

# Appendix F-1

## Sample Lightning Preparedness Guide

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Lightning is the occurrence of a natural electric discharge of very short duration and high voltage between a cloud and the ground or within a cloud, accompanied by a bright flash and typically also thunder.

### **FACTS**

- Lightning and Thunderstorms: Lightning is usually associated with thunderstorms.
  - The turbulent wind environment of a thunderstorm with updrafts and downdrafts allows electric fields to form and grow between the cloud and the ground and within the cloud itself – all necessary conditions for lightning to occur.
- If you can hear thunder, you can get hit by lightning.
- Contact by lightning can cause catastrophic injuries and death.
- Contact with lightning can be a result of:
  - Direct strike - occurs when lightning attaches itself directly to the victim. (3-5% of all lightning deaths/injuries)
  - Ground current - occurs when lightning hits the ground, spreads out and sends a current through a victim 10-30 metres away. (40-50% of all lightning deaths/injuries)
  - Side splash - occurs when lightning hits a tall object, travels part of the way down the object and then jumps to a nearby victim (who may be seeking

shelter near a tall object such as a tree). (20-30% of all lightning deaths/injuries)

- Contact to an object that is struck by lightning (for example, wire fence, corded telephone, water pipe) (15-25% of all lightning deaths/injuries)
  - Blunt trauma - occurs when a shock wave on the ground throws a person a distance of up to two meters and results in bodily harm/injury (percentage of all lightning deaths/injuries is unknown).
- Lightning can strike as far as 8 to 16 kilometers either ahead or behind the thunderstorm, even when skies are blue.
  - About 1/3 of lightning related casualties occur after the storm because people return to outdoor activities too soon. Activities are not to resume until at least 30 minutes after the last rumble of thunder is heard.

## **CHAIN OF COMMAND**

The persons filling the roles listed below are responsible for making the decision to stop the activity, move students to a safe location, and to determine when/if it is safe to resume the activity:

- Curricular activities - teacher
- Intramurals - teacher, intramural supervisors
- Interschool - Practices: teacher/coach; Games: teacher/coach in consultation with official
- Outdoor Education Trips - teacher in consultation with trip Leader
- Off-Site Activity Providers - teacher in consultation with facility manager/director
- Camps - teacher in consultation with camp director

## **RESPONSE PLAN**

A lightning response plan must be developed in advance of the outdoor activity. The following must be taken into consideration:

### **BE AWARE OF POTENTIAL THUNDERSTORMS PRIOR TO OUTDOOR ACTIVITIES**

Stay up to date with latest local weather forecasts (for example, The Weather Channel, local radio/TV stations/websites, The Weather Network, Environment Canada, Weather-One-On-One).

What to look for and/or listen for:

- Severe Thunderstorm Watch:
  - When conditions are favourable for the development of severe thunderstorms with one or more of the following conditions:
    - Wind gusts of 90 km/hr or greater
    - Hail of two centimeters (cm) or larger in diameter
    - Heavy rainfall
- Severe Thunderstorm Warning:
  - When there is evidence based on radar, satellite pictures, or from a reliable spotter that any one or more of the following three weather conditions is imminent or occurring:
    - Wind gusts of 90 km/hr or greater
    - Hail of two centimeters (cm) or larger in diameter
    - Heavy rainfall

*Note:* Environment Canada does NOT specifically warn for lightning.

Contact: WEATHER-ONE-ON-ONE at 1-900-565-5555. This is a user-pay consultation service from Environment Canada that puts you in touch with a meteorologist weekdays

from 5:00 am -9:00 p.m. Charges of \$2.99 per minute, plus taxes, will be added directly to your telephone bill.

## **When Outside**

Weather Observation: Identifying features of a thunderstorm:

- What to look for...
  - Large dark clouds, gusty winds, heavy rain/hail, lightning
- What to listen for...
  - Thunder: (Thunder is caused by lightning)

Canadian Lightning Danger Maps: Use a hand-held mobile device to monitor threats using Canadian Lightning Danger maps. When the red danger zones are in or are approaching your location, lightning is striking and there is immediate danger if outdoors. Go to a safe shelter. The interval between maps is 10 minutes. Refresh your browser to ensure you have the most current map.

## **OUTDOOR ACTIVITY PLANNING**

- If thunderstorms are forecast, avoid being outdoors at that time or make an alternate plan.
- Monitor the weather forecasts and warnings, as well as the Canadian Lightning Danger Maps (if accessible) during the day.
- Develop a process to cancel or delay the activity before any storm threatens.
- Inform organizers, volunteers, and students of emergency plan.
  - For example, communicate the procedures for assisting students with disabilities (for example, a wheelchair).

- Identify safe locations, for the activity area and determine the time required to reach them. Safe locations are:
  - Any building normally occupied or frequently used by people (for example, a building with plumbing and/or electrical wiring that acts to electrically ground the structure). (Sheds (wood/vinyl, metal), tents, open shelters on athletic fields and parks are designed to protect from rain and sun but NOT lightning.)
  - Any vehicle with a hard metal roof (not a convertible or golf cart) and rolled-up windows can provide a measure of safety. (The hard metal roof and body of the vehicle dissipate the lightning strike around the vehicle and not inside). (DO NOT TOUCH THE SIDES OF THE VEHICLE.)

### **Procedures when outside and no safe indoor shelter is available**

- Avoid:
  - open fields; the highest point in an open area
  - tall objects e.g. trees, poles
  - metal objects e.g. football standards, light poles, metal bleachers, fences
  - objects that conduct electricity e.g. golf clubs, bicycles.
- Take shelter in a low-lying area such as ditches, depressions, valleys (be aware of flooding).
- In a forest, seek shelter in a low-lying area under a thick growth of small trees or bushes.
- Remove metal objects (that is, anything conductive) and jewellery from body and pockets.
- Minimize body surface area in contact with the ground. (Do NOT lie flat on the ground.)

- Assume safest body position: crouch down, place feet close together, with only the balls of feet touching the ground, lower head and wrap arms around knees.
- In a group in an open area, spread out to be several meters from others.

### **PRIOR TO OUTSIDE ACTIVITIES COMMUNICATE TO STUDENTS**

- The dangers of lightning (Teach your students the following lightning safety slogans: 'When thunder roars go indoors....' 'IF YOU SEE IT, FLEE IT; IF YOU HEAR IT, CLEAR IT'.);
- The location of a safe place that is close enough for students to reach quickly.
- To stop the activity and move to the nearest safe location when the sound of thunder is heard, or lightning is observed.

### **Procedures for Water-Based Activities**

- People on or in the water are among those most at risk during thunderstorms. Swimming, boating, sailing/surf boarding are all dangerous activities when lightning is in the area.
- When on or in the water, move to land immediately at the first sign of a storm and go to a safe location or follow procedures for "When outside, no safe indoor shelter is available".

### **Procedures for Hiking/backpacking**

- Watch the weather and know when storms develop in the local area.
- Plan to be away from high risk areas such as peaks, ridges and higher terrain before a thunderstorm arrives.
- Move to lower ground quickly if thunder is heard when on exposed high ground.

- Avoid open areas that are 100 m wide or wider.
- Look for a dry ravine or depression and spread out to reduce multiple injuries.
- Avoid trees with large trunks if lightning strike is close.

### **RESUMPTION OF THE ACTIVITY**

Wait a minimum of 30 minutes from the last visual observation of lightning or sound of thunder before going back outside or resuming activity. Even if the sun is shining and the sky is blue.

### **FIRST AID FOR LIGHTNING VICTIMS**

- Lightning victims do not carry an electrical charge and can be handled safely.
- Call for help – 911. Victims may be suffering from burns or shock and should receive medical attention immediately.
- Give first Aid, to the level of your ability. If breathing has stopped administer cardiopulmonary resuscitation (CPR). Use an automatic external defibrillator (AED) if one is available.

Source: Environment Canada, 2017