the elevator in case of an emergency.
- Take a Red Cross first aid course.

## After the disaster

Even after the disaster, there is still an emergency. You must:

- Give first aid to injured people;
- Be sure to have your survival kit with you;
- Listen to the local radio station in case you are asked to evacuate.

## If asked to evacuate, I am ready!

If the authorities give orders to evacuate, do not insist on staying in the house, but instead leave immediately while taking care to:

- Bring along an emergency kit and a first aid kit;
- Wear proper clothing;
- Make sure your pets are safe;
- Leave a note on the table indicating the time of departure and the destination;
- Lock all the doors while leaving.

## Cooperate

- Listen carefully to the instructions given by the authorities and rescuers;
- Always follow the route which has been laid out for you;
- Go to the meeting place designated by the authorities;
- Observe what is around you and notify the authorities and people about anything that may seem abnormal or dangerous.

## Returning home

When you return home, you must:

- Check the condition of the house to evaluate the damage;
- Use a flashlight to inspect the site: it may be hazardous to turn on the lights;
- Check the condition of your electrical appliances;
- Get in touch with specialists for any electrical, heating or gas problems;
- Drink bottled water until the authorities confirm that the tap water is safe to drink;
- Check the food in your refrigerator and freezer, throw out all spoiled food or other;
- Use the phone only for emergencies: the work teams may still need the telephone circuits for awhile.

## Children and emergencies

Research shows that disasters have a long-term impact on children. Children are especially vulnerable. After an emergency, their reactions can be different according to their age. To help youth cope better, try to make them feel confident and secure and help them understand and perceive what is happening. We now know that children who participated in risk awareness programs are more equipped to face disasters than children who did not participate in such programs.

### Their reactions are normal

After an emergency, children may have certain reactions: they may cry, worry, be confused, withdraw or be aggressive. This expression of their anguish is only normal and temporary. It is better not to punish them because their reaction may persist. You should try rather to understand them and help them to get rid of their fears.

### You can help them

After an emergency, you can help the children get back to normal life by explaining to them what happened, taking their fears seriously, listening to what they have to say, being patient with them and encouraging them to express their feelings.

## Other Sources of Information

To complement the information or for more in-depth facts, here is a list of resources to refer to:

- [www.redcross.ca](http://www.redcross.ca)
- [www.redcross.ca/facingfear](http://www.redcross.ca/facingfear)
- [www.redcross.ca/bugout](http://www.redcross.ca/bugout)
- [www.climatecentre.org](http://www.climatecentre.org)
- [www.ifrc.org/what/disasters](http://www.ifrc.org/what/disasters)
- [www.iclr.org/index.htm](http://www.iclr.org/index.htm)
- [www.ecoaction.gc.ca](http://www.ecoaction.gc.ca)
- [www.publicsafety.gc.ca/res/em/nh/index-eng.aspx](http://www.publicsafety.gc.ca/res/em/nh/index-eng.aspx)
- [www.nrcan.gc.ca/studelev/index-eng.php](http://www.nrcan.gc.ca/studelev/index-eng.php)
- <http://earthquakescanada.nrcan.gc.ca/index-eng.php>
- <http://ec.gc.ca/default.asp?lang=En&n=8B2F9F48-1>
- [www.msp.gouv.qc.ca/jeunesse/index\\_en.html](http://www.msp.gouv.qc.ca/jeunesse/index_en.html)
- [www.sopfeu.qc.ca/en/zone\\_interactive/jeunesse.php](http://www.sopfeu.qc.ca/en/zone_interactive/jeunesse.php)
- <http://feu.scf.nrcan.gc.ca>
- [http://climatechangenorth.ca/section-BG/B2\\_Intermediate\\_Outline.html](http://climatechangenorth.ca/section-BG/B2_Intermediate_Outline.html)
- [www.fema.gov/kids/index.htm](http://www.fema.gov/kids/index.htm) (English only)
- <http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/heat-chaleur-eng.php>
- <http://www.hc-sc.gc.ca/ewh-semt/climat/adapt/heat-chaleur-eng.php>

# More activities

## Create a miniature water cycle

- Materials: an electric kettle filled with water, an aluminum pie plate, ice cubes
- Procedure:
  - Heat the water in the kettle until it begins to evaporate.
  - Place the ice cubes in the aluminum plate.
  - Place the plate with the ice cubes over the jet of steam.
  - Observe the formation of water drops under the plate.
  - Compare this miniature water cycle with the natural water cycle.
  - Discuss the path water takes to fall to the ground.

## Observe a landslide

- Materials: a bowl, sand, water
- Procedure:
  - Pile the sand in the bowl in the shape of a mountain.
  - Pour the water on top of the mountain and let it flow down the sides.
  - Observe the different formations.
  - Compare this phenomenon to the effects of rain on the ground and the link between floods and landslides.

## Identify potential earthquake hazards in the classroom based on the following questions:

- Are tables and desks placed in such a way that they cannot slide and block exits?
- Are all filing cabinets and cupboard doors securely latched?
- Are all computers securely fastened to their workstations?
- Are all shelves, filing cabinets and cupboards bolted to the wall?
- Are all overhead lamps securely fastened to the ceiling?

- Are potentially hazardous chemical products safely stored?
- Are chemical products stored in ventilated areas located far from exits?
- Are books and materials stored on shelves in such a way that they cannot fall from them?
- Are all decorations on the wall securely fastened?

**Organize** a campaign in your school or community to raise awareness and provide information about natural disasters.

**Invite** a guest speaker to talk about local or overseas disaster intervention.

**Play** a game consisting of preparing an emergency survival kit together, using coloured stickers on which participants write what they think should be included. Each participant posts his or her sticker on the board.

**Association** game with various coloured cards: disasters, definitions and appropriate behaviours.

**Lead** a timed simulation of an earthquake or other emergency situation: two minutes to prepare, simulation in teams and discussion.

# The International Red Cross and Red Crescent Movement

The International Red Cross and Red Crescent Movement is the world's largest humanitarian network and is active in 187 countries. Its emblem is a red cross on a white background. In many Islamic countries the red crescent is used instead of the red cross.

## History of the Movement

The movement was born in 1859 when a young Swiss, Henry Dunant, witnessed the bloody battle at Solferino, Italy, which saw the Imperial Austrian Army and troops of the Franco-Sardinian alliance fighting one another. Forty thousand men lay on the field, dead or in agony. And there was no one to care for the wounded.

Dunant organized the local community to bandage wounds, and feed and comfort the soldiers. Upon his return, he called for the creation of national rescue societies that would bring assistance to those wounded in war and lay the foundation for the future Geneva Conventions.

The Red Cross was born in 1863 with the creation of the International Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, which would then become the International Committee of the Red Cross. Its emblem was a red cross on a white background — the reverse of the Swiss flag. The following year, 12 governments adopted the first Geneva Convention, a crucial step in the history of humanity since this convention provided for care for the wounded and defined medical services as “neutral” on the battlefield.

## Members of the Movement

### International Committee of the Red Cross

- This is a neutral, impartial and independent organization.
- The ICRC mainly intervenes in times of conflict.
- The ICRC's mission is to protect life and dignity of victims of war and internal violence (the wounded, the sick, political and civilian prisoners) and provide them with assistance.
- It tries to prevent suffering by promoting right and humanitarian principles.

### The International Federation of Red Cross and Red Crescent Societies

- The Federation dispenses its aid without distinction with regard to nationality, race, religion, class or political opinions.
- The Federation conducts rescue operations to help disaster victims.
- The Federation's mission is to improve living conditions for the vulnerable by mobilizing the power of humanity.
- Its work is focused on four fundamental areas: the promotion of humanitarian values; disaster relief; disaster preparedness; and health and assistance to individuals on a community level.

### The national Societies

- The national Societies are the incarnation of the Movement's work and principles in 187 countries.
- The national Societies act as support to the government authorities in their countries.
- The various Red Cross societies provide relief services in the event of disaster; social and health programs; and assistance to individuals affected by war.
- The national Red Cross and Red Crescent societies include over 97 million members and volunteers worldwide.

## Newspaper articles

### Weather in 2003: British Columbia severely affected

Kamloops, British Columbia, December 30, 2003 – The devastating forest fires in August in British Columbia rank first among the most noteworthy events of the year. According to Environment Canada, this was the worst fire season ever and one of the most costly natural disasters in Canadian history. Images of the fires went around the world.

The figures were quite sensational: Nearly 2,500 forest fires covered 2,650 square kilometres. Firefighters did not have an easy task. At the height of the crisis, 7,600 of them were battling the destructive elements and 2,000 members of the forces came to lend them manpower. Three pilots died fighting the flames.

The Kelowna, Kamloops and Chase regions were heavily affected by the fires and residents will long remember their summer vacations. Authorities in the area coped with the second largest evacuation in Canadian history. In total, 50,000 individuals were forced to leave their homes and 334 homes went up in smoke. Flying over the destroyed areas, the provincial premier declared that he found no words to describe the extent of the disaster.

The Red Cross played a number of roles in taking part in the British Columbia forest fires. Several million dollars were collected to help the victims. The organization also supported the provincial government by registering the evacuees and setting up a bureau for reuniting families that had been separated by the fires.

According to a number of climatologists, the forest fires that occurred in British Columbia happened because the province was experiencing its worst drought in 50 years. They believe that the summer's events will convince more than one individual that the effect of global warming is a very real phenomenon.

### Hurricane Juan goes down in history

Halifax, Nova Scotia, October 1, 2003 – It's desolation in Halifax. Residents are slowly recovering from the second worst storm to hit the city in over a century. The category 2 hurricane that swept Nova Scotia with sustained winds of 158 km/hour and gusts of over 185 km/hour left behind immense chaos.

Electric lines were torn up, properties flooded, sidewalks lifted — Halifax is no longer the same. Many majestic homes in the downtown area were damaged. The loss of nearly 100 irreplaceable trees throughout the province, many over 100 years old, is also a shame. Along the coast, entire marinas and ports will have to be rebuilt.

Red Cross teams intervened quickly after the hurricane had passed. Let's remember that when the storm was at its peak, nearly 300,000 residents were without electricity in Nova Scotia and on Prince Edward Island. Shelters were opened to meet the population's basic needs. Food and hygiene kits were distributed. Currently, volunteers deliver water and packaged food to centres for the elderly in Halifax.

Total losses sustained by Nova Scotia and Prince Edward Island could reach \$100 million and authorities fear that deaths will increase the already heavy toll exacted by the hurricane. The experts had predicted a more active and intense storm season in the northern Atlantic Ocean. A warmer than usual ocean intensified Hurricane Juan just before it hit the coast of Canada.

## Newspaper articles

### Bois-Francs floods: One year later

Montréal, Quebec, August 4, 2004 – One year after the floods that hit the Bois-Francs region, the Red Cross expressed satisfaction with what was done to come to the assistance of victims.

In the evening of August 4, 2003, violent storms pummeled Bois-Francs. Nearly 130 mm of torrential rain fell in two hours, swelling the levels of several rivers. In total, 15 municipalities were flooded. In Tingwick, damage is considerable. Houses and cottages were carried off by the water and six families were evacuated by helicopter. Authorities dispatched to the site were hard pressed to block access to the roads covered by the rising tides and to come to the assistance of individuals trapped inside their homes. At least 300 residents were forced to leave the area. Barricades were placed where bridges had been destroyed to keep the evacuees from falling into the raging water.

In the hours that followed the floods, Red Cross volunteers intervened to bring the necessary support to the residents that had been affected. Families in need received aid in various forms. “We made sure that everyone surprised by the rising water received appropriate assistance: food, clothing, health care, cleaning and repairs to homes, as well as the replacement of certain essential items were our priority,” reports a Red Cross spokesperson. The special fundraising drive organized by the agency enabled \$282,000 to be collected to come to the aid of the 150 families in need and help their return to normal life. In the coming years, the Red Cross is committed to preparedness training with the Bois-Francs authorities and residents to enable them to react quickly in an emergency.

### Toronto was severely affected by the SARS epidemic

Toronto, Ontario, January 1, 2004 – All major Canadian media are unanimous: The Severe Acute Respiratory Syndrome (SARS) epidemic that raged from March to mid-June 2003 in Toronto was the event of the year in Canada.

SARS is a highly contagious disease causing fever and respiratory problems such as coughing, shortness of breath and difficulty breathing. In the most vulnerable individuals, the symptoms may worsen and result in death. SARS may have been transmitted to humans in livestock markets in the south of China. It appeared in a Toronto hospital on March 7, 2003.

On March 26, 2003, Ontario, the most populous province in Canada, declared a state of emergency. Individuals suspected of having been infected with SARS were quarantined, as were all the physicians, nursing staff and other patients who had come in contact with them. But before mid-June when medical authorities managed to control the epidemic, nearly 375 individuals had been affected. In total, 44 individuals died from SARS in Toronto, including two nurses and a physician.

Ontario’s minister of health called upon the Red Cross for assistance, which once again did an outstanding job. Volunteers assiduously helped individuals affected by SARS, delivering medical supplies. There were, however, risks for the volunteers, but once the situation was deemed safe, they were able to act in the community’s interest. Supplies of surgical masks, a thermometer, information and sterilization kits were thus delivered to individuals impacted by the virus and who were quarantined in their homes.

The economic impact of SARS was terrible. Tourists, visiting film production teams and business people fled the city. Economists estimate the monetary loss at over \$1.5 billion.

# Summary table of some disasters that have occurred in Canada

Natural disasters	Place	Date	Description
<b>Earthquakes</b>	Quebec (Ungava Peninsula)	1989	Magnitude: 6.3 The first earthquake in eastern North America produced a superficial shelf break.
	Quebec (Saguenay Region)	1988	Magnitude: 6.0 Felt in a 1,000-km radius around the epicentre.
	British Columbia (Queen Charlotte Islands)	1949	Magnitude: 8.1 The largest earthquake in Canada and one of the largest in the world.
	Northwest Territories (Baffin Bay)	1933	Magnitude: 7.3 The strongest seismic shock recorded north of the Arctic Circle.
	Newfoundland (bottom of the Atlantic Ocean)	1929	Magnitude: 7.2 Causes an enormous tsunami and 27 people drown.
<b>Floods</b>	Newfoundland (Badger)	February 2003	Cause: major ice jam causes 3 rivers to overflow. More than 1,100 individuals find themselves without shelter; icy wind imprisons the city of Badger under a metre of ice.
	Manitoba (Winnipeg)	April 1997	Cause: overflow of the Red River. More than 24,000 individuals are evacuated, 1,400 homes destroyed or severely damaged. Damage estimated at over \$750 million.
	Quebec (Saguenay Region)	July 1996	Cause: rainstorm. The worst flood to date in Canada: 10 dead; 16,000 individuals evacuated; 3,135 homes destroyed. Damage estimated at more than \$1 billion.
	New Brunswick	1923	Cause: melting snow, heavy rain and ice jams everywhere in the province. Two drowning deaths. Damage estimated at \$61 million.
<b>Forest Fires</b>	British Columbia	2003	One of the most costly disasters in Canadian history. Nearly 2,500 fires covered 2,650 square kilometres of land; 3 people die fighting the flames.
	Manitoba	1989	The worst fire in Canadian history: 25,000 individuals evacuated in 25 communities.
	Ontario	1916	The fire is started by lightning. Two villages are razed; 400 deaths; 8,000 left homeless.
<b>Tornadoes</b>	Alberta (Pine Lake)	July 2000	F3 tornado, 12 deaths and 140 injured.
	Alberta (Edmonton)	July 1987	One of the biggest tornadoes in Canadian history, 27 deaths.
	Ontario (Barrie)	1985	12 dead, hundreds injured, 800 left homeless.
	Ontario (Windsor)	1946	17 dead and hundreds injured.
	Saskatchewan (Regina)	1912	28 dead and hundreds injured.
<b>Hurricanes</b>	Nova Scotia and Prince Edward Island	2003	Hurricane Juan Winds of 158 km/hour, 8 dead, 300,000 homes without electricity and over \$100 million in damage.
	British Columbia	1962	Hurricane Freda Winds up to 145 km/hour, 7 dead.
	Ontario (Toronto)	1954	Hurricane Hazel Over 210 mm of rain and winds of 124 km/hour, 81 dead and 1,868 evacuated

**Natural disasters**

<b>Place</b>	<b>Date</b>	<b>Description</b>
Ontario and Quebec	January 1998	1.2 million Ontarians and 900,000 households in Quebec are plunged into darkness and cold for days; 64 areas in a state of emergency in Ontario. Red Cross intervention in Quebec: 300 shelters; 60,000 beds; 50,000 blankets; 16,000 hygiene kits.
British Columbia (Squamish)	1981	Cause: torrential rains and flooding; 9 dead.
Quebec (Saint-Jean-Vianney)	1971	Cause: rainstorm. An entire village is swept into an enormous clay pit; 31 dead, 1,500 evacuated.
Alberta (Frank)	1903	60 million tonnes of limestone from Mount Turtle break off and destroy the mining town of Frank; 70 dead.

**Man-made disasters**

<b>Place</b>	<b>Date</b>	<b>Description</b>
Quebec (Saint-Amable)	1990	Fire's duration: 79 hours. More than 1,000 individuals worked to fight the fire. Eighteen families evacuated. More than 300,000 litres of hydrocarbons pumped. 8,300 tonnes of toxic gases and 7,700 tonnes of oil vapour released into the atmosphere. 9 600 tonnes of carbon black and rubber and 4,500 tonnes of steel and synthetic fibres left on the soil.
Ontario (Toronto)	2003	A state of emergency is declared in Ontario between the months of March and June 2003. 44 individuals die from Severe Acute Respiratory Syndrome (SARS).
Ontario (Walkerton)	2000	Drinking water contaminated with E. coli bacteria. 7 deaths, several dozen individuals seriously affected and several hundred sick.
Nova Scotia (Peggy's Cove)	September 1998	229 deaths. 1,500 individuals dispatched to the crash scene. Some 600 Red Cross employees and volunteers participate in the rescue operations.
Ontario (Dryden)	2002	A chlorine dioxide leak in a paper factory results in the evacuation of between 300 and 400 individuals.
British Columbia	1988-1989	The oil tanker, <i>Nestucca</i> , runs aground off the coast of British Columbia, spilling 875,000 litres of oil and resulting in the death of over 50,000 marine birds.
Ontario (Toronto)	August 2003	One of the biggest electrical power outages in the history of North America. 50 million individuals were without electricity – some for over 12 hours – in the northern United States and southern Canada.



# Heat parameters

Heat and temperature are often used synonymously. However, heat is more than just temperature. Temperature is only one of the four variables that constitute heat. Heat is a composite of the following four variables:

- **Ambient temperature:** the measurement of how hot or cold it is outside. It is typically measured using a thermometer and reported in degrees Celsius in Canada and Fahrenheit in the United States.
- **Radiant heat:** the sun's direct (infrared) rays as felt on the body. These rays can be indirect, such as those reflected from different types of surfaces.
- **Humidity:** the amount of moisture the air contains in comparison to how much it can hold.
- **Wind speed:** the speed at which air moves.

It is the combination of these four variables that is the most accurate way to assess the environmental parameters of heat that can contribute to heat stress.

# Heat and the body

## Mechanisms that heat and cool your body

The human body has a core temperature of approximately 37°C/98.6°F. Each individual's core temperature can vary slightly. In order to maintain a normal body temperature, the body must absorb and dissipate heat. This process is called thermoregulation.

Your body produces its own heat, especially during physical activity. Hot air and exposure to direct sun rays or hot surfaces further heat your body. This heat is lost by contact with cool surfaces or cool air and is aided by sweat production, which cools your body as it evaporates. The weather conditions play a big role in how your body regulates its temperature. For example, if it's windy, sweat is evaporated faster, which increases comfort and cooling of your body. However, high humidity slows down this evaporative process as the air becomes saturated with water vapour, decreasing the rate at which sweat can be absorbed from the skin. Thus, thermoregulation is dependent on four key mechanisms:

- **Evaporative cooling:** is the evaporation of water from the skin (sweat) and the respiratory passages (breathing) to cool the body. It is the most critical cooling mechanism at high temperature because it always results in body heat loss and never in heat gain. Wind speed or air movement can increase evaporative cooling and provide relief in a hot environment.
- **Convection:** the transfer of heat from a warm object toward a cooler object, such as the release of body heat to the cooler air. When the air is cooler than the skin temperature, heat can be lost through convection.
- **Conduction:** the transfer of heat by direct physical contact, such as holding an ice cube; the body will transfer its heat to the cold object (ice cube) and melt it. Heat is either gained or lost through direct transfer by surface contact depending on skin and the objects' temperature.
- **Radiation:** the transfer of infrared waves emitted from one object and absorbed by another. The exchange of heat by radiation depends on a person's surface area, surface temperature, clothing and the temperature of the environment. Radiant heat could be generated by a number of sources, such as direct sunlight. The body may also radiate heat to assist in cooling, if surrounding surfaces are cooler.

# Heat-related illnesses

Emergency heat-related illnesses		
Type of illness	Signs and symptoms	What to do
Heat exhaustion (Include picture)	Can be caused by losing too much water and salt from your body (e.g. excessive sweating without hydration). Symptoms include heavy sweating, weakness, fatigue or tiredness, dizziness or fainting, nausea or vomiting, extreme thirst and quick breathing.	Get help from an adult. Bring the person to a cool place (e.g. an air conditioned area). Have the person rest. Have the person loosen any tight clothing. Give him/her sips of water. Put cool water directly on his/her skin by using a cloth. Also fan him/her.
Heatstroke (Include picture)	The most severe form of heat illness, which can be life threatening as the body loses its ability to manage its own temperature. Symptoms include temperature of 40.6°C or higher, severe headache, decreased responsiveness to simple questions and loss of consciousness.	Get help from an adult. Call 911 or your local emergency number. Have the person rest in a cool place (e.g. an air conditioned area). Remove the person's extra clothing. Spray or splash the person with cool water and fan him/her. Put ice packs in the groin, armpit and back of the neck. If the person becomes unconscious, do not try to give them water.

Non-emergency heat-related illnesses		
Name of illness	Signs and symptoms	What to do
Heat cramps	Most often occurs as a result of heavy sweating such as during or after you have been running, playing sports or doing something that makes you tired on a really hot day. Symptoms include sharp muscle pain in the legs, arms or stomach area. The pain from cramps is caused by not replacing salt lost from heavy sweating.	Get help from an adult. Take the person to a cool place (e.g. an air conditioned area). Let the person rest and give him/her water. Massage and stretch the muscle or the area where the person says he/she has pain.
Heat edema	Can occur when you sit or stand for a long time, especially in extreme heat. Symptoms include swelling of the hands, feet and ankles.	Move to a cooler location (e.g. an air conditioned area) and rest. Elevate swollen legs.
Heat rashes (Include picture)	Symptoms include red bumps, itching and discomfort.	Keep skin clean, cool and dry. Move to a cooler location (e.g. an air conditioned area) and rest.

# Heat and vulnerable groups

Groups that are vulnerable to heat	Challenges
Older adults (like your grandmother, grandfather, or an older neighbour)	Cannot always tell if they are thirsty Do not sweat as much as a young person Can get dehydrated very easily Sometimes have difficulty moving around Sometimes isolated or alone
Infants and young children (like your little brother, sister or cousin)	When playing outside, their body temperature increases a lot. Their body temperature in the heat increases so fast because of their smaller size. Do not always sweat as much as older kids They need their parents, babysitter or caregiver to help them if they are not feeling well.
People with chronic illness or physically impaired (someone who is sick, or someone in a wheelchair)	They take certain medications that make them more sensitive to heat. Are sometimes confined to their beds or are dependent on caregiver, family or friends for help with everyday things Isolation – do not leave home and socialize
Low income, homeless, living alone	Have limited financial resources that can prevent access to protective measures Not as much access to clean water and cool places Limited access to health care Can have higher rates of alcohol and drug dependency Social isolation
Newcomers to Canada and tourists	Language barriers for non-English or French speakers Cultural differences (food, clothing) Limited knowledge of health and social service programs
Those who work in the heat (e.g. farmers, construction workers, miners)	Increased physical strain Need to get the job done Irregular exposure to heat (lack of acclimatization)
The physically active (marathon runners, recreational athletes, people who walk or bike)	Increased physical strain Reduced perception of risks Expectation of usual performance in the heat

# Being prepared for the heat

Since the meteorological conditions that can lead to heat stress can be forecasted and communicated to the public, heat-related illnesses are largely preventable through knowledge, education and adaptive behavioural actions.

As a teacher, you are in an excellent position to help your students adopt safe behaviour by promoting adequate preparation for extreme heat events. Educating the students regarding effective prevention of heat-related illness can help them avoid more serious health problems when exposed to extreme heat.

Here are a few ideas to promote amongst the students:

## Heat and sports safety; heat and outdoor safety

- Drink plenty of water or natural fruit juice mixed with water. Don't wait to feel thirsty. Find a reusable bottle that is fun to drink from and use it as a reminder to drink water regularly. Be eco-friendly and think about the environment.
- Eat fruits and vegetables that have high water content.
- Wear a hat (with wide brim) and loose-fitting, light-coloured clothes made from breathable fabric. Sunglasses are very useful to protect your eyes from UV rays.
- Splash your face with cold water if you feel hot.
- When necessary, wear sunscreen and bug repellent.
- Locate a shaded place where you can cool off or bring a sun umbrella to reduce your exposure to radiant heat from the sun.
- When exercising or playing sports, remember to take extra water breaks, move into the shade and remove gear such as helmets or equipment to let your body cool off.

- Talk to your parents if you feel it is too hot to practise a sport or outdoor activities. See if it is possible to move the activity to an air conditioned environment. That way you will be able to stay cool and maintain your activity level even when it is very hot outside. You could ask to reschedule the activity if necessary. Mornings or nights are better times for sports on hot summer days.
- Drink before and after every physical activity and cool off after the activity in a cool place.
- When you get home, take a cool bath or shower until you feel refreshed.
- Choose activities that are not too tiring or go to the pool during the day.
- Go to the air conditioned library or the mall for a couple of hours.
- If you do not have an air conditioner in your home, play in a cool place, such as the basement, for awhile.

## Heat and school

- Bring a reusable bottle of water that can be refilled at the water fountain. Be eco-friendly. Think about the environment.
- Wear breathable, loose-fitting, light coloured clothes. Bring a hat with wide brim for recess.
- Splash your face with cold water when you go to the washroom.
- Ask the teacher if it is possible to move to a cooler place or to a part of the school where there could be air conditioning, such as the library or the gym.
- Ask mom or dad to put fruits and vegetables in your lunchbox.
- When you go out for recess, stay in the shade and choose activities that are not too tiring.

# Reminder

## General safety rules and instructions in case of fire.

To ensure that you make the best of the situation in case of a fire or any other emergency, be ready!

- Take a first aid course offered by the Canadian Red Cross.

### And remember:

- Remain calm (avoid panicking).
- Always use staircases instead of elevators.
- Never go back into a room that is on fire.

## Daily activities

### Teacher

- Inform your students on the instructions to follow in case of an evacuation.
- Make sure emergency equipment in your room is functional.
- Ensure that emergency exits in your room are readily accessible.
- Assign some participants the task of closing windows.
- At higher elementary or secondary levels, ask some students to assist those with mobility disabilities.

### Students

- Get information from your teacher if you do not know what to do in case of a fire.

## Instructions during emergencies

### If YOU SMELL SMOKE

#### Teacher

1. Immediately have everyone evacuate the room.
2. Evacuate from the closest emergency exit.
3. Set off the manual fire alarm on your floor (red box) and notify a person who is in charge.

#### Students

1. Evacuate in a single file, calmly, silently and without running in the direction identified by your teacher.
2. Leave your personal belongings where they are.

### If YOU HEAR THE ALERT SIGNAL

#### Teacher

1. Ask students who were assigned specific tasks to close all windows in the room and to assist their friends who need help.
2. Take a list of students with you.
3. Be ready to evacuate with the students.

*Note: If the alert is unfounded, wait for instructions from management.*

#### Students

1. Immediately stop all your activities.
2. Close the windows that you have been assigned to.
3. Prepare to help the students your teacher has identified.
4. Calmly and silently wait for the fire alarm and be ready to evacuate.

*Note: If the alert is unfounded, wait for your teacher's instructions.*

### If YOU HEAR THE FIRE ALARM

#### Teacher

1. Have students evacuate the room without taking their personal belongings and close the door.
2. Evacuate towards the meeting place that was identified with your group.
3. Make a roll call of the students and notify the floor coordinator.
4. Supervise your group and wait for authorization from the coordinator before re-entering the building.

#### Students

1. Leave the room in a single file, calmly, silently and without running in the direction identified by your teacher.
2. Walk normally through the corridors and hold the stair rail to avoid falls.
3. Keep your rank and remain close to the teacher.
4. Never go back into the building!
5. Keep silent and follow the teacher's instructions.

Adapted from: **Plan d'évacuation d'une école. Guide pratique**, Ministère de la Sécurité publique du Québec, Direction générale de la sécurité et de la prévention (September 1996)

# Glossary

- Action plan:** Set of measures taken to plan something, an action or behaviour.
- Alert:** Set of actions taken to inform the authorities, the assistance personnel and the population of an actual or possible danger.
- Assistance:** Set of measures taken to protect persons (evacuation, shelter, material help, etc.) and safeguard their belongings and assets.
- Authority:** Person or group of persons one can refer to for help.
- Cataclysm:** Disruption on the Earth.
- Catastrophe:** Sudden event that can cause disruption and may lead to damage and death; a widespread disaster.
- Crisis:** Emergency of a political nature, or an emergency disaster or catastrophe that was managed in such a way as to lead to other problems of a greater nature.
- Demobilization:** Assistance, persons or organizations returning in an orderly fashion to regular daily activities.
- Disaster:** Catastrophic event that can lead to human and material losses.
- Distress:** Critical and dangerous situation.
- Emergency:** Event that may bring physical or psychological harm to one or more persons or which can cause material damage and may require rapid assistance that a first aid organization can provide.
- Emergency kit:** Kit that contains essential objects.
- Emergency provisions:** Clothing, non-perishable food, hygiene articles and safety equipment that will be needed in the event of confinement during a disaster.
- Emergency situation:** Situation that requires immediate assistance.
- Essential objects:** Objects that are necessary.
- Essential needs:** Need for food, clothing and shelter.
- Evacuation Plan:** An ordered sequence of actions that describes how to leave your home or a public place when you must leave in a hurry due to an emergency situation.
- First aid kit:** Case that is kept at home and/or in the car, containing the basic necessities for coping with an emergency.
- First aid worker:** Member of a first aid organization that will bring help to the victims of an accident or disaster.
- Human element:** That which is made by human beings (e.g. a building).
- Man-made disaster:** A disaster of which human beings may be an involuntary agent (industrial accidents like explosions, fires or leaks of toxic chemicals; socio-economic disasters like pollution; socio-political disasters like human rights violations).
- Mitigation:** Total measures taken to reduce the destructive effects of a disaster and limit their impact on the well-being of individuals and their property.
- Mobilization:** Set of actions taken to activate the assistance resources.
- Natural element:** That which is made by nature (e.g. a tree).
- Potential danger:** Threat, risk that could materialize if the conditions were present.
- Prevention:** A set of measures taken to prevent danger, risk or harm from occurring.
- Recovery:** Return to a normal situation by reintegrating people who were evacuated and implementing programs that will allow people to get back to normal activities (getting public services back into operation, rebuilding equipment, production, etc.).
- Ring of fire:** Volcanoes on the edge of the Pacific Ocean.
- Safety rules:** Conduct principles.
- Survival kit:** Case, pouch or bag containing articles and provisions for 3 days and that can be used in the event of evacuation.
- Trauma:** Event that can cause emotional or physical problems.

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\*\* - Available in French only.



# PROGRAM EVALUATION



Name of school: \_\_\_\_\_

Name of educator: \_\_\_\_\_

Grade level: \_\_\_\_\_

### Preparedness Program:

- It can happen, be ready
- Facing the unexpected, be prepared
- Be ready, be safe

### To be filled out by the educator.

For each of the following statements, please check the box that best corresponds to your level of agreement.

CONTENT AND PROCESS	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
The preparedness program really makes youth more aware of the need to be ready in case of an emergency.					
The preparedness program is well suited to a school setting.					
The preparedness program is easy to implement.					
The preparedness program is of high quality.					
The content of the preparedness program allows for the attainment of objectives set by the Ministry of Education of your province or territory.					
The content of the program is diversified.					
Young participants liked the content of the preparedness program.					
The teaching approach used in the preparedness program is adapted to participants' levels.					
The teaching approach used in the preparedness program is appropriate.					

<b>CONTENT AND PROCESS</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Don't know</b>	<b>Disagree</b>	<b>Strongly disagree</b>
The teaching approach used in the preparedness program is adapted to participants' levels.					
The teaching approach used in the preparedness program is appropriate.					
<b>FUTURE USE</b> I liked the program and will continue to facilitate preparedness activities in my class.					

**WHICH ACTIVITIES HAVE YOU COMPLETED?**

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**WHICH ACTIVITIES ARE YOU PLANNING TO LEAD IN THE FUTURE?**

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**OTHER COMMENTS:**

Would you have any suggestions to improve the program?

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**RETURN ADDRESS:**

Thank you for returning the completed questionnaire to:

**Canadian Red Cross/Expect the Unexpected Program**  
**170 Metcalfe Street, Suite 300**  
**Ottawa, ON, K2P 2P2**

***WE APPRECIATE YOUR VALUABLE FEEDBACK!***

# The Canadian Red Cross: anywhere, anytime

The Canadian Red Cross<sup>1</sup> is one of the 187 national Societies which, along with the International Committee of the Red Cross (ICRC) and the International Federation of Red Cross and Red Crescent Societies (the Federation), form the International Red Cross and Red Crescent Movement. Its mission is to improve the lives of vulnerable people by mobilizing the power of humanity in Canada and around the world.

The Canadian Red Cross Society is a volunteer organization that provides the public with humanitarian services and emergency relief:

- In the area of prevention against disasters or conflicts or when they occur in Canada and around the world.
- Through community outreach in the fields of health and social services.

Humanitarian and relief services are provided according to the Fundamental Principles<sup>2</sup> of the International Red Cross and Red Crescent Movement. Canadian Red Cross programs are made possible by virtue of thousands of volunteers acting on its behalf and by Canadians' generous financial assistance.

## The Fundamental Principles of the Red Cross

### Humanity

The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health to ensure respect for the human being. It promotes mutual understanding, friendship, co-operation and lasting peace amongst all peoples.

### Impartiality

It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

### Neutrality

In order to continue to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

### Independence

The Movement is independent. The national Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

### Voluntary service

It is a voluntary relief movement not prompted in any manner by desire for gain.

### Unity

There can only be one Red Cross or one Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

### Universality

The International Red Cross and Red Crescent Movement, in which all Societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.

<sup>1</sup> In conformity with the law, use of the Red Cross emblem or name in Canada is exclusively reserved to the Canadian Red Cross and to military medical units (Geneva Conventions Act, R.S. 1985, c. G-3).

<sup>2</sup> This text is adapted from the fundamental principles proclaimed by the 20<sup>th</sup> International Red Cross Conference held in Vienna in 1965. Please note that the original text was revised and included as part of the Statutes of the International Red Cross and Red Crescent Movement, which were adopted at the 25<sup>th</sup> International Red Cross Conference, held in Geneva in 1986.



Canadian Red Cross

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