YouthSafe Outdoors

Adventure Leadership

Contents

Resource Aim

The purpose of this resource is to support the efforts of teachers and other leaders in planning and providing safe outdoor pursuit and remote environment experiences for participants. It provides information to support implementation of Safety First! Guidelines for BC School Off-site Experiences.

The content was developed through a synthesis of the key information from dozens of books, articles and other current written, audio-visual, Internet and expert resources. The intent is to provide leaders with current information related to the appropriate planning and leadership of safe outdoor experiences and the identification and management of risks and eventualities.

This resource is intended to complement the Youthsafe Outdoors administrative resources (e.g., forms). It also serves as a support for the instructional resources. Content may be taken out of this document and modified for the creation of presentations to or handouts for students (e.g., elements of gear checklists, hazard identification and safety planning, rescue and emergency procedures).

The document is not tied to any specific curriculum or program. It has obvious applicability to outdoor pursuits excursions undertaken as part of physical education or outdoor education. However, it can be used by any teacher/leader involved in planning and leading outdoor pursuits or travel into semi-remote or remote environments, regardless of curricular or extra-curricular context.

The document is a resource document. It is intended for reference, as its elements are relevant to a particular outing. While more detail-oriented than *Safety First!,* the content should not be considered exhaustive on any one subject. Refer to the Additional Resources and References file included where more detailed information and explanation is desired regarding the whys and how's of strategies and techniques identified herein.

Finally, the inclusion of content in this resource does not imply that any particular activity or environment is safe for a given group. This resource is intended to provide information and tools to help support decision-making. However, the teacher/leader must look at each situation and determine how to proceed, always retaining "NO GO" as an option if the risks are excessive for an educational/recreational/sport context. Parents/guardians and students trust teachers/leaders to use resources like this to help inform, not replace, their judgement.

Hazards Management

The purpose of this section is to provide teachers/leaders with more complete information regarding natural hazards and related specific safety precautions, as a complement to the Safety First! Guidelines which tend to focus on the risks associated with the activity. This supplementary reference resource will benefit individuals involved in trip planning, informing parents/guardians and students and instructing students regarding the common environmental hazards presented. Recognizing that students participate in activities not only in their home province but further afield, included here are references to many geographical regions including the forest, prairie, inland waters, mountain, and ocean environments. The material provided here is generally introductory, awareness level information only. Additional research and training are suggested.

Note to reader: Over this section, numerous charts will be presented, with each including one "!", two "!"s, and sometimes a "+" sign. Interpret these symbols as follows:

 means the subsection contains precautions to help the individual or group avoid the hazard (e.g., avoiding being caught in an avalanche by good route selection)

 means the hazard is beyond general avoidance and the actions suggested are things to do to minimize the potential for harm (e.g., what to do if caught in an avalanche)

 means actions to take to help deal with the aftermath of an individual affected by the hazard (e.g., how to rescue and treat someone who's been caught in an avalanche).

Weather and Forecasting

Climate is what one expects – weather is what one gets. Before leaving on any trip, the teachers/leaders should gather weather forecast information, weigh the information to determine whether to go, to delay or modify the outing, or not to go at all. Weather forecasts, for both terrestrial and marine (ocean and large inland water) environments, are available online from Environment Canada at weather.gc.ca. The site also includes public warnings (issued when conditions are favourable for the development of severe weather such as major storms, high winds, tornados, etc.) and watches (issued when severe weather is imminent or occurring.

Forecasts issued by Environment Canada and/or other commonly used sources such as The Weather Network, radio and television stations and other such sources are generally relatively accurate and reliable over the short term (e.g., up to two days). However, while forecasting accuracy has improved much, it remains an inexact science because:

- Atmospheric movements are substantially random in nature;
- No two weather systems, masses or fronts are identical;
- Weather observation stations are sometimes too far apart to secure accurate readings of local weather; and
- Some weather phenomena are very localized, especially in the mountains.

Therefore, it is important that someone in the group have at least basic weather reading and forecasting skills (e.g., three-hour forecasts). The tools that enhance forecasting accuracy include a compass, barometer (or altimeter) and the individual's senses. Following is a summary of some of the key factors and trends that the amateur forecaster can look at in making short-term forecasts.

Clouds

Cloud types are divided into families according to their elevations.

High Clouds	Base 6,500 m to 13,000 m	Potential Indications
Cirrus	thin, wispy, detached clouds in fine filaments; also known as mare's tails	may indicate precip. in next 24 hours, esp. if increase with wind steady from NE, E or S
Cirrocumulus	a more continuous covering of wispy cloud; white cloud patch in small elements or ripples (mackerel sky); may create halo around sun/moon.	generally fair weather, but may bring showers
Cirrostratus	transparent whitish cloud veil of a fibrous or smooth appearance	may bring precipitation if thickens and lowers

Middle Clouds	**Base 1,750 m to 6,500 m**	
Altostratus	grey or blue-grey cloud sheet; striated; can be fibrous or uniform; can reveal sky patches	usually brings rain or snow
Altocumulus	white or grey patches, sheets, or layers of clouds with shadowing; rounded masses/rolls	fair weather with precip. within 8-10 hours
Low Clouds	**Base from ground surface to 6,500 m**	
Stratus	a grey cloud blanket with a uniform base	alone may produce a fine drizzle, but not rain; with NE to S winds, can mean heavy precipitation
Nimbostratus	thick, dull, grey; usually blot out the sun	steady rain or snow
Cumulus	white, cauliflower clouds; detached with sharp outlines	storm potential if vertically building or getting flat anvil tops
Stratocumulus	rounded masses or rolls with dark spots and whitish patches	do not produce precipitation, but often turn into nimbostratus
Cumulonimbus	great dark clouds with vertical development, often anvil-shaped on top	heavy thunderstorms imminent; rain, snow or hail

Clouds must be viewed with wind direction shifts and pressure changes in order to determine weather patterns. In general, watch for lowering, thickening clouds.

Barometric Pressure

Barometric pressure is created by the weight of the air above the earth. Barometric pressure affects the weather in the following ways:

- Warm air rises, is less dense than cold and holds more moisture;
- As air cools and sinks, its density increases and it creates higher pressure; this denser air keeps other systems away, so skies in a high-pressure system remain clear; and
- Air in a low-pressure system is less dense than in a high, so it draws winds into the system; when these winds are moist, cloudy, stormy weather occurs.

A pocket altimeter can give excellent indications of an approaching weather system. An altimeter that registers an increase in altitude, even though none has taken place, is actually reporting a drop in air pressure.

Although exceptions occur, the following guidelines are usually reliable:

Steady pressure:	more of the same weather and often not windy.
Rising pressure:	clearing, but watch for instability, which may suggest showers.
Falling pressure:	clouding over and precipitation may follow unless the storm passes over far enough away.
Rapid change, up or down:	a fast change in the weather, usually windy.

Changes in barometric pressure create changes in wind. Wind is essential to weather, as the wind, at varying elevations, blows in different weather systems. Because of the influences of the mountains in Western Canada, prevailing weather patterns vary substantially from region to region and from season to season.

Forecasting the Weather

As noted, there are issues related to excessively relying on posted weather forecasts, particularly over extended outings taken without external communications technology that allows access of current forecasts, and/or in areas with changeable local weather. General weather signs, particularly when taken in combination, can be used to predict the short-term weather (i.e., three to four hour) with some degree of confidence. Note that leaders are not expected to be weather forecasting experts. However, some awareness of common weather signs, including those relegated to folklore, can benefit a group by reaffirming a decision to continue an outing or conversely, allowing a timely retreat from a route or other alternative action.

Weather signs may include the following.

- Cloudy, unsettled weather when:
  - the barometer is low or falling,
  - the temperature at night is higher than usual,
  - the clouds move in different directions at different levels,
  - high cirrus clouds increase,
  - summer afternoon clouds darken, or
  - a large halo or corona appears around the sun or moon and stays until clouds thicken and obscure it.
- Steady precipitation when:
  - there have been signs of unsettled weather,
  - the wind is S or SE and the pressure is falling,
  - pressure is low or falling rapidly and wind is increasing,
  - the wind is SE to NE and the pressure is falling, or
  - cumulonimbus clouds (thunderheads) develop against a S or SE wind.
- Showers when:
  - cumulonimbus clouds develop against a W wind, or
  - cumulus clouds develop rapidly in the early afternoon (spring/summer).
- Clearing weather when:
  - the barometer rises,
  - the wind shifts into the W or NW, or
  - the temperature falls.
- Continued bright weather when:
  - the barometer is steady or rising slowly,
  - cloudiness decreases after 3 P.M. or 4 P.M.,
  - morning fog breaks within two hours after sunrise,

    - there is a light breeze from the W or NW, or
    - there is a red sunset.
- Higher temperatures when:
    - the barometer falls,
    - the wind swings away from the N or the W, or
    - the morning sky is clear (except when the barometer is high/rising in winter).
- Lower temperatures when:
    - the wind swings from the SW to the W, or from the W to the NW or N,
    - skies are clearing (although clearing skies in the morning will likely mean warmer weather by afternoon, particularly in the summer),
    - in the winter, the barometer rises,
    - snow flurries occur with a W or N wind,
    - pressure is low and falling rapidly, or
    - wind is E or NE and backing slowly into the N (the fall in temperature will be gradual).

Using Natural Signs and Folklore to Predict the Weather

The natural environment can also be used to forecast the weather. Again, teachers/leaders are not expected to know this information, but awareness of these types of clues has benefited countless outdoor travelers who have used the information gleaned from the environment to confirm or change their course of action and thereby contributed to the safety of the venture. In addition, participants enjoy learning about these natural signs and practising watching for them in the field.

Clues include the following.

Colours: In the evening, a violet sky or blue traces mean good weather. A golden layer with strokes of green at the edges means high winds tomorrow. A grey sky usually brings rain the next day.

Rainbows: A rainbow in the morning indicates a squall moving in; one at mid-day means unstable weather; a night rainbow means the storm has passed.

Stars twinkling blue: Means rain because moist air absorbs light in the green and red spectra.

Sun dogs: Sun dogs are rainbow-like bands around the sun in the morning or evening. They usually indicate colder weather is on the way.

Smoke drifts: Smoke moves in relation to barometric pressure. If it curls straight up and dissipates quickly, high pressure and good weather continue. If it levels off and drifts thickly in a horizontal path, expect low pressure and rain.

Smells increase: Odours are thicker and more profuse when low pressure is moving in. The woods smell more woodsy. The air is fresher during barometric highs.

Sounds increase: Cloudy, low-pressure days cause sounds to travel further and to echo more. Prior to rain or snow, everyday sounds will seem loud or exaggerated.

Aches: Low pressure causes joints to ache and sinus pressures to increase. People are generally happier in barometric highs, and moodier in barometric lows.

Tree leaves: Indicators of changing winds. The leaves grow in relation to the prevailing wind – a shift in wind turns the leaves over so the tips curl back and the undersides are exposed.

Birds fly low: Birds come low before a storm because low pressure keeps insects, the birds' food, from flying higher.

"Red sky at night, sailor's delight." Dry air refracts red light, indicating clear dry air to the west (which is often the direction from which storms come).

"Red sky in the morning, sailors take warning." Red sunrises are caused by reflections in moist air that may indicate rain later in the day.

"Rain before seven, clear by eleven." Morning rains rarely persist over the day.

Morning fog: Moisture in damp air condenses at night; usually burns off by the heat of the morning sun.

Afternoon fog: Late afternoon or evening fog usually forms as moisture falls through warmer air; it often indicates a pending storm.

Halos: Halos around the sun or moon signal the approach of a warm front and the possibility of slow, steady precipitation.

Active bugs: Insects swarm and ants scurry during a barometric low.

Fish are biting: Fish are more active during barometric highs.

Morning dew: Heavy dew on the morning grass – fair weather today. Dew is most common on calm, cloudless, cool nights.

No dew: No dew at night may indicate rain by morning. No dew in the morning may indicate rain by the next day.

Evening sky: Clear sky at sunset – fair weather tomorrow. Grey sky at sunset – poor weather tomorrow.

Barometer: "When the glass falls low, prepare for a blow. When it rises high, let all your sails fly". Therefore, dropping barometric pressure results in increased winds and storms, while rising pressure suggests increasing favourable weather for being outdoors.

Other Factors Influencing Weather

Obviously, the season has an impact on the weather to be expected on a trip; one expects sub-zero temperatures and snow more often in winter than in summer. However, local factors like large lakes, frost pockets, mountains, aspect and elevation can have an impact on the microclimate. Spring and fall weather, particularly in the mountains, can include winter-like conditions and groups venturing there must be prepared for this.

Temperature decreases an average of two degrees Celsius per 300-meter increase in elevation (1,000 feet). The temperature drops at higher elevations because the air higher up is less dense, so there is less kinetic motion among the molecules. However, at increased altitudes there are also increases in solar radiation; therefore, temperature variances can be extreme from day to night. Once the sun goes down, the temperature drops, and the clouds are the only cover that keeps the heat in. These sudden temperature changes, especially in the afternoon, can trigger avalanches and/or rockfall.

Mountain topography also modifies the predominant wind direction. For example, the wind will follow valleys and flow over cols and saddles. The intensity of the wind will therefore vary, creating funnelling and dead air spaces (e.g., leeward of peak). It is also possible for the mountains to create wind (e.g., Chinooks). The differences in temperature between the valleys and peaks create local air currents from hot air rising and cold air settling.

Wind, Wind Chill and Whiteout

Wind

Wind increases the risk of fatigue, hypothermia, and frostbite as well as causing or contributing to other incidents. Efforts to walk, ski, or paddle into a strong wind are exhausting. An increase in wind speed results in a decrease in air temperature. With the increased cold, any exposed skin runs a greater risk of frostbite (heat is lost faster from unprotected areas of the body due to convection). The wind cools the body by repeatedly stripping away the micro-layer of warmer air that is present around it.

Wind also acts as an external hazard in various activities. For example:

- Wind decreases the stability of water craft and increases wave size on open water (e.g., lakes, ocean), either of which can swamp or tip a boat,
- Wind can affect the stability of a person on land, potentially causing or contributing to slips, trips or falls,
- Visibility is decreased by blowing snow, spindrift and whiteout conditions created by wind,
- Exposed to winds, standing dead or dying trees in forests becomes a hazard, and
- Snow conditions may change, creating drifting, cornices and avalanche dangers.

Wind: Safety Precautions

- dress appropriately for the activity and weather, including adding a windproof/resistant outer layer and head, face, neck, hand coverings and windproof/resistant footwear as winds increase, especially at colder temperatures,
- keep active to generate internal warmth,
- stay dry and work to minimize sweating; it's an ongoing personal challenge to avoid sweating by opening clothing or wearing less when the wind is blowing on any exposed skin or through thin, breathable clothing layers,
- choose sheltered routes, rest spots, and campsites that minimize wind exposure.
- carry a tarp (highly compressible, lightweight versions are available) to mushroom over the group or otherwise create an instant wind break to rest or wait out a windstorm.
- curtail activity if tree branch and tree blow-downs become a significant risk, and
- as frostbite risks rise significantly with high wind chill, curtail activity and exposure if wind chill dips to -40 or colder (well-dressed group) or -28 (less well-prepared group). See below for more info re: wind chill.

Wind Chill

Canada was an international leader in the development of the wind chill index. The index we rely on is also used in the United States (with the US temperatures noted in degrees Fahrenheit and wind chills related to those numbers). Wind chills are not stated in degrees, as they are not actual temperatures, but values based on a combination of scientific data and human test subjects describing the "feeling of cold" on their skin.

Anticipated wind chills are now often provided as part of weather forecasts in winter or when they are otherwise relevant. It can be accessed, along with or as part of weather forecasts, if the group has satellite technology that facilitates reception of messages or data.

Where only temperature and wind speed are known from a forecast, wind chill may be determined by consulting a wind chill index chart. Finally, in the absence of weather forecasts, with just a thermometer, wind chill may be estimated based on observations in the field.

Use of the Wind Chill Index Chart to Estimate Wind Chill

First, estimate the wind speed outside by observing the movement of trees, flags and other indicators, using the guide provided in the table below. A flag can be any piece of very light fabric (e.g., survey ribbon) large enough to visibly show gradations in wind, hung or held up high in an open area where wind can freely affect it (e.g., hung from the top of a ski/hiking pole, a paddle, etc.).

Once wind speed has been estimated and the temperature outside is known, use this data to estimate the wind chill value by referring to the numerical chart below.

Estimating Wind Chill										
Wind Speed Kph	**Signs for Estimating Wind Speed**	**Temperature (˚C)**								
		0	**-5**	**-10**	**-15**	**-20**	**-25**	**-30**	**-35**	**-40**	**-45**
10	Wind felt on face – flags begin to move	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57
15		-4	-11	-17	-23	-29	-35	-41	-48	-54	-60
20	Small flags extended	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62
25		-6	-12	-19	-25	-32	-38	-44	-51	-57	-64
30	Wind raises loose paper; small tree branches move	-6	-13	-20	-26	-33	-39	-45	-52	-59	-65
35		-7	-14	-20	-27	-33	-40	-47	-53	-60	-66
40	Small trees sway; large flag or tarp extends and flaps	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68
45		-8	-15	-21	-28	-35	-42	-48	-55	-62	-69
50	Large tree branches move; hard to use an umbrella	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69
55		-8	-15	-22	-29	-36	-43	-50	-57	-63	-70
60	Trees bend; hard to walk against wind	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71

Adapted from Environment Canada – Canada's Wind Chill Index at ec.gc.ca

Whiteouts

Whiteouts are the reduction of visibility due to fog, clouds, heavy snowfall and/or snow blown up from the ground (e.g., during a blizzard). In a true whiteout, everything turns white and it becomes difficult to distinguish terrain features or even identify the horizon. Flat light on snow contributes to blurring indistinct terrain features even more. In severe conditions, one may not be able to see even a meter or two, creating a serious impediment to route finding on land, water or snow, or to driving on a road.

Whiteouts: Safety Precautions

- keep an eye on the weather over the trip,
- practise visual orientation while travelling, glancing behind frequently to be familiar with the appearance of the terrain from the opposite direction,
- frequently check position on the map,
- if conditions are deteriorating and a whiteout is a distinct possibility, consider route modifications that allow the group to make use of a major feature (e.g., aim for a major collecting feature or travel parallel a major linear feature that prevents going off-course),
- have a working knowledge of maps and compasses (and GPS, if appropriate), and be able to use these tools alone and together as a directional guide,
- be able to determine and follow a back bearing (e.g., note these on the Itinerary Card), and
- keep to the trail; it is a definite feature on the landscape.

If a Whiteout is Encountered:

- regroup and calculate/reassess your position,
- retreat to last known position or pitch camp before visibility is too compromised,
- maintain tight party control,
- travel cautiously if the group must move; go slow to avoid ending up lost or in a dangerous place like a cliff band or a canyon; use pacing and plan with a margin or error built in
- watch for a break in the weather; momentary clearings may reveal identifiable landmarks,
- use dead reckoning to move from landmark to landmark enough to get to a safe place to stop, or use a party member out front as the landmark (leapfrogging or directing left and right to on bearing),
- maintaining a constant angle in relation to snow drift lines (e.g., on a lake) can be helpful,
- avoid travel if snow blowing into group's tracks may quickly affect ability to retrace steps (can test by having one person walk out 100 m on a bearing and wait 15 minutes, checking ability to follow tracks back to group, relying on back bearing as back-up),
- **STOP** if caught in a total whiteout and/or disoriented. Do not wander around. Put on extra clothes, put a tarp up and sit tight. Continue only when the weather clears sufficiently,
- bivouac before further confused or fatigued
- if driving, turn on all exterior and interior lights; slow down to match conditions,
- be patient and avoid passing on the road, maintaining a safe following distance,
- get off the road if the visibility gets below a safe level; don't stop on the road for fear of causing a chain reaction collision,
- if stuck or stranded, stay with the vehicle and call for help; run motor sparingly for heat (checking tail pipe first to ensure it is clear of snow or debris).

Heat, Solar Radiation and Snow blindness

Heat-related Hazards

Heat excess can result in dehydration or heat exhaustion or, at the extreme, heat stroke.

Heat: Safety Precautions

- wear a wide-brimmed hat,
- wear light coloured clothing,
- use protective measures to prevent overheating – the layering principle in both hot and cold weather,
- protect oneself from reflective surfaces such as snow, water, etc.,
- reduce or stop activities in extreme heat,
- consider water supply and seasonal conditions when planning the route – water source may have dried up,
- expect dehydration, even in cold conditions,
- replace fluid loss constantly; thirst sensations may be inadequate indicator of fluid balance, and
- stop and treat heat related illnesses immediately.

Solar Radiation

Severe sunburn or snow blindness can occur easily if precautions are not taken and repeated exposures can cause degenerative changes in the skin that may result in skin cancer. Solar intensity increases with altitude, because the atmosphere is thinner. Also, reflective rays from snow surfaces or water can be very damaging. Exposure is not eliminated on cloudy or foggy days. Clouds and fog tend to scatter ultraviolet radiation, leaving the individual exposed to more rather than less radiation on an overcast day than on a clear one.

Solar Radiation: Safety Precautions

- be aware of sun hazards, on clear days and cloudy,
- avoid excessive sun exposure, particularly in the middle of the day when the sun is highest,
- wear a wide-brimmed hat,
- wear lightweight, protective clothing (e.g., long-sleeved shirts and pants),
- apply a liberal amount of an effective sunscreen (at least SPF 30) to all exposed skin; e.g., the face, neck, tips of ears and tip and bridge of nose,
- apply lip protection to guard against sunburn, fever blisters and cold sores,
- avoid sun tanning; any colour change to skin damages the ski, and
- exercise caution if taking antibiotics or other medications that increase sun sensitivity.

Solar Radiation: Treatment

- get out of the sun or put on sun-protective clothing,
- hydrate,
- draping a cool, moist cloth/towel over the affected area can help reduce pain,
- moisturize the exposed skin with lotion (e.g., aloe vera)

Snow Blindness

Snow blindness, sunburn of the surfaces of the eye (particularly exacerbated if on a reflective snow surface), feels like having sand ground into the eyes. While mild cases will only cause temporary discomfort and short-

term reductions in vision, severe cases can be very debilitating and can result in total incapacitation for several days (longer if not treated).

Snow Blindness: Safety Precautions

- wear sunglasses with 100% UVA and UVB protection; wrap around style or glasses with side shields can be very helpful too,
- wear a wide brimmed hat, and
- if sunglasses are lost, an eye covering can be fashioned by cutting a couple of narrow slits in a piece of cardboard, duct tape folded over on itself, or other suitable material.

Snow Blindness: Treatment

- rest in a darkened tent or room,
- cool, wet compresses can help minimize pain and inflammation,
- cover both eyes with a soft cloth or gauze bandage to block light, and
- if pain remains, a pain reliever such as Ibuprofen can be taken.

Precipitation and Electrical Storm

Precipitation

Rain, snow or fog can all seriously hamper any outdoor trip. Being wet affects not only the physical well-being of the group, but the mental attitude and social functioning of its members as well. Getting wet increases the risk of hypothermia and trench foot; wet clothes greatly reduce their insulation value and increase heat loss. The weight of equipment also increases when wet, causing increased energy expenditures and contributing to exhaustion.

The physical or natural environment also becomes more hazardous. Wet trails are slippery and difficult to walk on. River crossings become dangerous due to rising water levels. Avalanche hazards increase with large snowfalls that have not had the chance to consolidate.

Precipitation: Safety Precautions

- carry appropriate wet weather clothing on all trips, including jackets and pants,
- carry a tarp or other means to set up a quick group shelter, especially if route is exposed,
- assess the effect of changing weather on the safety of the proposed route or outing,
- always monitor the condition of group members , and
- select campsites and rest stops that are protected from the weather.

Electrical Storms

Electrical storms are a great danger, especially if on the water or if caught in an exposed location. Lightning usually involves electrical discharges on a huge scale between the atmosphere and an earth-bound object (i.e. originates in thunderclouds and terminates on the ground). It may also be caused by the “pull” of electrons up from the ground to the base of a positively charged cloud. It is typically pulled from the most conductive object closest to the source clouds. Lightning strikes are often “indirect strikes”. Indirect strikes (ground currents) cause most lightning related injuries and deaths.

When lightning strikes an object, it does not stop there but spreads out, traveling along the line of least resistance. The electricity flows along conductors such as lakes and hollows, streams and ditches, and

overhangs. It tends to travel in direct lines on the ground. Rocky ground absorbs electrical current much more slowly than ion-rich humans and animals. Lightning strikes taller objects.

Predicting Electrical Storms

There are numerous signs that a lightning storm is approaching, including:

Sudden temperature changes: Rising wind and dropping temperatures precede a thunderstorm. This results from a downburst of cold air that accompanies the storm.

Cloud changes: Watch for cumulus showing strong upward growth.

Ionization of air: As the air becomes charged with electricity, it gives off a distinctive odour (from ozone). The air may also hum. Hair may stand on end.

Thunder and lightning: Watch for lightning and listen for thunder. If thunder and lightning strike within five seconds of one another, the storm is very near (about 1.6 km away per 5 second gap). If the interval increases, the storm is moving away; if it decreases, it is approaching.

Tornados

Tornados occur in Canada, more often in the prairies, but they have happened in the mountains. A tornado is a violently rotating column of air, extending from within a thundercloud down to ground level, and frequently visible as a funnel cloud. They have an average diameter of about 50 meters but can be as small as a few meters to several hundred meters wide. They can last from several seconds to more than an hour. Tornados are often accompanied by rain or hail. Tornados can pick up and carry objects, including people, cars and even buses and they can pull whole buildings off their foundations and destroy them. Most injuries and deaths related to tornados are caused by airborne debris striking, impaling or crushing people.

Tornados: Safety Precautions

- If aware of a tornado watch in an area, 'watch' meaning conditions are favourable for the formation of tornados, turn on a radio/weather radio if you have one to listen for updates or use your cell phone or other external communications technology, if you have a device, to get updates
- posting of a tornado 'warning' means an active tornado funnel has been spotted; a tornado is occurring that poses a serious threat to people and property in its path, and others may form as well,
- learn to recognize signs of a tornado, including:
- persistent and strong rotation in the base of a cloud,
    - whirling dust or debris along the ground under a cloud base,
    - heavy rain or hail followed by either dead calm or a fast, intense wind shift,
    - loud, persistent rumble or roar,
    - at night – small, bright, blue-green to white flashes at ground level (a tornado snapping power lines), and/or
    - also, at night, persistent lowering from the cloud base, silhouetted or lit up by lightning.
    - locate a safe shelter,
    - if in a building, go to the basement or somewhere in the interior of the building on the lowest floor (e.g., interior hallway, under a stairwell, in a closet or bathroom). Crouch down, facing downward and cover head with hands. If possible, cover up with some sort of thick padding (e.g., mattress, blankets or sleeping bags),
- stay far away from any windows to avoid flying glass. If in a building with windows, do not try to open them,

- avoid seeking shelter under bridges or highway overpasses as debris can be funnelled there,
- if in a vehicle and time permits, drive it out of the tornado path. Observe the tornado's path for a few seconds, comparing it to one or more fixed objects visible in the foreground. Escape at right angles to the anticipated path,
- if in a vehicle but unable to drive it out of the tornado path, leave the vehicle for shelter,
- lie flat face down in a ditch or low spot, as far from trees, roads, buildings, etc. as possible. Protect the back of the head with the arms or hold tightly to a shrub or small tree, and
- follow all instructions provided by emergency services personnel.

After a Tornado

- keep the group together and call/wait for emergency personnel,
- render first aid to any who have been injured,
- avoid power lines and puddles with wires in them; they may still be live,
- avoid stepping on broken glass, nails and other sharp objects,
- avoid entering any heavily damaged buildings, and
- avoid using lighters or matches if near pipelines or buildings that may have natural gas leaks.

Cold, Hypothermia and Frostnip and Frostbite

Hypothermia

The most common cold related condition is hypothermia, a drop in body core temperature. It can occur at temperatures hovering at or above 0º Celsius, if not more so, as less care is taken to maintain body warmth. Hypothermia may be mild to severe, with signs and symptoms as follows:

Mild: core body temperature of 32-35° C; shivering, pale or waxy skin, numbness of skin, tense muscles, slow responses/clumsiness.

Moderate: core body temperature of 28-32° C; violent shivering, sluggish muscles, loss of coordination, withdrawal.

Severe: core body temperature of 20-28° C; shivering stops or is intermittent, rigid muscles, bluish skin and lips, slow pulse and breathing, irrationality, incoherence, loss of consciousness, coma, death.

Cold: Safety Precautions

- check the weather forecast and prepare accordingly,
- be aware of mechanisms of heat loss from the body: radiation, convection, conduction, evaporation and respiration,
- instruct students about the signs, symptoms and treatment of cold related illnesses in themselves and others,
- list and inspect all equipment and clothing needed for protection,
- assess the effect of changing weather on the safety of the group; modify plans as necessary,
- wear layered clothing; put on or remove layers to manage personal microclimate,
- wear a hat and tube/buff or scarf to minimize heat loss from radiation; tuck cold hands into own armpits or feet into a buddy's armpits,
- be aware of wind chill factors and wear windproof/resistant clothing to reduce convective heat loss,
- avoid sweating and change wet/damp clothes caused by perspiration to reduce heat loss by evaporation,

- avoid overexertion resulting in a high breathing rate and wear a facemask or tube scarf on cold, dry days to reduce loss of heat by respiration,
- avoid excessive fatigue as it contributes to hypothermia,
- use seat pads for sitting on cold ground/snow and insulated sleeping pads to reduce conductive heat loss,
- increase activity level if chilling to generate heat to warm the body,
- drink often and lots as dehydration contributes to hypothermia; have a hot drink before bed to warm up from the inside-out,
- eat high calorie foods and snacks to maintain energy levels,
- wear dry clothes to bed, including head and neck coverings,
- have buddies monitor for hypothermia by attending to their partner's coordination, coherence and shivering.
- seek shelter or build a fire in the event of deteriorating conditions, and
- stop and treat any serious cold injuries/conditions immediately.

If someone is exhibiting signs and symptoms of hypothermia:

Mild

Stop further heat loss and restore warmth slowly from the core out by doing the following:

- shelter the victim,
- remove any wet clothes,
- put on lots of warm, dry clothes on or wrap in jackets, blankets or sleeping bags, and
- give warm drinks and food.

Moderate

Seek medical aid immediately for anyone suffering moderate to severe hypothermia.

- shelter and cover the victim (removing any wet clothing);
- wrap in warm jackets, blankets or sleeping bags,
- use warm dry compresses (e.g., warm water in a water bottle) on neck, chest and groin,
- if using hot water bottles or chemical hot packs, wrap them in cloth first to avoid direct contact with skin,
- direct body heat from another individual stripped down to his/her underwear can help,
- do not apply direct heat (e.g., hot water) to avoid damaging the skin and/or causing cardiac arrest
- keep them still and handle gently to minimize circulation of cold blood in extremities to core and possibly causing cardiac arrest,
- apply warmth to the head, neck, armpits and groin (e.g., warm person, water bottle);
- give warm fluids and food if conscious,
- monitor breathing and begin CPR if the person's breathing has stopped and no pulse is detectable, and
- unless pulse and respiration are absent (1 min. check), airway blocked, obvious fatal injury and body temperature below 20°C, evacuate as alive.

Severe

- if temperature is below 28°C, but the airway is clear and there is no obvious fatal injury, re-warm only once in hospital (blood chemistry changes will likely be fatal in a field warming scenario.)

Frostnip and Frostbite

Frostnip is the first stage of frostbite. The skin (typically cheekbones and earlobes) appears whitish and waxy and feels numb. Treat frostnip by covering the area affected with a warm hand or blowing warm exhaled air

on it. No permanent injury will occur. Frostbite results when body tissues are exposed to sub-zero temperatures over a period of time and they freeze. The most susceptible parts of the body are the extremities; face, ears, feet and hands.

Frostbite: Safety Precautions

- all above related to hypothermia,
- avoid wearing small boots or lacing boots too tightly in cold weather,
- exercise/wriggle fingers and toes to maintain circulation, and
- monitor the condition of all party members constantly and utilize a buddy system to watch for signs of frostbite; have buddies check each other's cheeks, ears and other exposed skin, looking for changes in colour (e.g., whiteness) and/or texture (e.g., waxy feeling).

If someone is affected by frostbite:

- protect skin from further exposure,
- remove wet clothing and generally work to get the person warm and dry,
- re-warm superficially frostbitten skin (i.e., red or whitish, tender to touch, responds by indenting when pressed on) slowly, through contact with other body part (e.g., armpits), or by placing it in clean water and slowly warming the water to 40-42°C. Cover raw areas with sterile dressing and change it frequently,
- do not rub the tissue or let the thawed tissue refreeze,
- do not use direct heat (e.g., stove, campfire) because of the risk of burns,
- painkillers (e.g., Ibuprofen) may be necessary to treat the tingling, burning sensation of circulation returning,
- keep thawed skin well wrapped to protect it from re-freezing, and
- if there's a chance the affected area(s), once thawed, will freeze again, do not thaw. If the tissue is numb, the victim cannot move the affected joint, and the tissue feels hard and does not indent when pressed on, the frostbite is deeper. Do not thaw or allow weight-bearing on the body part to avoid damaging the tissues. Provide fluids and evacuate to medical attention if numbness or sustained pain or blisters develop.

Earthquakes

Canada has numerous high-risk earthquake zones, with BC most at risk of experiencing the effects of a significant one. The first indication of an earthquake may be a loud bang or roar followed by the ground pitching and rolling.

Earthquakes: Safety Precautions

- move to a safe place, and once there, DROP to the floor, COVER (protect your head and torso) and HOLD on to something heavy and sturdy (e.g., table, bed) until the motion stops
- indoors the safest places are under sturdy furniture, in doorways or corners (hold on to furniture as it may shift around during the quake),
- do not try to exit a shaking building,
- avoid windows (potential for flying glass), doorways (doors likely to slam) and tall, heavy unmoored objects that may fall over,
- outdoors stay in the open away from trees, buildings and power lines,
- if in a crowded area, take cover somewhere you will not be trampled if others panic,

- in a vehicle, pull off the main through fare away from bridges, overpasses, buildings that could collapse or power lines; park and stay in the vehicle,
- near an ocean, get as far as possible above the water in case of a tsunami developing,
- in a boat, move out to deep water, far from the beach in case a tsunami develops, and
- have an emergency supply kit available to your group on all trips.

After an Earthquake

- stay calm, put on sturdy footwear if available, and move cautiously,
- keep the group together, listen to a radio for instructions from emergency officials, and call/wait for emergency personnel,
- treat yourself first, then assist others,
- gather emergency kit and attend to the injured,
- check for unstable hazards like weakened foundations and glass,
- avoid flipping light switches on until certain there are no gas leaks (especially if there is a 'rotten egg' smell present, indicating leaking natural gas),
- if in a building, check for shut off valves for gas and water,
- be cautious of electrical lines,
- be aware that other hazards caused by earthquakes are: fire, landslides, roadway damage, dike failures, liquefaction, cracks etc.,
- be prepared to Drop Cover and Hold if aftershocks occur,
- avoid entering heavily damaged structures,
- avoid using lighters or matches if near pipelines or buildings that may have natural gas leaks, and
- avoid stepping on sharp objects.

Nightfall

Being caught out in the dark can be avoided by having a realistic time plan for the outing including a good margin for error. Hurrying a trip or trying to travel as far as possible without considering the specific abilities of the group is asking for trouble.

Nightfall: Safety Precautions

- carry sufficient flashlights/headlamps to allow safe travel over a short distance to a suitable bivouac site, but try to select a suitable bivouac site before dark, and
- deal with the mental state of the party by establishing an alternate plan, maintaining close contact, and reassuring group members.

Terrain, Bushwhacking and Marsh

Terrain hazards are many and varied and a group may encounter none to several on any given outing. The inclusion of information and safety procedures in this section does not imply that all terrain can be safety negotiated with youth participants. A significant margin for error must be present before accepting a given risk. "NO GO" always remains an option where the risk is substantial and the benefits questionable or uncertain.

Bushwhacking

Bushwhacking involves travel on an unmarked or indistinct route, often through vegetation. It should be avoided whenever possible as it can be both frustrating and exhausting if the distance to be covered is of any great length and can add to the risk of getting lost.

Some of the hazards associated with bushwhacking include:

- Blow down, including jumbles of partially decayed logs,
- Rocks entangled in the shrubs offer unstable footing,
- Shaded rocks and logs may be wet and slippery,
- There may be snow patches present that can be slippery,
- Thick brush may obscure other hazards such as roots or cliff bands,
- Steep sections may be dangerous to navigate; thin branches may offer weak handholds,
- The footing may be muddy and slick after a rain,
- Branches can snag backpacks and throw the hiker off balance,
- Branches and leaves holding water may soak the hiker brushing against them,
- A hiker may accidentally whip a branch back in the face of a following hiker,
- Group members may be separated in dense brush by obscured visibility and muffled sound, and
- Wild animals can be startled and respond aggressively.

Bushwhacking increases the level of exertion and slows the rate of travel. Avoid it if at all possible by backtracking to find "the" trail, if there is one. If not, consider seeking a higher route on a ridge or snowfield or a lower one following a shallow or dry streambed.

Bushwhacking: Safety Precautions

- choose the shortest viable route possible through the bush,
- dress for protection; e.g., long-sleeved shirts and long pants, sunglasses or safety glasses to protect eyes from branches,
- lead with the hands, then head, then legs and feet,
- establish a known destination and know the back bearing from it,
- establish a conservative time estimate for the travel leg, and encourage group members to remain patient,
- sometimes, as a route is being scouted, a second person can put up surveyor's tape to help minimize chances for anyone to get lost (if used, plan for its removal; e.g., last person picks it up at end of return trip),
- follow a compass bearing from landmark to landmark, if possible; these should be relatively close together to maintain the intended line of travel,
- if can't see landmarks (i.e., very thick bush), simply keep an eye on the compass and walk on the bearing as much as possible, correcting for deviations around obstacles,
- space the group 2-3 metres apart to prevent being whipped by branches, but close enough to maintain visual contact fore and aft,
- encourage hikers to frequently check on the person behind them and to stop the people ahead if they lose audio contact with their follower,
- encourage using partners to assist over and under major obstacles,
- carry water,

- seek a route in the densest timber where shade may reduce the growth of the understory,
- utilize animal trails, where possible, remaining cautious of being drawn too far off the group's intended direction, and
- sing or call often to warn animals of your presence.

Marshes

Marshes are marked on most topographical maps and are to be avoided. The time of year, and rainfall/dryness of the season must be kept in mind. In spring, many low-lying areas will be moist and muddy, but by fall, many of the marshes may be dried up.

Marshes: Safety Precautions

- as it is difficult to determine the stability of such areas, avoid boggy regions,
- avoid mud or silt around river beds; they may contain quicksand,
- skirt around marshes, or cross on beaver dams, solid logs or rocks,
- if necessary, walk on rooted or tufted vegetation,
- consider carrying a walking stick (or paddle if on a paddling trip) to aid balance,
- if walking in marshy water, check for leeches following exposure,
- have alternate footwear available, and
- be prepared to provide reaching assists if necessary.

Steep Terrain and Rockfall

Steep Grassy Terrain

When wet, steep grassy slopes are challenging to cross in hiking boots, and sometimes nearly impossible in running shoes. After a long period of dry weather, the grass may become very crumbly, and again difficult to cross. The most dangerous situation occurs when grass slopes are frozen; the hard, slick surface is very difficult to cross.

If a steep slope is encountered, stop and assess it before crossing and plan a safe route. This is often best done with a side view, where possible, to get an accurate picture of the slope angle. Steep grassy slopes may appear to be easy but weather can make them dangerous to cross.

Steep Grassy Terrain: Safety Precautions

- check the slope before crossing; note the area below the slope and any dangers it presents,ensure group members have adequate footwear; e.g., sturdy hiking boots for steep, slippery grassy terrain,
- ascend or descend slowly, placing each foot slowly and firmly,
- on a downhill traverse, travel in a diagonal line with the uphill foot in the line of travel and the downhill foot at about 45° downhill off the direction of travel to maximize contact with the ground and help prevent rolling the ankles,
- utilize trails, soil creep steps, terraces (stepping on the upside of each grassy hummock or tussock where it's more level), animal trails or other breaks in the slope, and
- be aware that shaded spots may be frozen.

Steep Broken Ground

Steep broken ground refers to sloping ground that has small cliff bands or drop-offs interrupting its surface. Drop-offs are difficult to see, especially when descending. Wet vegetation may result in a slip and fall. Loose rock or dirt creates a slippery surface as well. Consider what could happen if someone slipped.

Steep Broken Ground: Safety Precautions

- Avoid:
  - jumping or running,
  - shortcutting,
  - scrambling up where there is a dangerous drop-off below,
  - scrambling up terrain that cannot be climbed back down,
  - walking in each other's fall-line (the line a rock would follow if it were kicked loose),
  - going too close to the edge of any cliffs,
  - leaning into the slope, and
  - letting zeal for reaching an objective interfere with good judgement.
- adjust walking style to increase stability; e.g., taking shorter steps on downhills and placing the entire foot on the ground when walking uphill,
- gradually traverse downhill, edging boots firmly into the slope,
- try to gouge or chop steps,
- use a walking stick(s)/ski pole(s) to stabilize oneself,
- select easy places or breaks in walls to climb up or down,
- buddies backstop each other while descending, and
- if the slope is too steep or unstable, stop, turn back or seek another, more suitable route.

Scree Slopes

Scree slopes are formed by the broken rock debris at the base of cliffs and by the actions of glaciers that form moraines. They can be stable and solid, possibly covered in vegetation, or very loose and insecure with the added danger of rolling pieces of rock.

Scree Slopes: Safety Precautions

- party organization – keep the group close together to minimize rockfall hazard,
- avoid:
  - crossing directly below other people along the fall-line,
  - thin scree overlying a steep rock slab (very slippery),
  - small cliff bands often found in scree slopes,
  - leaning into the slope, and
  - scree running or bounding downhill (although exhilarating, the rocks set rolling and the chance of falling make it a potentially dangerous practice),
- avoid ascending scree slopes if possible,
- if must ascend, do so diagonally using switchbacks, kicking steps into small scree using the edge of the boot; use a strong ski or trekking pole or ice axe as a third point of contact (keeping it on the uphill side so it can be used to dig in to arrest a fall or slide),
- instruct re: self-arrest (e.g., dig in with hands, elbows, knees and toes; if fall on back, roller over and dig in),
- descend scree slopes straight down, using a short, shuffling step (knees bent, standing upright, feet pointing downhill and heels gouging in to form a step on each stride)

- step on larger consolidated stones,
- avoid running, especially if not wearing boots,
- plant each foot firmly and briefly and test its stability before relying on it,
- keep weight distributed over the entire sole; don't push off the toe,
- wear gaiters and gloves,
- when descending, gouge the heel into small scree to form a step, and
- slow down before bottom, if bottom of slope is not clearly visible (to avoid any drop-offs).

Boulder Fields

Boulder fields are made up of large boulders that are stable because of their size. Crossing boulders can be fun, but it is also time consuming. Avoid boulder fields, especially when the party is inexperienced, carrying packs, and/or tired.

Boulder Fields: Safety Precautions

- wear proper footwear with good ankle support
- watch for moss or lichen, which is slippery,
- avoid boulder fields partially covered in soft snow, even if it means a long detour,
- step on flat, solid surfaces on the tops of boulders/rocks as the first choice, and
- step in the "V" between two boulders when carrying a heavy pack.

Rockfall

Rockfall can be a significant hazard in some mountainous areas, due to the loose nature of the rock. The hazard is greatest on or below steep rock faces, and in or below gullies, which may channel falling rocks.

Rockfall can be caused by:

- People or animals knocking rocks free,
- Lightning, jarring rocks loose,
- Rain, particularly in runoff channels,
- Strong winds,
- Sun and melting snow, and
- Freeze/melt cycles, which create cracks in rock.

Rockfall: Safety Precautions

- use maps and guidebooks to select routes that minimize crossing under areas subject to rockfall,
- watch for signs of past rockfall in an area (e.g., steep gullies, debris piles) and select routes that avoid such areas,
- travel closely together so dislodged rocks cannot pick up too much momentum or, conversely, move across a suspect area one at a time,
- cross hazardous areas quickly,
- avoid hiking or climbing below other parties; if climbing, have group members remain in safety zones well away from the base of the climbing area until they need to be there,
- properly secured helmets must be worn for all climbing and rappelling activities where rockfall is a hazard,

- pull down, not out, if climbing and finding a loose rock,
- attempt to stop a rock you dislodge before it can gain momentum,
- warn others if you dislodge a rock, yelling, "ROCK, ROCK, ROCK..." repeatedly until the rock stops moving, and
- avoid stopping to rest in hazardous spots.

Trails Near Cliffs, Deep Water or Fast Rivers

Trails near cliff edges, cliff faces, deep water, or rivers require tight party control because of the high risk.

Trails Near Cliffs, Deep Water or Fast Rivers: Safety Precautions

- leader positions should support good observation and support of students in tricky sections,
- encourage students to concentrate on their movements and refrain from chatting until past the hazardous area,
- secure footing and slow movement,
- establish reasonable safety limits from the edge,
- be aware of rockfall (use head protection, day pack overhead),
- if necessary, use a fixed rope to establish a safety line, and
- know appropriate use of reaching assists and emergency procedures around water.

Snow Cornices and Snow Fields

Snow can be encountered at any time of the year in many parts of Canada, particularly at higher elevations. Different types of snow-covered terrain require different route finding and safety techniques.

Cornices

Cornices are wave-like deposits that form on the lee sides of ridges, peaks, etc. They may be hard and solid or soft and readily fractured. Cornices present falling hazards to hikers, skiers or snowshoers who may not see them and break through them from above. They also present hazards associated with breaking off above people and hitting them with the cornice snow and/or any other avalanches they trigger.

Snow Cornices: Safety Precautions

To avoid cornices from above:

- approach them from the windward side,
- stop and look around periodically to seek clues to their existence,
- probe the snow occasionally with a walking stick or ski/trekking pole to establish that there is rock below,
- watch for buttresses along a ridge; a series of these can create bays with cornices extending between,
- watch for cracks or indentations that indicate potential fracture lines for cornices,
- stay well back from any observed fracture lines,
- avoid getting too close to the edge; be on a roped belay if any risk, and
- consider cornice stability (e.g., early season, warm day after a snowfall).

If travelling below a cornice:

- consider the likely path of the cornice if it fell, and any avalanches it may trigger,
- avoid traveling under the cornice and its path, and
- apply avalanche safety precautions (e.g., station spotters, cross one at a time)

Snowfields

Snowfields vary according to their exposure to the sun, underlying terrain, time of day, weather and season. For example, sun-exposed areas can be soft and mushy, while shaded areas may be hard and icy. Either situation can present difficult travel conditions (sinking vs. slipping). Soft snow is especially tiring, as is a hard, but breakable crust. Before taking a group on any snowfield (beyond small patches on gentle terrain), the teacher/leader must understand the nature of the snowfield in relation to the factors noted above and be able to select a safe route.

Beware of:

- Slippery footing on snow or hidden underlying logs and rocks,
- Air spaces around boulders and fallen timber,
- Snow slopes on steeper terrain where there is a dangerous runout over broken ground or cliffs,
- Moats created along the edge of snowfields as the sun melts the snow,
- Depressions that may indicate streams created by melting snow,
- Snow bridges, which may break under a person's weight, and
- Icy edges along snowfields.

Snowfields: Safety Precautions

- consider the quality of the snow on the snowfield (e.g., impacts of weather, aspect, time of day) and size of the area to be crossed,
- avoid steep snow slopes, as these require specialized mountaineering equipment such as ice axes and crampons,
- consider where a person would end up if he or she slipped,
- avoid slushy areas; e.g., select snow that is in the shadows if available,
- avoid stepping too close to large rocks and logs; take a large step to get off of one to avoid any potential air pockets surrounding the object,
- test the snow with a stick, ski pole or ice axe,
- kick steps when ascending,
- make switchbacks when traversing, kicking the entire foot into the snow,
- use a heel-to-toe "plunge step" when descending moderately angled slopes with soft snow,
- use heels to control speed or brake speed if glissading or boot skiing,
- use ski pole (remove wrist straps in the event of snagging), walking stick or ice axe for balance, support or self-arresting, and
- always be prepared to retrace a route or take an alternative route if hazards presented by snow encountered are too high for safety.

Avalanche

An avalanche involves a mass of snow releasing and sliding down a slope. Slides are triggered by a variety of factors, but almost all of those affecting people are triggered by the people themselves. Therefore, most avalanche accidents are preventable with knowledge and appropriate route selection. The safest guideline to follow is to avoid avalanche terrain. Only well-trained and well-prepared groups should consider venturing into potential avalanche terrain, and then only when the risk rating is low or moderate. Parks Canada has specific regulations for custodial groups involved in winter trips in avalanche terrain.

What follows below is very cursory information regarding avalanche hazards and related safety precautions. **ADDITIONAL TRAINING AND READING ARE ESSENTIAL.** The information in this section can be used to help prepare all teachers/leaders and students for a trip to get an overall sense of the parameters of travel but are no replacement for formal training or travel with a trained and certified guide.

Avalanche Area Pre-trip: Safety Precautions

- obtain the current avalanche hazard forecast from the *Canadian Avalanche Association* avalanche.ca or Parks office and plan a safe route for current conditions,
- obtain a weather report and forecast shortly before leaving on the trip; focus on factors that may contribute to increases in the hazard rating, including recent or anticipated:
  - heavy and/or rapid snowfall,
  - rainfall, which can wash away the bonding layers in the snowpack,
  - high winds, as these may affect snow deposition on leeward slopes,
  - a sudden warming trend, especially after an extended cold snap, and
  - solar radiation that melts the snow surface and causes weakening of the snowpack as water percolates down.
- check avalanche equipment (transceivers, probes, shovels) and ensure all know how to use it,
- ensure transceiver compatibility,
- consider group make-up, experience, fitness level and group size,
- have alternative routes in mind and be prepared to use one of them if the preferred route is not safe, and
- consider the subjective human factor; e.g., desire to ski "good terrain", repeating past successful trips assuming these areas/routes are safe, following other groups' tracks/routes, assuming conditions can't change much over a trip.

Recognizing Avalanche Terrain

Microclimates affect local avalanche conditions, so ongoing monitoring and evaluation of avalanche hazard must occur in relation to route finding. Well-forested slopes have lots of anchors (e.g., trees, rocks) and are generally safe choices.

Consider the following potential indicators of avalanche hazard:

- Ground cover such as grass or fine scree, that can act as a smooth sliding plane for avalanches,
- Signs of past avalanche activity on slopes of similar aspect, angles and elevation; e.g.:
  - tree "flags" with branches growing primarily on the downward slope side as those on the upward slope have been repeatedly sheared off,
  - large piles of avalanche debris (rocks, uprooted trees), and/or
  - avalanche paths where a slope has been scoured clean,
- Terrain traps that include features that increase the potential and consequences of being caught in an avalanche; e.g., depressions with abrupt transitions increase the odds of deep burial; cliffs and trees increase the chance of traumatic injury; and, gullies and canyons decrease the chance of escaping below or off to the side of a slide,
- Large gullies or coulees that act as "drain spouts" for ridges or mountains,
- Narrow or v-shaped valleys,
- Slopes from 25 to 60 degrees,

- Convex slopes,
- Leeward slopes where the snow is wind-packed and overhanging cornices may trigger avalanches,
- Snow-loaded slopes that have the same plane and exposure to the sun as recently avalanched slopes,
- Small or short slopes, which may be just as vulnerable to avalanches as larger ones,
- North facing slopes (more subject to unstable snow pack than south facing), and
- South facing slopes are most dangerous in the spring due to melting.

Additional Factors Affecting Snow Pack Stability

There are many factors that affect the stability of the snow pack. As a result, the avalanche hazard can change hourly. This is particularly true in many of Canada's mountain ranges where the snow is subject to changes in structure (snow metamorphism). Conditions can be very unstable and need to be frequently checked (e.g., using shovel shear test, compression test, a Rutschblock, and/or a ski pole test). Learn how and when to use each of these tests.

In the field, watch for:

- Large accumulations of snow in one snowfall, especially a recent snowfall,
- Cold temperatures during a snowfall,
- Large, faceted, snow crystals (depth hoar) which form at the base of the snow pack due to a large temperature gradient in the snowpack,
- Presence of persistent slabs (cohesive slab of snow overlaying an underlying weaker layer); very dangerous because not predictable and can be triggered by light loads and release above the trigger - hard to escape if the person is the trigger,
- Sustained low temperatures following a snowfall which prevents bonding,
- Melting conditions which result in the lubricating of layers by meltwater,
- Late morning to mid-afternoon sun during warm, spring-like weather,
- Warm, gusty winds, or temperatures that remain mild all night,
- Wind loaded snow that forms slabs,
- Evidence of wind loading including cornices, smooth pillows of snow, and drift patterns,
- Top snow layers turning to mush due to radiation (watch for small "rivers" of running snow, or rolling snowballs often characteristic of spring conditions),
- The entire snow pack becoming soft, due to the base being saturated and undercut with meltwater,
- Deep, long cracks ahead of, or to one side of one's skis and/or "whumph" sounds of snow layers collapsing on each other, and
- Hollow "drum-like" sounds from the snow as one weights it may indicate a weak layer underneath a dense layer.

Crossing a Potential Avalanche Slope: Safety Precautions

- Avoid potential avalanche terrain and be prepared to turn back rather than continuing if conditions are not highly favourable. However, if a suspect slope must be crossed:
- unbuckle all equipment so it can be readily jettisoned,
- zip up clothing and put on hat and mitts,
- identify an escape route(s),
- identify a rendezvous point,

- only expose one at a time (e.g., travel 100 meters apart if climbing, descending or traversing a suspect slope); cross slopes one at a time while others wait and watch from a safe location, and
- all watch the person crossing so there would be good potential to secure an accurate "last-seen" location in the event the individual is caught in a slide.

Remember: Have the courage to say NO GO!

Avalanche Survival

With the firm establishment of avalanche transceivers as mandatory equipment for travel in avalanche terrain, survivability of avalanches has increased. There have been ongoing improvements in transceiver technology as well as the development of devices such as avalanche airbags, which, when deployed, inflate to keep the wearer nearer the surface to increase survivability. External communications technologies help get search and rescue teams on site quickly. All these technological innovations continue to improve one's chances of living through such an ordeal. In addition to wearing a transceiver, appropriate prompt reactions by the individual and the group on site continue to be one's best chance of surviving an avalanche.

If caught in an avalanche

- if triggering a slide below your feet, jump upslope quickly to try to stay above the fracture line,
- assuming crossing one at a time, if caught, shout, so others will know you need help and can visually follow your descent to see your last known location,
- if possible, try to ski out of the path of the avalanche, to the side or down, riding the moving snow if necessary,
- if can't escape, discard equipment (e.g., skis/snowboard, backpack) so you ride higher in the snowpack, and deploy airbag if have one to further aid floatation,
- hold onto something solid, like a large tree or boulder (from downslope side to keep from being crushed by other objects being swept down),
- swim hard to stay as high as possible in the snow. Aim for the side of the avalanche if possible,
- fight to reach the surface,
- poke a hand up as the slide comes to a stop to help rescuers find you,
- create an airspace for breathing using the other hand and take a deep breath and hold it for few seconds just before the snow settles (expands lungs and buys more space),
- try to move, but don't risk losing air pocket; relax; conserve energy and oxygen, and
- call out if you hear others; otherwise, save your breath.

Avalanche Search and Rescue

Avalanche training includes strategies and techniques for maximizing potential success of a search and rescue operation. This training is essential.

To locate a buried victim

- call out and listen for a response from the missing person,
- ensure your own safety and that of remaining group members; assess ongoing avalanche risk in deciding whether to attempt search and rescue,
- use external communications device to contact emergency search and rescue,
- ensure the avalanche has stopped moving before anyone ventures onto the debris field,
- plan the search strategy and escape route(s),
- post a lookout to watch for further slide activity,

- minimize the number of people in the debris zone at a time,
- mark the "last seen" point and any items found at the surface (e.g., pack, ski gear, items of clothing, avalanche cord) and identify likely path of victim,
- keep the field clear of any of the searchers' personal effects,
- conduct a transceiver search – all switch to receive, spread out and listen for a signal,
- once a signal is located, assign someone to pinpoint the signal and probe to find the victim while others continue to search for other victims,
- use probes if no transceivers or no signal located – probe near surface clues, likely spots for a body to come to rest, and then set up a probe line. Mark location person is found with a probe,
- a lot of snow must be moved if the person is buried deeply (e.g., if the victim is two meters deep, the rescuers will need to dig a two-meter-wide x two-meter-long pit. Start from the probe and dig downhill, throwing the snow downhill. Take short shifts to maintain digging speed
- uncover the buried person's head first to support breathing. Turn off the victim's transceiver if the search is continuing for others. Provide first aid as required, within first aider's capacity (e.g., ensure airway, breathing and circulation, treat as spinal injury, treat injuries, treat for hypothermia, and arrange evacuation).

Cold Water

There are many hazards associated with water; including cold water (whether in a pond, lake, river or ocean), river (paddling or crossing on foot) and ocean. Here, several of the common ones found in Canada will be discussed.

Because BC waters (ponds, streams, lakes, rivers and ocean) generally have cold water (especially if fed by mountain run-off), the risk of immersion hypothermia is present year round.

Cold Water: Safety Precautions

- see precautions related to hypothermia for relevant information,
- precautions must be taken to ensure that a mild to moderately hypothermic subject can be re-warmed. Carry:
  - extra dry clothing stored in waterproof bags or containers,
  - a space blanket, blanket or sleeping bag, and
  - warm drinks or the means to produce them.

Minimize Heat Loss Following Cold Water Immersion

- hitting cold water can be a shock and may result in an initial lack of response to the situation;
- stay calm and get head out of the water; get breathing under control,
- call for help immediately, when able to catch a breath, so others will come to the rescue,
- keep clothes on, except heavy boots if these are impeding climbing out,
- try to get as much of the body out of the water as possible;
- conserve energy rather than swimming unless there is a boat or other floating object or shore nearby,
- do the Heat Escape Lessening Position (HELP) if alone or Huddle if with others (minimizing exposure of neck, groin and armpits to cold water).

See *Hypothermia* treatment above, based the on the degree of cooling of the body's core temperature.

Ice

Ice Crossings

Crossing a frozen steam or lake can be hazardous. Snow covered or drifted streams are not necessarily completely frozen over; water can be moving underneath the overlying snow cover.

Ice Crossings: Safety Precautions

- carefully select the route to be taken,
- check the thickness of the ice – a minimum of 15 cm is necessary for groups,
- determine where currents make the ice weak (e.g., stream entries/egresses),
- look, listen and feel for signs of weak ice; e.g., water visible under the ice, bubbles flowing away from you, sounds from the ice, ice "springy" underfoot),
- avoid partially submerged objects such as stumps or rocks as they weaken the ice,
- test the ice in front with rocks or a pole,
- distribute weight on snowshoes or skis,
- have group members hang onto a rope if crossing as a group,
- carry a long pole or bough if possible, if crossing one at a time,
- cross one at a time, or well spread out if not on a rope,
- undo the hip and chest belt of packs and have slip knots or quick release in tow rope to pull a toboggan, and
- have reaching assists available.

Ice Rescue

Self-rescue procedure:

- attempt to get out where fell in, by pressing the arms outward over the ice and making the body level; keep trying even if the ice continues to break,
- grab onto the surface of the ice an arm's length away from the hole (claw with keys, a sharp rock, fingernails or whatever is available) and kick as hard as possible to propel the body up and forward onto the ice,
- even if not succeeding in getting out, keep as much of the body out of the water as possible,
- if successful in getting out, once on the ice, stay flat to distribute body weight, and
- crawl on belly or roll towards shore until it is safe to stand up.

Rescue of another

- use a reaching assist (never a body part) and stay low,
- ensure everyone remains well back from the weak ice,
- get everyone off the ice as soon as possible,
- be prepared to treat the victim(s) for cold water immersion hypothermia.

River and Flashflood

River Hazards

Prior to doing any river paddling (e.g., canoeing, kayaking, rafting), the class of the selected reach (section of the river to be paddled) needs to be identified, along with the category of any specific rapids on the reach to ensure the challenges anticipated are within the ability of the group. The season and water level need to be considered in light of the types of hazards anticipated; sometimes a reach gets easier in medium to higher

water (more obstructions underwater so more open channel) and sometimes it gets harder (river gets pushier resulting in less time to make decisions and harsher consequences for errors).

River hazards are caused or contributed to by the nature of the riverbed (e.g., gradient, depth, constrictions, bends, and the presence of large rocks or ledges or drops). In addition to rocks, objects like fallen trees or logs pose hazards that must be avoided.

The current or flow of a river is determined by the gradient (steepness of the channel), bends (where the current will be faster on the outside of the bend and slower on the inside), and constrictions (compressing water increases speed and can add waves).

Waves

Waves can vary significantly from minor waves to large breaking waves where the top of the waves each collapse on the upstream side of the wave. Such waves can swap and open boat. Waves often appear in 'wave trains' of successive waves; paddlers need to manage their speed to avoid diving the bow under an upcoming wave and be aware of the cumulative effect of getting a little water in the boat on each wave and ending up swamping and swimming.

Rapids

Rapids form from water flowing around and over a variety of obstructions and/or the river bottom. The complexity of rapids is related to how fast the water is flowing, the number and size of obstructions it is flowing around, and their proximity to each other. Paddlers must learn to read the river so they can plan their course. They can take advantage of eddies behind obstructions (generally along the sides) on the river, where the current flows back upstream. Eddies give paddlers a chance to rest and scout the river below, but care must be taken entering and leaving them because the current flows in the opposite direction and an improper lean can tip the boat.

Holes

Holes are created when water flows over a ledge, rock or other solid obstruction and then re-circulates on itself back upstream, creating a hole. While small holes can be fun play spots on a river, the large ones created by big rocks, ledges, weirs and dams can create dangerous hazards. The re-circulating water is often foamy and aerated, and the hole can have steep sides, making it difficult to exit from. Such waves can be called 'stoppers' or 'keepers' because of their ability to stop a boat and hold it.

Stoppers and hydraulics are to be avoided on a river. A hydraulic caused by a large ledge or man-made weir can possess such a strong backflow that a swimmer or boat will be held and not be able to continue downstream.

Holes: Safety Precautions

- know and recognize the danger of holes on the river; e.g., although frequently hidden from upstream view, the holes usually appear as a calm spot in the midst of turbulence or a smooth "horizon line" marks the drop off of water – beware!
- avoid paddling in areas where large holes are a risk to group members,
- know and be ready to affect a rescue (e.g., throwbag, tag line) if a boat tips, and
- rescue priority is always people (rescuers, then swimmers), then boats, then other gear.

Log Jams and Sweepers – "Strainers"

Log jams are caused by high water, flooding and eroding banks. Overhanging trees or "sweepers" are caused by streams undercutting the banks. Both hazards are dangerous to paddlers as water can flow through the

hazard, but boats and people cannot. Even in slow water, these hazards can trap an individual and cause serious incidents.

Log Jams and Sweepers: Safety Precautions

- avoid paddling on rivers and streams in flood or exceptionally high water,
- ensure students have enough river reading and boat negotiation skills before taking them on rivers or streams prone to these hazards, and
- where log jams may be present, ensure students know that if they tip upstream of one, that they are to work hard to swim at and kick themselves up onto the logs; they must fight, at all costs, to avoid being sucked under the strainer.

River Crossings

River crossings that must be undertaken when hiking, backpacking or mountain biking, can be a high-risk activity and require very tight group control. It should not be assumed that a visible trail or blaze across the river means the best crossing point is on the line of sight. The best crossing point can vary, depending on the weather, water level and other factors. Factors to consider in determining whether and, if so, where to cross include the following:

- The speed of the water, which can be increased by slopes, logs, boulders, curves, and narrow riverbanks,
- The volume of water, which can be increased by rainstorms, melting snow, glaciers (late in the day) or dams being opened; a decreased volume of water is usually found early in the day,
- Obstacles in the water – the sound of rolling boulders, the sight of fast floating logs and/or white water,
- A ripple pattern on the water indicates where the current is strongest and where there are submerged obstacles,
- Hydraulics or holes caused by large, submerged boulders or ledges,
- Projecting obstacles downstream, such as boulders, sweepers, logs, that could pin a person if a slip occurred while crossing and they got swept downstream,
- Water temperatures and existing weather conditions. Anticipate a possible shock reaction to an immersion in cold water,
- River clarity may be muddy or silty due to glacial floor,
- Watch for mossy, wet, or iced rocks and logs, and
- Ford at wide places, between bends and where there is a gravel bottom and safe runout; avoid large rocks, sand, mud and high banks.

River Crossings: Safety Precautions

- undo pack hip and chest belts,
- wear running shoes or other alternative footwear to protect the feet and keep boots dry (suggest at least removing socks and drying out feet and shaking water out of boots before putting socks back on, to help keep feet drier and less blister prone when hiking again),
- stand sideways to cross with the upstream shoulder angled towards the opposite shore,
- shuffle the feet (don't take big steps),
- a rope strung across the stream may provide support; walk downstream of it,
- alternatively, use a stick or trekking/ski pole upstream for support and to check changing water depth,
- have bigger, stronger, more experienced people carry the packs of those less capable,
- groups may choose to cross in pairs or threes, linking arms, (keeping lighter/weaker person downstream so those upstream help 'break' the current for them, and
- if carrying a bike or other large object, keep it downstream of the body, prepared to let it go if need be.

Flash Floods

Flash floods are a sudden, huge volume of moving water, generally caused by rapid, heavy rainfall in all or part of a drainage area, with water accumulating and funnelling into canyons or over natural floodplains or other low-lying areas. They can be very dangerous due to the speed the water moves at and its potential to carry along rocks, logs, mud and other debris.

Flash Floods: Safety Precautions

- check forecasts for heavy rainfall warnings in the proposed trip area,
- observe the weather for heavy rainfall, particularly if coming down over a short period of time,
- in unfavourable conditions, avoid hazardous areas such as steep ravines, canyons, creeks, streams and rivers, flood plains, low-lying areas and areas downstream of dams,
- select campsites on high ground, and
- plan an evacuation route and ensure everyone in the group knows it.

If caught in a flash flood:

- immediately scramble to high ground,
- avoid walking through floodwaters, as the depth may vary and the bed may be unstable, and
- avoid driving through floodwaters; abandon the vehicle if it stalls in floodwater.

Ocean Hazards

British Columbia has many beautiful coastline areas to enjoy. However, coastal areas can be extremely hazardous to unprepared hikers, boaters, or swimmers. Being knowledgeable of the area to be visited and its unique hazards will reduce the likelihood of injury.

Tides

Tides are affected primarily by the gravitational pull of the moon, and respond significantly to the size of coastal shores, shapes, and bottom contours. Check predicted times and heights of high and low tides for hundreds of stations in Canada through the Canadian Hydrographic Service at *tides.gc.ca.* There are also publications which can also be acquired with this information.

Tides: Safety Precautions

- refer to tide and current tables before planning a trip which requires ocean or beach travel,
- plan trips regarding direction and time of tide changes if they be on the water by self propelled crafts or small sailing vessels,
- avoid hiking trips on long exposed beaches, especially at times of known extreme tide changes,
- take care not to become stranded offshore by an incoming tide; the next low tide could be many hours away, and
- be aware of extreme changes in tides if participating in any beach activities involving the surf.

Currents: Tides have a huge effect on currents and the subsequent waves that develop in areas where the water moves through narrow channels. Local knowledge when participating in activities on the ocean is extremely important.

Longshore Currents: When waves approach the shore at an angle, a current develops flowing parallel to the shore. These currents are common on straight beaches and will increase with the size, strength and direction of the approaching swell and the length and steepness of the beach. These currents can sweep swimmers and small craft into rip currents, piers, jetties and other hazards. Care must be exercised when taking part in boating or swimming activities in areas where these currents are common, especially when tide changes are large and rapid and when surf is high.

Rip Currents: A rip current is a channel of water moving out to sea. Rip currents form in various ways. When longshore currents become strong enough to overcome the incoming waves, they form a sediment trough that allows a rip current to develop beneath the surface (e.g., between sandbars, under piers or along jetties). Waves may accumulate on the shore and return behind rocky headlands or islands to create rips.

Rips are identified by discoloured water due to sediment in the current, debris and foam floating seaward or a break in the incoming wave pattern. Contrary to popular belief, rip currents don't pull a swimmer under the surface of the water; just away from the shore. That said, they are the major hazard for all beach goers, particularly non-swimmers. Others, especially weak swimmers get in trouble because they tend to fight the current and exhaust themselves.

Currents, Including Rip Currents: Safety Precautions

- refer to tide and current tables before planning a trip which requires ocean travel,
- avoid paddling trips which involve long crossings or areas with known extreme currents,
- plan trips with regard for direction and time of tide changes if they be on the water by self propelled crafts or small sailing vessels, and
- be aware of extreme changes in tides if participating in any beach activities involving the surf.

If Caught in a Current

- remain calm to save energy; don't struggle,
- if wading, travel parallel to the beach to get out of the current,
- if swimming, swim or tread water with the flow of the current until it dissipates beyond the surf or travel at a right angle to the current towards the nearest breaking waves,
- if you swim out of a rip current and are inside the breakers, use the waves to push you to shore,
- if you are out beyond the breakers, where the current is diminished, swim to shore at a right angle to the beach to avoid the rip,

- do not attempt to swim against the current; numerous deaths have been attributed to swimmers struggling to the point of exhaustion,
- get help if unable to swim in (e.g., wave arms overhead, call out),
- do not enter a rip current to save someone caught in it; summon help, throw the person in trouble a floating aid and shout instructions re: how to escape (as per above).

Waves

Waves are affected by the wind, tides and currents. Having local knowledge of the area that you will be in is of paramount importance. There are many types of waves, each with its own types of inherent risks. The types of waves ocean or beach goers need to be aware of include the following:

Rogue waves: Waves of significantly larger than normal size for the area. They can take a swimmer or beach hiker by surprise. These waves develop far out to sea and are unpredictable.

Shore breaking waves: Sometimes, waves break directly on the shore. Shore breaks are unpredictable and dangerous. They have caused many serious neck and spinal injuries to both experienced and inexperienced surfers and swimmers.

Small waves: Surfers' slang for small waves is "ankle busters". Small waves can be dangerous, sweeping the feet out from under waders.

High surf waves: These are large powerful waves generated by winds and storms at sea, sometimes thousands of miles from shore.

Waves on ledges: These are large waves originating from deep water breaking on rock ledges. However, this condition can occur even when the water appears to be calm.

Waves: Safety Precautions

- be aware of extreme changes in tides if participating in any beach activities involving the surf,
- when the surf is high, enjoy watching storm waves from a distance and avoid rocky headlands; rocks can be slippery and waves can become unexpectedly large,
- never turn your back on the ocean,
- swim/kayak at beaches with lifeguards when possible,
- check with lifeguards or land/coast managers for conditions,
- read and observe posted warnings,
- watch children carefully,
- watch the surf for at least 15 minutes before entering the water,
- never attempt to swim at the water's edge during big surf,
- stay out of big waves,
- never rely on a board or small craft as a substitute for strong swimming ability,
- never play in big surf if not a strong swimmer,
- if the sea recedes for a noticeable distance, get away from the beach as fast as possible,
- be particularly careful when the surf's up and running fast, and
- have an emergency supply kit available on all trips.

Tsunamis

A tsunami is a series of very huge waves, typically caused by the displacement of a large volume of water in the ocean or on big lake. Causes of the displacement incident may include offshore earthquakes, volcanic

eruptions, glacial calvings or other major disturbances. A tsunami resembles a very rapidly rising tide vs. a breaking wave, which is why they are sometimes referred to as 'tidal waves.'

Tsunami: Safety Precautions

- if feeling an earthquake while in a tsunami prone zone, head for higher ground, at least 10 meters above sea level (higher if possible),
- never go out to watch a tsunami,
- some communities in Canada's tsunami risk zone have systems set up to warn of a potential tsunami approaching (e.g., by siren, telephone or loud hailer), and
- if in a boat and aware of a tsunami approaching, head out for or remain in deep water.

After a Tsunami

- stay calm and move cautiously,
- keep the group together and call/wait for emergency personnel,
- treat yourself first, then assist others,
- gather emergency kit and attend to the injured,
- if in a building, check for shut off valves for gas and water,
- check for unstable hazards like weakened foundations and glass,
- listen to the radio for updates,
- be cautious of electrical lines,
- avoid entering heavily damaged structures,
- avoid using lighters or matches if near pipelines or buildings that may have natural gas leaks,
- avoid stepping on sharp objects, and
- follow other actions suggested for an earthquake, tornado or other major disruptive event.

Forest Fire

Wildfires are a natural part of forest ecosystems. They may be caused by natural phenomena such as lightning or by human error, such as failing to properly extinguish a campfire.

Forest Fires: Safety Precautions

- check on the fire hazard in the area before starting the trip, and select appropriate routes if the hazard is high; e.g., through sparsely vegetated areas rather than in dense forest/bush, canyons, or other higher risk areas,
- remain alert to field conditions contributing to increased fire hazard; e.g., drought, high temperatures, low humidity, winds, thunderstorms,
- in the event of wildfire, identify safety zones (e.g., large lakes) and escape routes (e.g., staying upwind of the fire if it doesn't add excessive distance), and
- be alert to signs of forest fires; e.g., smoke, and call out to report it and seek direction re: appropriate escape route.

If trapped in a wildfire:

- dress for protection; e.g., long pants and shirt; avoid synthetics such as nylon that can melt,
- have the group stay low and breathe through wet bandanas or shirts to minimize smoke inhalation.
- look at the map and consider where the nearest safe zones are likely to be given the direction of travel of the fire;

- consider whether there is a way to cross through the fire or get to safe terrain (e.g., lake or large river, large rocky area),
- crossing a fire area is dangerous; if this is the best option, plan how to do it with minimal risk (e.g., fire in lull, low fire, aiming through already-burned areas, route with good footing),
- seek shelter within the fire; e.g., crouch or swim out in a large body of water or lay down on less combustible terrain like rock,
- lay down in a wet, open marsh/lake/pond or even a large dirt/sand area if that is all that is available; cover up with soil or other non-combustible material to protect from smoke and flame,
- create a safer spot by moving combustible material away (e.g., low bush and small lying logs), trying to get close to an obstacle like a rock face or large boulder to provide a barrier between the group and the fire,
- if paddling, can overturn canoe or kayak (keeping pfd on) and get under the boat to take advantage of the cool, trapped air,
- keep a close eye on any asthmatics in the group, and
- proceed with caution after a fire has passed; avoid stepping on hot embers or in burning stump holes. Also keep an eye out for treefall as dead, burned trees can topple. Evacuate.

Plants

There are numerous species of poisonous plants in Canada. A partial listing follows. Some of these plants can be confused with ones that are edible or have other traditional purposes. Unless a group member has expertise in this area and a good plant field guide along to verify the plants identified, it is best to refrain from allowing students to eat any wild plants. Some poisonous plants to be aware of include:

- Poison ivy (external irritant)
- Stinging nettle (external irritant)
- Black henbane
- Devil's club
- Death camas
- Water hemlock/water parsnip
- Some mushrooms (e.g., fly agaric, poison pie, panther agaric and emetic russula), and
- Tall larkspur/Monkshood.

The most common plant affecting outdoor travelers in Canada is poison ivy. However, if other known plant hazards exist along a proposed route, instruct students re: the identification and avoidance of the plant.

If someone's skin is exposed to poison ivy or another plant skin irritant:

- cleanse exposed skin with isopropyl (rubbing) alcohol, if available, to dissolve the poison,
- wash/rinse with cool running water for 10 – 15 minutes,
- wash the affected area thoroughly with soap (e.g., dish soap or other soap that cuts through oils in the plant) and water, and
- wearing gloves, remove clothes and anything else that may have come in contact with the plants and wash these separately from other clothing. If a towel was used to dry off affected body areas, wash this with the affected clothing as well,

If a rash emerges:

- expect it to take 2 to 3 weeks to heal,
- don't scratch!
- use cold packs or an ice pack (wrapped in cloth) for 10-15 minutes, over-the-counter corticosteroids or oral antihistamines to reduce itching, and
- calamine lotion, baking soda, zinc oxide, oatmeal bath, yogurt, etc., can help dry up oozing blisters.

Other Plant Hazards: Splinters, Cactus Spines and Thorns

- remove the offending object as soon as possible to avoid potential bacterial or fungal infection,
- sterilize tools (e.g., tweezers/forceps, multi-tool, scalpel/small pocket knife) in a flame (don't bother wiping off black residue),
- grab the end with tweezers and pull it gently out along the same path it took going in. If buried deeply, it may be necessary to cut a bit of the skin to access the object,
- once the object is removed, apply antibiotic and bandage,
- removing cactus spines is a slow, tedious process this way. An alternative, if planning a hike in cactus country, is to bring along a small bottle of white glue. Smear a thin layer of glue over the affected area, press on a piece of tape and allow it to dry thoroughly. Then, lift one corner and edge to get a grip on the tape and rip it off the skin in one fast motion. The layer of glue and the cactus spines should come with it,
- once the spines are removed, apply antibiotic and bandage, and
- check clothing, shoes, socks, etc. to ensure there are no more spines evident.

Animals

Bears

Black bears are present in many parts of Canada with grizzly, and other bears in many locations. While black bears will usually avoid people, conflicts remain possible, particularly in the following circumstances:

- garbage/human food habituation,
- sows with cubs,
- bears protecting food caches, and
- bears startled in the bush or along noisy water courses.

Travel in grizzly bear country requires extra care.

Bears: General Safety Precautions

- check reports and posted warnings at park visitor centres or with other land managers before the trip; consider the specificity, nature and recency of a warning(s) in determining whether to proceed or alter a proposed route,
- travel in groups of four or more, especially in grizzly country (bears less likely to attack),
- remain aware of surroundings, and be cautious at all times,
- be particularly cautious if mountain biking because of the speed and lack of noise bikes make (consider using bear bells on the bikes),

- be especially cautious if horseback riding as horses may spook if seeing or smelling a bear and may run or throw their riders to get away,
- try to stay on trails (bears learn human travel patterns and generally avoid well-used trails),
- make noise while traveling on land (e.g., sing, chant, yell "Yo bear!", clap hands), especially where visibility and hearing is limited (e.g., in dense vegetation, near streams),
- carry bear repellent (pepper spray) in an accessible holster; also consider carrying bear bangers and a launching pen and/or a small signal horn. For all bear repellent devices to be relied upon, know their application methods and limitations (i.e., read the instructions carefully, practice with the device and/or take some training),
- in very remote circumstances, groups may consider a rifle a necessary part of gear; if so, the rifle must be properly licensed and ammunition must be stored separately,
- watch for signs of recent bear activity; e.g., beds, rubbed and scratched trees, stripped berry bushes, overturned rocks and logs, diggings, tracks, scat, etc.,
- if coming across or smelling an animal carcass or gut pile left by a hunter, leave the area immediately as bears eat carrion and will defend a carcass or gut pile as a food stash,
- be cautious where berries are prevalent; make sure the area is free of bears before picking any,
- never approach a bear, especially a cub,
- women and girls should take care during menstruation to avoid attracting bears to the smell of blood; properly dispose of sanitary products in bear-proof garbage cans, burn after use, or seal in double plastic bags and carry them out,
- avoid bringing dogs, except for assistant or companion animals (e.g., guide dog for a student with a disability), and keep any dogs present in control (leashed), and,
- remember who the visitor is here; respect bears' privacy.

Large Predators

Cougars, Wolves and Coyotes

Conflicts with predators other than bears are very rare. Cougars (also called mountain lions and panthers) and wolves are very reclusive and rarely seen in the wild. Cougar encounters are more common than those involving wolves. As cougars rarely show themselves, any one that is seen in close proximity should be assumed to be at imminent risk of attacking. Coyotes are much more common, but generally pose little risk to humans, especially in groups.

Predators: Safety Precautions

- stay in a group; animals are much less likely to approach groups than individuals,
- teach students about these animals and inform them of the hazards they may pose, and what to do if encountering one,
- give all these animals their space,
- make noise while travelling to avoid startling animals, especially in dense bush or near bubbling streams; they are most active in the hours near dawn and dusk,
- watch for signs of large predators such as tracks in snow or mud, partially predated carcasses (may be partially covered),
- do not approach animals for photographs,
- do not attract or feed wildlife,
- keep dogs on leashes,
- keep small children close by, and

- consider carrying a walking stick/trekking or ski pole that can be used as a defensive weapon if necessary.

If a cougar, wolf or coyote approach:

- stay calm and stand upright, face the animal continuously, and speak to it so it distinguishes you from prey and back away slowly; do not run,
- do not approach the animal (predators are unpredictable),
- give the animal an avenue of escape,
- adults pick up any smaller children present so they are not confused with being prey,
- make yourself appear as large as possible (e.g., use equipment, jacket, backpack, skis, sticks, etc. to make yourself appear large),
- if the animal comes at you aggressively, fight back. Speak loudly and firmly so it sees you as a threat vs. prey; grab a stick or throw rocks and defend yourself. Focus your attacks on the animal's head, eyes and nose. Do not run or play dead,
- leave the area as soon as possible, and
- report any serious wildlife related incident to parks or land management officials (e.g., Conservation Officer Service 24-hour toll free hotline 1 – 877-952-7277 (RAPP) or #7277 on the Telus Mobility Network.

If bitten by a predator or bat:

- Consider the possibility that the animal could be rabid and act to minimize possible infection:
- wash the wound immediately with soap, water and/or antiseptic to minimize transference of the virus from the animal's saliva,
- seek medical attention as soon as possible, and
- report the incident to the local health department.

Ungulates: Moose, Elk, Bison, Bighorn Sheep

Groups traveling in wildland areas in Canada need to be knowledgeable of the hazards associated with ungulates. Large ungulates are a great thrill to watch, but they can be dangerous during the mating and calving seasons. Cloven-hooved, male animals rut during the fall, from September through November. Females of the species may be more aggressive during the spring calving season, particularly if they are protecting a calf. They also often carry ticks and other parasites that can bear diseases that may be transferred to humans. The biggest risk of serious injury or death related to ungulates is related to automobile collisions with moose.

Ungulates: Safety Precautions

- take particular care driving in moose country, especially after dark,
- remain in vehicles if stopping to view animals on the roadside; don't honk or otherwise try to scare the animals away as this stresses them,
- stay in a group and make enough noise to avoid startling an animal in the bush or where the sound of running water may mask the group's presence,
- photograph animals from a safe distance (do not stalk or startle),
- give ungulates you see lots of space and escape routes, so they don't feel threatened,
- be more alert and cautious when animals do not flee when confronted; never turn your back on these animals,

- never attract or feed wildlife,
- avoid bringing dogs and keep any present on a leash, and
- avoid coming between a cow and her calf.

If an ungulate approaches:

- an upset moose will often display with ears pinned back, raised hackles and/or lowered head,
- an upset elk will often pin its ears back and will grind its teeth,
- an upset bison may do one or more of the following: head shaking, snorting, foot stomping, pawing the ground, engaging in short charges or running toward you raising its tail,
- if a female animal, act big and aggressive to try to convince her to leave,
- if a male animal, avoid eye-to-eye contact or other aggressive displays,
- a moose will likely only charge if it feels stressed, cornered, harassed, if it is mating season or calving season,
- back away from an animal slowly, not running unless it is charging,
- seek escape routes in thick groves of bush or behind big trees, below cliff bands, up trees, under deadfall, etc.,
- if attacked by an aggressive animal, drop heavy packs and flee, and
- if an ungulate charges and knocks you down, curl into the fetal position and use hands and arms to protect your head. The animal may still kick and stomp but will likely move off when the 'threat' you pose appears eliminated.

Raccoons, Skunks, Porcupines, Foxes, etc.

Conflicts with these animals typically fall into the nuisance vs. emergency category. Work to minimize impacts on native wildlife or experience inconvenience caused by interactions with these species.

Other Animals: Safety Precautions

- don't attract or feed wildlife or try to approach them for photographs,
- manage foodstuffs, leftovers and garbage to minimize attracting scavenging animals (e.g., locked in a vehicle or otherwise 'mini-bear' proofed,
- racoons are a risk, not only of getting into food, but also have 'pack rat' tendencies and will steal small shining objects (e.g., keys, jewelry, eyeglasses, silverware, cell phones); put things like this away out of sight if in racoon country,
- porcupines will chew on objects like wooden paddle shafts, attracted to the salts from human sweat; take care when storing these items at night,
- take care when using or exploring old buildings or caves which may be home to rodents. Some (especially deer mice) may carry hantavirus. People may contract the virus by breathing in dust from the urine, saliva or feces of infected rodents. An infected person will show flu-like symptoms, progressing to pneumonia within 3 to 4 days.

Rodents: Safety Precautions

- if having a surprise encounter with a skunk, talk calmly and stomp your feet so it knows where you are (skunks have poor eyesight); alternatively, freeze and don't say anything in hopes it will pass by,
- if a skunk stomps its feet and turns around, close your eyes tight and run in the opposite direction as fast as possible; you are about to be skunked,
- anticipate the potential to encounter this hazard and bring the appropriate equipment and supplies on the trip or stay out of suspect buildings,

- indoors or in poorly ventilated areas, minimize the creation of dust from surfaces that have visible mouse feces or other signs they have been present,
- don't sleep on a floor where there is evidence of mouse activity,
- avoid suspect site unless rodent-contaminated areas can be disinfected with a spray bottle containing bleach solution or commercial disinfectants,
- wear rubber/plastic gloves when cleaning disinfected rodent-infested areas and disinfect gloves prior to removal, and
- avoid handling rodents.

Skunks and other Weasels: Removing Odour

- While a skunk or other weasel will always try to retreat from humans, if cornered, they can and will use their defensive musk.
- If a person or animal in the group is "skunked":
- the best treatment is a mixture of one litre 3% hydrogen peroxide, 1/4 cup baking soda and 1 teaspoon liquid soap (which breaks up the oils in the spray and lets the other ingredients work). This mixture must be mixed in an open container and never covered due to the risk of explosion. To use, mix the ingredients well and apply the lather to dry skin/hair; leave on for five minutes or longer and rinse well. Do not use on the face. If eyes have been affected by the skunk spray, flush them and the face with water. You can put 1 – 2 mineral oil drops in the eyes to reduce pain and protect from any splash of the mixture.
- tomato juice, the old standby, generally just masks the odour because the skunk smell is so strong it disables our olfactory receptors for skunk odour. Then, the tomato juice smell is stronger, but the skunk scent is still present.
- if bitten by a rodent (especially a skunk as they can carry rabies), contact the health department to report the incident.

Porcupine Quills: Removing Quills

If an individual is quilled by a porcupine, respond quickly as a broken quill under the skin requires surgical removal. Any movement causes embedded quills to migrate even deeper into flesh and each quill's spongy core absorbs body fluid, causing it to swell and become more difficult to remove.

- with pliers or tweezers, grab hold of the quill as close to the skin as possible and pull it straight out. This is very painful, but unless medical attention is near, it is the only reasonable option. Treat the wound to prevent infection.

Domestic Animals

In addition to wildlife encounters, domestic animals such as dogs, cattle, pigs, goats, sheep, horses and other domestic pets can be hazardous.

Dogs: Safety Precautions

- be cautious around unknown dogs, especially if they are in packs of three or more animals (pack mentality often leads animals to behave aggressively in situations where, if each, were alone, it would be fearful),
- be aware of potentially dangerous situations that may contribute to a dog feeling threatened (e.g., tied up, defending territory/property). A dog encountered in the bush/ backcountry may have been dumped and left to fend of itself; such a dog would likely be scared and hungry and could react aggressively,
- attempt to distinguish whether a dog is responding defensively to you (e.g., growling and moving away from you) vs. aggressively (e.g., snarling, teeth bared, moving toward you),
- if a dog approaches to smell you-stay still with your eyes focused down; most dogs will retreat when they determine you are not a threat,
- never approach a strange dog, and always ask permission before petting a dog,
- do not run past a dog or turn your back and run away; it is a dog's instinct to chase, and
- do not disturb a dog that is sleeping, eating, chewing on a bone/toy, or caring for puppies.

Encounter with a Vicious Dog

- remain calm, speak calmly and firmly while giving commands to "sit" and "stay",
- look around for a stick, rock or other potential weapon to use to defend yourself, if necessary,
- generally, avoid contact if possible, but if encounter is imminent, keep your eye on the animal (don't let it get behind you) and make a lot of noise to discourage approach by the animal(s),
- do not scream and run,
- remain still, hands at your sides and avoid eye contact until the dog leaves; then slowly back away until it is out of sight,
- if attacked, throw down a pack or jacket in the path of the animal(s) to distract it and move away in a zig-zag pattern,
- if the dog attacks, put/get anything you can between you and the dog (e.g., tree, stick, pack, bike), or try spraying the dog with a water bottle,
- if you fall on the ground curl into a ball with your hands over your head and neck, protecting your face,
- remain still and do not scream or roll around, and
- if bitten, do not panic. You may be able to prevent worse bites by pulling the dog's head closer to you while it is biting you, so it can't pull away and bite deeper or again. Look for an opportunity to hit the dog in the eye or end of nose.

If bitten by a dog:

- Consider the possibility that the animal could be rabid and act to minimize possible infection:
- do not panic
- wash the wound immediately with soap, water and/or antiseptic to minimize transference of the virus from the animal's saliva,
- seek medical attention as soon as possible,
- report the incident to the local health department, and to the animal control agency or police,
- tell the official everything you know about the dog: e.g., owner's name and address if known, whether the dog appears to be a stray, what the dog looks like, where you saw it, whether you've seen it before, and in which direction it went.

Snakes

Most snakes in Canada are non-venomous; however even non-poisonous snakebites produce a puncture wound that may get infected. Be especially aware if there are any poisonous varieties in the area you plan to visit. In BC, there are rattlesnakes in the interior from the US border north to Kamloops area.

Snakes: Safety Precautions

- educate students about preparation for and safe travel in snake country,
- if hiking in snake country, consider wearing long, loose pants and hiking boots; gaiters are also good to help minimize the chance of being bitten by a snake,
- watch where you put your feet,
- do not step over logs and rocks; step on top of them and then away in case a snake is underneath,
- keep your eyes and ears open,
- do not stick your arm, hand, or finger into holes in or under logs, rocks, shrubs or ledges; use a stick; never prod or poke a snake,
- be aware that rattlesnakes can swim and resemble a long stick in the water,
- keep dogs on leash,
- check out campsites before setting up, preferably during daylight (use a flashlight otherwise to check it out),
- take care gathering firewood; the woodpile could be a snake's home or rest spot,
- keep tent doors closed except when going in and out and check bedding and piles of clothes before going to bed if the door has been left open.

Encountering a Snake

- if hearing a snake (e.g., rattle, grass or ground cover being moved), stop and listen to locate the snake, so it can be avoided
- if a snake is encountered, stay clear and do not block its way,
- do not place any part of your body within striking range of a snake (a body length at least) and move away in a safe direction quickly but calmly if you are too close, and
- recognize signs of imminent attack including any or all the following: snake coiled, head of snake is raised, rattle is shaking (may not make noise if rattle is wet, if rattle is under wood or rocks, or if the snake is immature and does not have a fully functional rattle yet).

If bitten by a snake:

- stay calm; moving rapidly circulates the venom more,
- lay down and remain still, keeping the bite below the level of the heart (i.e., do not elevate the injured body part),
- identify the snake if you can and take pictures if possible, without getting too close,
- wash wound with soap and water,
- remove constricting clothing,
- suction with bite/sting extractor if available within 15 minutes of bite,
- cover bite with a sterile dressing,
- drink plenty of fluids,
- **Do Not**: suck, cut, apply cold/alcohol/electric shock/tourniquets, or administer aspirin, and
- **Do**: seek medical attention as soon as possible. In the meantime, keep the person resting still, allowing the poison to leave his or her system. Treat symptoms.

Insects, Ticks and Spiders

Mosquitoes, black flies, bees, wasps and hornets are resident in most parts of Canada. In favourable conditions, they may appear in swarms. Mosquitoes breed in wet areas and bees, wasps and hornets are attracted to meadows with abundant wildflowers. Biting or stinging insects can, in people with allergic sensitivities to histamines, result in anaphylactic shock.

Insects

Insects: Safety Precautions

- plan trips into buggy environments for fall rather than spring/summer, if possible, when the bug populations will likely be smaller,
- in bug season, select open, breezy trails and camp areas rather than deep, forested areas,
- prior to the trip, confirm any allergies of students (e.g., to bee or wasp stings) especially if these are serious, and require these students to bring their Epi-pens or anaphylactic kits,
- use appropriate clothing layering to avoid overheating and sweating, which attract insects,
- wear long-sleeved shirts and pants, and socks and shoes versus sandals,
- if mosquitoes and/or black flies are an issue, pant legs can be tucked into socks,
- wear light to neutral colours and minimize use of perfumed cosmetics,
- use repellents; minimize use of high concentration DEET directly on the skin of younger children, or only use it on their clothing rather than their skin,
- if on an extended trip, sponge bath daily before bed with soap and water to remove repellent; shower thoroughly after trip,
- use hats or caps, bug hats and/or bug suits if out in particularly buggy areas in conditions favourable to them,
- consider food choices with a preference for low sugar and meat content and keep foodstuffs covered,
- avoid waving hands around and slapping bugs, as this generally serves only to attract more insects, and
- try to be in camp before dusk, when mosquitoes are most active.

If bitten or stung:

- avoid scratching,
- over-the-counter lotions, salves, after-bite stick, or cold compresses may reduce swelling, pain and itching,
- over-the-counter antihistamines and anti-inflammatories (e.g., ibuprofen) may help reduce redness and swelling,
- if a bee's barb or venom sack is left in the skin, use a fine edge (e.g., credit card) to stroke it off the skin (avoiding pinching the sack and injecting more venom into the skin), and
- if symptoms such as shortness of breath, fainting, widespread redness or other indications of an allergic reaction occur, apply antihistamines (e.g., from Epi-pen or anaphylactic kit) and seek medical attention as soon as possible.

Ticks

Ticks are parasites that attach themselves to a host in order to feed on blood. In rare instances, toxins are secreted by the tick that can result in illnesses such as Rocky Mountain Spotted Fever, Lyme Disease, or Tick

Paralysis. Ticks are most active in the spring and early summer months. Sustained, hot, dry weather usually reduces the tick hazard.

Ticks: Safety Precautions

- wear light coloured clothing, so ticks may be more easily spotted,
- wear a hat and tuck any long hair up under it,
- tuck pant cuffs into socks,
- tuck shirt into pants and do up wrist cuffs,
- use repellents with DEET (see caution under Insects above), particularly on clothing,
- avoid bushwhacking and try to walk in the middle of trails away from shrubbery along the side,
- avoid sitting or lying down in meadows,
- inspect oneself and one's buddy daily, attending to areas like the neck, hair and open cuffs
- when camping in infected areas, check sleeping bags, tents, packs etc., and
- have students shower well and continue to check for ticks even after returning home, as they may remain on clothing or persons for some time.

If a tick becomes attached:

- remove the tick as soon as possible to minimize the potential for infection,
- use tweezers or wear rubber/latex gloves,
- using tweezers, gently grasp the tick as close to the skin as possible and extract it with a slow, steady pull straight away from the skin, taking care not to twist or crush the tick in the process,
- alternatively, a heated metal object (e.g., knife blade) may be held close to the tick to force it to release,
- wash the bite area and your hands with soap and water or antiseptic,
- avoid scratching the affected area, and
- if the mouthparts of the tick remain embedded in the skin, or if inflammation, headaches, fever or a rash occurs, see a doctor (bring the tick along for testing).

Spiders

Although most spiders cannot pierce the skin of people, there is one found in Western Canada that can cause problems; the Western Black Widow Spider. The female is 12-19 mm (1/4 – ¾") long and shiny black (or very dark brown), with a large round or oval-shaped abdomen. The most striking feature is the bright red-orange hourglass shape on the underside of the abdomen. The male is much more difficult to identify as are the young of both sexes; about half the size of the adult female, with cream-coloured markings on the legs and abdomen.

Spiders: Safety Precautions

- be careful around old buildings, barns, log and wood piles,
- watch where you sit or lay down; nesting spots for spiders include places along or under rocks, old stumps, and logs,
- if a specific concern arises, tuck pants into socks, use gaiters, tall boots, long sleeved shirt and a hat, and
- check body for bugs, shake out clothing, footwear and sleeping bags before use.

If Bitten by a Spider:

- spider bites may initially cause little pain to severe local pain, abdominal cramps, nausea, vomiting, weakness, sweating, rash, tremors, a cyanotic center that can result in an open ulcer, fever, joint pain, chills, and systemic infection.
- if symptoms such as shortness of breath, fainting, widespread redness or other indications of an allergic reaction occur, apply antihistamines (e.g., from Epi-pen or anaphylactic kit).
- treat for shock,
- wash wound with soap and water and apply sterile dressing,
- over-the-counter lotions and salves or cool compresses may reduce swelling, pain and itching,
- over-the-counter antihistamines and anti-inflammatories (e.g., Ibuprofen) may help reduce redness, and swelling, and
- seek medical attention if signs and symptoms suggest a serious reaction is occurring.

Marine Life

There are tremendous opportunities to study and enjoy seeing marine life along the coastal areas of BC, both on foreshore areas and at sea. However, there are several potential hazards associated with animal life in each of these areas.

Along the foreshore, shellfish, urchins, sea birds and sea lions and seals can cause problems. Red Tide is an algal bloom that produces toxins in filter-feeding organisms like shellfish, and these toxins are concentrated and passed on to humans who consume the affected shellfish, causing the potentially fatal Paralytic Shellfish Poisoning. Sea bird guano can cause Histoplasmosis, producing symptoms like influenza in mild cases or pneumonia when severe. Sea lions, seals and otters (river and sea) have sharp teeth and can bite, particularly if they feel cornered or threatened.

Foreshore Hazards: Safety Precautions

- footwear with hard soles such as sandals, runners or aqua socks are strongly recommended when walking along foreshore areas to avoid cuts from sharp rocks, corals and barnacles and puncture wounds caused by stepping on sea urchins,
- avoid touching jellyfish, sea urchins or corals, alive or dead,
- avoid/don't disturb areas with accumulations of sea bird guano to minimize disturbing spores,
- teach students about foreshore animals and inform them of the hazards they may pose,
- do not put hands in dark holes,
- give animals like sea lions, seals and otters their space,
- do not approach animals for photographs,
- do not attract or feed wildlife,
- keep small children close by,
- keep dogs on leashes, and
- watch for Red Tide warnings and avoid shoreline foraging when warnings are present.

At sea, appropriate whale watching rules and etiquette needs to be followed for the safety of the whales as well as the observers. Also, jellyfish stings are a potential hazard to swimmers as are contact with sea urchins and some toxic corals.

Animal Hazards at Sea: Safety Precautions

- keep your distance; never pursue, encircle or separate the animals in a pod; let whales, porpoises, etc. approach you versus you approaching them and let them determine the duration of the 'encounter',
- minimize noise,
- limit ocean swimming to daylight hours and try to stick to clear water vs. murky so animals can see you and avoid you and you can see them,
- do not try to swim with cetaceans, for your safety and theirs,
- be particularly careful when near mothers and their young,
- teach students about whales and inform them of the hazards they may pose,
- do not approach animals for photographs,
- do not attract or feed wildlife,
- never dispose of any rubbish, litter or contaminants at sea,
- avoid gathering or touching jellyfish, corals or other sea creatures when swimming, snorkelling or scuba diving, and
- follow established whale watching guidelines for safety and security of the animals and people viewing them. See env.gov.bc.ca/bcparks/explore/gen_info/whale_rules_poster.pdf

Gear Lists for Common Outdoor Pursuits

There is no such thing as bad weather, only bad clothing. – Norwegian Proverb

Introduction

Gear is a constant: Regardless of where a group goes, what activity it is doing and how long it will be out, there will be a need for appropriate clothing, equipment, documents and contingency tools and supplies (e.g., first aid, survival and repair kits). In this section, the reader will find gear lists for the sixteen most common outdoor pursuit activities done by schools in BC.

Context: Unless otherwise specified, the lists presented assume engagement in the activity in a semi-remote to remote area in Canada; modify appropriately if in an urban area or otherwise close to facility support, or if out-of-country. The lists are generally progressive, recognizing three periods of time out; i.e., day trip, overnight, extended (> 2 days and 1 night). The lists were also made with a range of weather in mind. However, some items listed as optional may be required for trips in potentially colder or wetter environments or seasons.

Group: The lists were drawn for school groups. This context requires substantial care and attention to safety. While a teacher/leader may choose to take less gear on personal recreational outings, they should consider the items suggested on the lists when planning trips involving students. Excessive delays due to inadequate clothing, equipment or contingency items could result in serious complications to the student's health and safety. Groups should, however, only carry items someone in the group knows how to use (e.g., repair kit items).

Also, the groups are generally assumed to consist of students generally age eight and above and of average maturity. The teacher/leader and parents/guardians will have to make decisions about items required or recommended from home (e.g., the students' ability to handle items like matches/lighters and knives responsibly). These are important items for outdoor living and survival, but in immature hands, they could pose hazards.

Using the lists: Any list(s) may be downloaded and modified to meet the teacher/leader's needs for a trip, displayed electronically, and/or printed and copies made for the students/parents/guardians. The intent is to provide a suggested baseline list of items to consider and for the teacher/leader to use his or her judgement to determine what is needed for a particular outing.

See *Gearing Up* in the *Self-reliance Instruction* resource for information regarding sharing these lists with students and other related considerations.

Day Hiking

Personal

- ❑ Daypack (big enough for personal gear plus some group gear)
- ❑ Full water bottle/hydro pack (at least 1 litre/3 hours)
- ❑ Healthy, high energy snacks and/or lunch
- ❑ Sunglasses (with good UV protection)
- ❑ Sunscreen and lip protector
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife
- ❑ Headlamp or flashlight

Clothing

- ❑ Sun-shielding hat, visor and/or bandana
- ❑ Short or long-sleeved shirt
- ❑ Shorts and/or long pants
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket
- ❑ Rain jacket (with hood or separate rain hat) and rain pants
- ❑ Wind shell
- ❑ One or two pairs of comfortable, absorbent socks (synthetic or wool preferred)
- ❑ Appropriate footwear (good walking shoes, runners or light boots)

Personal Optional

- ❑ Warm hat, toque, tube scarf or earband
- ❑ Wind pants
- ❑ Gloves or mitts
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Umbrella
- ❑ Map(s)
- ❑ Compass
- ❑ Walking stick or poles
- ❑ Compass
- ❑ Camera
- ❑ Binoculars
- ❑ Note pad and pencil
- ❑ Bathing suit and towel

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Knife
- ❑ Watch
- ❑ Map(s) and compass
- ❑ First aid kit
- ❑ External communications device
- ❑ Toilet paper, spade/trowel and hand sanitizer

Group Survival Kit

- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Extra food
- ❑ Flashlight or headlamp
- ❑ Matches or lighters in waterproof containers (3 places) and firestarter
- ❑ Cooking pot
- ❑ Wire saw or folding saw

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (e.g., 10 m of parachute cord)

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Group Optional

- ❑ Route/area info (e.g., guidebook)
- ❑ Thermos of hot fluid
- ❑ Stove and fuel
- ❑ Bear spray and holster/leader and/or bear bangers (in bear country)
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Cable ties (locking plastic ties)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

Backpacking

Overnight trip (does not assume Day Hiking list)

Personal

- ❑ Backpack (internal or external frame)
- ❑ Stuff sacks/garbage bags, etc., to organize and waterproof gear in pack
- ❑ Sleeping bag(s)
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Full water bottle/hydro pack (at least 1 litre/3 hours)
- ❑ Healthy, high energy snacks
- ❑ Sunglasses (with good UV protection)
- ❑ Sunscreen and lip protector
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon)
- ❑ Toiletries (soap, hand sanitizer, toothbrush and paste, dental floss, comb, etc.)
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife

Clothing

- ❑ Sun-shielding hat
- ❑ Underwear
- ❑ Long underwear (top and bottoms, synthetic or wool)
- ❑ Shirt
- ❑ Long pants
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket (synthetic, wool or down)
- ❑ Wind shell
- ❑ Rain jacket (with hood or separate rain hat) and rain pants
- ❑ Three to four pairs of synthetic or wool socks
- ❑ Hiking boots or sturdy walking shoes
- ❑ Extra footwear to be worn at camp
- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Gloves or mitts (synthetic or wool)

Personal Optional

- ❑ Shorts
- ❑ Vest (synthetic, wool or down)
- ❑ Wind pants
- ❑ Extra footwear for stream crossings (e.g., sandals, runners, wetsuit booties)
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Gaiters
- ❑ Sleeping bag liner
- ❑ Bivuoac sack
- ❑ Pack cover
- ❑ Trekking poles/walking staff
- ❑ Bug hat/shirt/suit (if in really buggy areas)
- ❑ Bandana
- ❑ Pack cover
- ❑ Thermos of hot fluid
- ❑ Candle lantern
- ❑ Compass
- ❑ Maps(s)
- ❑ Camera
- ❑ Binoculars
- ❑ Note pad and pencil
- ❑ Bathing suit
- ❑ Bandana or small towel
- ❑ Hut or camp shoes

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Route/area info (e.g., guidebook)
- ❑ Bear spray and holster/leader and/or bear bangers (in bear country)
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Pots and lids
- ❑ Cooking utensils (e.g., pot lifter/vice grip pliers, can opener, cutting board, mixing bowls, spatula, leather gloves)
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dishtowels)
- ❑ Hand soap or hand sanitizer
- ❑ Garbage bags
- ❑ Cordage/rope and a carabiner for stringing up food at night, or for potential rescue applications
- ❑ First aid kit
- ❑ External communications device
- ❑ Toilet paper, spade/trowel and hand sanitizer

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (e.g., 10 m of parachute cord)
- ❑ Cable ties (locking plastic ties)
- ❑ Epoxy
- ❑ Multi-tool or small tool kit including knife, vice grip pliers, screwdrivers and scissors
- ❑ Wire (2 mm braided steel)
- ❑ Spare pack parts (e.g., assorted fasteners and buckles, clevis pins and wire rings, cord locks, pack strap webbing (2 m of 2 cm wide))
- ❑ Tent pole repair kit (e.g., pole sleeve or hose
- ❑ clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch)
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/ speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide, sticky both sides))

Group Optional

- ❑ Water carrier
- ❑ Packable lantern
- ❑ Axe
- ❑ Saw (e.g., folding or wire pocket style)
- ❑ Grill, Dutch oven and/or reflector oven
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Thermos of hot fluid
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter

Other Items: suggested by terrain, season, group and/or program objectives (specify)***:***

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Backpacking

Extended trip: All overnight plus the following:

Personal

- ❑ Consider items on Personal Optional list for Overnights as above
- ❑ Extra blister protection/treatment supplies
- ❑ Spare bulb and batteries for headlamp/flashlight/camera
- ❑ Spare eyeglasses
- ❑ Personal sanitary supplies

Clothing

- ❑ Change of hiking clothing (all layers)
- ❑ Extra insulation layer(s) (e.g., warm jacket and pants)

Personal Optional

- ❑ Daypack for trips from base camp
- ❑ Journal
- ❑ Book
- ❑ Tent games (e.g., cards)
- ❑ Small musical instrument

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Consider items on Group Optional list for Overnights as above
- ❑ Back-up water purification system
- ❑ Additional fuel
- ❑ Extra garbage bags

Group Repair Kit

- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)

Group Optional

- ❑ Solar shower
- ❑ Signal flares

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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Canoeing/Kayaking/Rafting

Day trip **Note:** consider likelihood of spills in determining required vs. optional items

Personal

- ❑ Personal flotation device with whistle
- ❑ Paddle, or oar if paddling an oar raft
- ❑ Sprayskirt if kayaking
- ❑ Daypack, duffel, dry bag (waterproofed with stuff sacks/garbage bags, etc.) or jug(s)
- ❑ Water bottle/hydro pack (at least 1 litre/3hours)
- ❑ Healthy, high energy snacks and/or lunch
- ❑ Sunglasses and tie/strap
- ❑ Sunscreen and lip protector
- ❑ Insect repellent (in bug season)
- ❑ Garbage bag (to separate wet and dry gear)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife
- ❑ Headlamp or flashlight

Clothing

- ❑ Sun-shielding hat or visor
- ❑ Short or long-sleeved shirt
- ❑ Long pants
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket
- ❑ Rain jacket (with hood or separate rain hat) and rain pants (leg bottoms should not be sealed)
- ❑ Wind shell
- ❑ Appropriate footwear (e.g., runners with synthetic or wool socks, neoprene booties, river sandals)
- ❑ Change of clothes in waterproof bag or container and/or stored at end of run

Personal Optional

- ❑ Shorts
- ❑ Helmet (required for whitewater paddling)
- ❑ Helmet liner
- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Gloves or mitts (synthetic or wool)
- ❑ Wind pants
- ❑ Long underwear (tops and bottoms, synthetic or wool)
- ❑ Wetsuit, paddling jacket or dry suit (may be required in whitewater)
- ❑ Camera
- ❑ Maps(s)
- ❑ Note pad and pencil
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Thermos of hot fluid
- ❑ Bathing suit
- ❑ Small towel
- ❑ Kneepads
- ❑ Binoculars
- ❑ Paddle leash

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Canoes, kayaks or rafts (rigged)
- ❑ Extra paddles (1 per canoe/raft; 1/3 kayaks)
- ❑ Painter lines/towline
- ❑ Cordage/rope for tying in gear
- ❑ Throw bags
- ❑ Bailers &/or sponges &/or bilge pumps/craft
- ❑ Flotation bags/tubes for canoes or kayaks (if playing in whitewater)
- ❑ Multi-tool
- ❑ Watch
- ❑ Map(s)/charts (in waterproof bag) and compass
- ❑ First aid kit
- ❑ External communications device
- ❑ Toilet paper, spade/trowel and hand soap/hand sanitizer
- ❑ River Rescue Kit, if appropriate for route (e.g., static rope, 3-4 carabiners, 2 Prussik loops, 3 m loop of 25 mm wide nylon webbing, 2 pulleys (5-10 cm), axe, collapsible Sven saw or folding saw)
- ❑ Sea Kayak Safety Gear if sea kayaking: rescue stirrups, paddlefloats, visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe light for night)

Group Survival Kit

- ❑ Tarp(s)
- ❑ Extra food
- ❑ Thermos of hot fluids
- ❑ Matches/lighters in waterproof containers (3 places) and firestarter
- ❑ Stove, pot and fuel
- ❑ Water purification system
- ❑ Emergency flashlight or headlamp
- ❑ Wire or folding saw

Canoeing/Kayaking/Rafting *(continued)*

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (10 m of 2 mm diameter)
- ❑ Cable ties (locking plastic ties)
- ❑ Raft patch kit if rafting (patch material, sandpaper, glue and catalyst, solvent, mixing cup, paintbrush) and valve tools
- ❑ Multi-tool or small tool kit (including scissors, vice grip pliers, screwdrivers, unidriver and assorted bits)
- ❑ Assorted nuts and bolts
- ❑ 2 large nails

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

_____

_____

Group Optional

- ❑ Route/area information (e.g., guidebook)
- ❑ Bear spray and holster/leader and/or bear bangers (in bear country)
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirrors for day; flares or strobe light for night)
- ❑ Fish hook and line

Other Items: suggested by terrain, season, groups and/or program objectives (specify):

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Canoeing/Kayaking/Rafting
Overnight trip: All of day trip plus the following:

Personal

- ❑ Backpack, duffel, jug, dry bag, etc. (gear waterproofed)
- ❑ Sleeping bag(s) and/or blankets
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon, etc.)
- ❑ Toiletries (soap, toothbrush and paste, dental floss, comb, toilet paper, etc.)

Clothing

- ❑ Full change of clothing for in camp (underwear, pants, shirt, socks)
- ❑ Warm hat, toque or tube scarf
- ❑ Gloves and or mitts
- ❑ Warm sweater, pile or jacket
- ❑ Extra footwear to be worn in camp

Group

- ❑ Route/area info (e.g., guidebook)
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Pots and lids
- ❑ Cooking utensils (e.g., pot lifter/vice grip pliers, can opener, cutting board, mixing bowls, spatula, leather gloves)
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dishtowels)
- ❑ Hand soap/hand sanitizer
- ❑ Garbage bags
- ❑ Cordage/rope and a carabiner for stringing up food at night, or for potential rescue applications
- ❑ Shovel

Group Repair Kit

- ❑ Epoxy
- ❑ Silicone sealer
- ❑ Wire (2 mm copper)
- ❑ Tent pole repair kit (e.g., pole sleeve or hose clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch)
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/ speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide, sticky both sides))

Group Optional

- ❑ Water carrier
- ❑ Lantern (and mantles) or candle lantern and candles
- ❑ Axe
- ❑ Saw (e.g., folding or wire pocket style)
- ❑ Grill, Dutch oven and/or reflector oven
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Bear spray and holster/leader and/or bear bangers (in bear country)
- ❑ Additional communications device(s) (internal, external)
- ❑ GPS receiver

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Canoeing/Kayaking
Extended trip: All overnight trip plus the following:

Personal
- ❑ Spare bulb and batteries for flashlights/headlamps
- ❑ Personal sanitary supplies

Clothing
- ❑ Bug hat/shirt/suit (in really “buggy” areas)
- ❑ Extra socks
- ❑ Ensure adequate insulation (e.g., warm jacket and pants for in camp)

Personal Optional
- ❑ Spray covers for canoes
- ❑ Camp chair
- ❑ Fishing gear and license
- ❑ Book
- ❑ Journal
- ❑ Small musical instrument
- ❑ Tent games (e.g., cards)

Group
- ❑ Consider items on Group Optional List for Overnights as above
- ❑ Additional fuel
- ❑ Solar shower
- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)
- ❑ Additional rescue and repair kit items as route and expertise in use suggest

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Orienteering

Note: local day activity assumed here; see Day Hiking if in more remote area

Personal

- ❑ Daypack
- ❑ Map
- ❑ Compass (if being used)
- ❑ Watch
- ❑ Full water bottle (at least 1 litre/hour orienteering) or group water source
- ❑ Healthy, high energy snacks and/or lunch
- ❑ Sunglasses and tie/strap
- ❑ Sunscreen and lip protector
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle

Clothing

- ❑ Sun-shielding hat
- ❑ Underwear
- ❑ Long-sleeved shirt
- ❑ Long pants
- ❑ Rain jacket and pants
- ❑ Wind shell
- ❑ One or two pairs of comfortable, absorbent socks (synthetic or wool preferred)
- ❑ Appropriate footwear (good walking shoes, runners or light boots)

Personal Optional

- ❑ Wind pants
- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Gloves or mitts
- ❑ Camera
- ❑ Note pad and pencil

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Tarp(s) (if no roofed facility available)
- ❑ Knife
- ❑ Watch
- ❑ First aid kit
- ❑ External communications device
- ❑ Extra water and/or food
- ❑ Duct tape
- ❑ Toilet paper/trowel and hand soap/hand sanitizer (if no washroom facilities available)

Group Documents:

- ❑ Trip plan (including safety and emergency plans)
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Group Optional

- ❑ Thermos of hot fluids
- ❑ Communications devices (internal and/or external)
- ❑ Emergency flashlight or headlamp

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

Cycling/Mountain Biking

Day trip

Personal

- ❑ Bicycle (in good repair and appropriate for type of cycling) with bell/noisemaker
- ❑ Hard shell helmet
- ❑ Rear carrier and panniers, handlebar bag or daypack
- ❑ Full water bottle/camelback (at least 1 litre/3 hours cycling)
- ❑ Healthy, high energy snacks and/or lunch
- ❑ Sunglasses (with good UV protection) and tie
- ❑ Sunscreen and lip protector
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids, including some large ones
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife

Clothing

- ❑ Sun-shielding hat
- ❑ Underwear
- ❑ Short or long-sleeved shirt
- ❑ Shorts and/or long pants
- ❑ Warm long-sleeved shirt, sweater, pile or jacket
- ❑ Rain jacket (with hood or separate rain hat) and rain pants
- ❑ Wind shell
- ❑ One or two pairs of comfortable, absorbent socks (synthetic or wool)
- ❑ Runners/cycling shoes/other approp. footwear

Personal Optional

- ❑ Reflective vest
- ❑ Cycling gloves/gloves/mitts (strongly recommended for mountain biking)
- ❑ Shin and elbow pads (if mountain biking on challenging terrain)
- ❑ Long underwear (tops and/or bottoms, synthetic)
- ❑ Wind pants
- ❑ Toe clips for bicycle
- ❑ Rear and side reflectors
- ❑ Warning flag
- ❑ Map(s)
- ❑ Compass
- ❑ Lock
- ❑ Camera
- ❑ Note pad and pencil
- ❑ Binoculars
- ❑ Warm hat, toque or tube scarf

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Knife
- ❑ Watch
- ❑ Map(s) and compass
- ❑ First aid kit
- ❑ External communications device
- ❑ Toilet paper, spade/trowel, & hand soap/sanitizer

Group Survival Kit

- ❑ Tarp
- ❑ Water purification system
- ❑ Extra food (sufficient for one night out)
- ❑ Emergency flashlight or headlamp
- ❑ Matches or lighters in waterproof containers (3 places) and firestarter
- ❑ Cooking pot
- ❑ Wire saw or folding saw

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (10 m of 2 mm diameter)
- ❑ Cable ties (locking plastic ties)
- ❑ Patch kit (2-3 tire levers, patches, scuffing/sanding material, glue)
- ❑ Pump(s), presta-to-Scrader valve adapter or pumps of both types if needed
- ❑ Spare tube(s) for different sized bikes
- ❑ Multi-tool or Allen wrenches (size 3-6 mm), small pliers, wire cutters, adjustable wrench (12 cm), screwdrivers and spare nuts and bolts
- ❑ Spoke wrench
- ❑ Chain tool and spare and chain links
- ❑ Lubricant

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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_____

Group Optional

- ❑ Route/area information (e.g., guidebook)
- ❑ Thermos of hot fluid
- ❑ Stove and fuel
- ❑ Bear spray and holster/leader and/or bear bangers (required for mountain biking in bear country)
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe for night)

Other items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Cycling/Mountain Biking
Overnight trip: All of day trip plus the following:

Personal
- ❑ Panniers (waterproofed with stuff sacks/garbage bags to keep gear dry)
- ❑ Sleeping bag(s) and/or blankets
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon, etc.)
- ❑ Toiletries (soap, hand sanitizer, toothbrush and paste, dental floss, comb, toilet paper, etc.)

Clothing
- ❑ Full change of clothing for in camp (underwear, pants, shirt, socks)
- ❑ Warm hat, toque, tube scarf or earband
- ❑ Gloves and or mitts
- ❑ Warm sweater, pile or jacket
- ❑ Three to four pairs of synthetic or wool socks
- ❑ Extra footwear to be worn at camp

Personal Optional
- ❑ Shorts (e.g., cycling shorts, chamois lined)
- ❑ Cycling pants
- ❑ Vest (synthetic, wool or down)
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Sleeping bag liner
- ❑ Bivuoac sack
- ❑ Bug hat/shirt/suit (if in really buggy areas)
- ❑ Pannier covers
- ❑ Thermos of hot fluid
- ❑ Candle lantern
- ❑ Map(s)
- ❑ Compass
- ❑ Camera
- ❑ Binoculars
- ❑ Note pad and pencil
- ❑ Bathing suit
- ❑ Bandana or small towel
- ❑ Bungee cords (for lashing gear)

Group
- ❑ Route/area info (e.g., guidebook)
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Pots and lids
- ❑ Cooking utensils (e.g., pot lifter/vice grips pliers, can opener, cutting board, mixing bowls, spatula, leather gloves)
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dishtowels)
- ❑ Hand soap/hand sanitizer
- ❑ Garbage bags
- ❑ Cordage/rope and carabiner for stringing up food at night, or for possible rescue application

Group Repair Kit
- ❑ Additional bike repair tools and materials (e.g., headset wrench(s), 15 mm pedal wrench, spanner(s), extra tire patch materials, spare nuts and bolts, crankarm wrench and crank bolts, chain link extractor, spare tire(s), seat bolt, spare toe strap, spare spokes, tube of grease, air gauge)
- ❑ Spare pannier parts (e.g., assorted fasteners and buckles, pack strap webbing (2 m of 2 cm wide), 2 cord locks))
- ❑ Tent pole repair kit (e.g., pole sleeve or hose clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Wire (2 mm braided steel)
- ❑ Wire cutters
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch)
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/ speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide, sticky both sides))

Group Optional
- ❑ Water carrier
- ❑ Candle Lantern(s)
- ❑ Saw (e.g., folding or wire style)
- ❑ Grill and/or reflector oven
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Thermos of hot fluid
- ❑ Additional communications device(s) (internal, external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe for night)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Cycling/Mountain Biking
Extended trip: All overnight plus the following:

Personal
- ❑ Consider items on Personal Optional list for Overnights as above
- ❑ Extra Band-aids
- ❑ Spare bulb and batteries for headlamps/flashlights/camera
- ❑ Spare eyeglasses
- ❑ Personal sanitary supplies

Clothing
- ❑ Change of cycling clothing
- ❑ Extra insulation layer(s) (e.g., warm jacket and pants)

Personal Optional
- ❑ Daypack for trips from base camp
- ❑ Journal
- ❑ Book
- ❑ Small musical instrument
- ❑ Tent games (e.g., cards)

Group
- ❑ Consider items on Group Optional list for Overnights as above
- ❑ Back-up water purification system
- ❑ Additional fuel
- ❑ Extra garbage bags
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe for night)

Group Repair Kit
- ❑ Additional bike repair items: e.g., extra tubes, multi-socket bicycle wrench or set of drive socket wrenches, rear brake cable, rear derailleur and cable, freewheel tool or cassette tool, cone wrenches for hubs, rack bolts, spare axles (front and rear), extra bearings, pedal cage, light oil for the chains
- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)

Group Optional
- ❑ Solar shower

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

Rock/Artificial Wall Climbing

***Note**: outdoor, day trip context only at site near vehicle access. See Day Hiking if going to a more remote site*

Personal

- ❑ Helmet
- ❑ Climbing harness
- ❑ Daypack
- ❑ Water bottle/hydro pack (at least 1 litre/3hours)
- ❑ Healthy, high energy snacks and/or lunch
- ❑ Sunglasses (with good UV protection) and tie
- ❑ Sunscreen and lip protector
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle

Clothing

- ❑ Sun-shielding hat
- ❑ Underwear
- ❑ Short or long-sleeved shirt
- ❑ Shorts and/or long pants (loose fitting or stretching)
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket (synthetic or wool)
- ❑ Rain jacket (with hood or separate rain hat) and rain pants
- ❑ Wind shell
- ❑ One or two pairs of comfortable, absorbent socks (synthetic or wool preferred)
- ❑ Appropriate footwear (boots, specialized rock-climbing shoes, running shoes, approach shoes)

Personal Optional

- ❑ Warm hat, toque, tube scarf or earband
- ❑ Long underwear tops and/or bottoms
- ❑ Wind pants
- ❑ Gloves or mitts
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Umbrella
- ❑ Chalk bag and chalk
- ❑ Camera
- ❑ Note pad and pencil
- ❑ Gloves or mitts
- ❑ Binoculars
- ❑ Map(s)
- ❑ Compass
- ❑ Hut or camp shoes

***Notes:** Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Climbing rope(s)
- ❑ Slings/webbing
- ❑ Hardware: carabiners, belay/rappel devices, cams, pitons, etc. (as appropriate to site)
- ❑ Rescue equipment appropriate to site
- ❑ Knife
- ❑ Watch
- ❑ Map(s) and compass
- ❑ First aid kit
- ❑ External communications device
- ❑ Toilet paper, spade/trowel and hand sanitizer

Group Survival Kit

- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Extra food
- ❑ Emergency flashlight or headlamp
- ❑ Matches or lighters in waterproof containers (3 places) and firestarter
- ❑ Cooking pot
- ❑ Wire saw or folding saw

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage
- ❑ Cable ties (locking plastic ties)

Group Documents

- ❑ Trip plan
- ❑ Risk Management Plan
- ❑ Emergency Plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

_____

_____

Group Optional

- ❑ Route/area information (e.g., guidebook)
- ❑ Thermos of hot fluid
- ❑ Stove and fuel
- ❑ Bear spray and holster/leader and/or bear bangers (required in bear country)
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe for night)

***Other Items**:* suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Cross-country Skiing/Snowshoeing

Day trip

Personal

- ❑ Skis/poles/boots or snowshoes/bindings/boots
- ❑ Ski poles for skiing (optional for snowshoeing; round baskets if off-trail)
- ❑ Daypack
- ❑ Water bottle/hydro pack (at least 1 litre/3hours) and/or thermos with hot fluids
- ❑ Healthy high energy snacks and/or lunch
- ❑ Sunglasses or glacier glasses with good UV protection (side shields beneficial on snow)
- ❑ Sunscreen and lip protector
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife
- ❑ Headlamp or flashlight
- ❑ If in avalanche terrain: transceiver, probe pole and shovel (durable)

Clothing

- ❑ Warm hat, toque, tube scarf or ear band
- ❑ Gloves or mitts (as weather suggests)
- ❑ Underwear
- ❑ Long underwear (tops and bottoms, synthetic or wool)
- ❑ Pants/tights
- ❑ Warm long-sleeved shirt, sweater, pile or jacket
- ❑ Wind shell
- ❑ One or two pairs of warm socks (synthetic or wool)

Personal Optional

- ❑ Additional clothing items from above list (e.g., extra gloves, mitts, tube scarf, etc)
- ❑ Sun-shielding hat
- ❑ Vest (synthetic, wool or down)
- ❑ Wind pants
- ❑ Gaiters
- ❑ Climbing skins (may be required on steep route)
- ❑ Warm jacket or parka
- ❑ Snow/rain pants
- ❑ Shovel
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Personal wax kit (2–3 waxes, cork, scraper)
- ❑ Knee pads if telemarking
- ❑ Maps(s)
- ❑ Compass
- ❑ Thermos of hot fluid
- ❑ Toe/hand warmers
- ❑ Camera
- ❑ Note pad and pencil
- ❑ Binoculars
- ❑ Hut or camp shoes

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Wax kit(s) (may be personal gear); 2–3 waxes, cork and scraper/six participants maximum
- ❑ Knife
- ❑ Watch
- ❑ Map(s) and compass
- ❑ First aid kit
- ❑ External communications device
- ❑ Thermos of hot fluid
- ❑ Toilet paper, spade/trowel and hand sanitizer

Group Survival Kit

- ❑ Tarp
- ❑ Water purification system
- ❑ Extra food
- ❑ Emergency flashlight or headlamp
- ❑ Matches or lighters in waterproof containers (3 places) and firestarter
- ❑ Cooking pot
- ❑ Snow saw, wire saw or folding saw

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (e.g., 10 m of parachute cord)
- ❑ Cable ties (locking plastic ties)

Group Documents

- ❑ Trip plan
- ❑ Risk Management Plan
- ❑ Emergency Plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Group Optional

- ❑ Route/area information (e.g. guidebook)
- ❑ Stove and fuel
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Emergency toboggan
- ❑ Snow study kit: screen, magnifier, ruler, thermometer, notebook, etc.

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

Cross Country Skiing/Snowshoeing
Overnight trip: All of day trip plus the following:

Personal

- ❑ Backpack (internal frame preferred)
- ❑ Stuff sacks/garbage bags, etc. to organize and waterproof gear in pack.)
- ❑ Sleeping(s)
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon)
- ❑ Toiletries (hand soap/sanitizer, toothbrush and paste, dental floss, comb, toilet paper, etc.)

Clothing

- ❑ Full change of clothing for in camp (underwear, pants, shirt, socks)
- ❑ Turtleneck, tube-scarf or other neck covering (synthetic or wool)
- ❑ Extra warm hat, toque or bella clava
- ❑ Extra globes and/or mitts
- ❑ Water-resistant outer mittens
- ❑ Warm sweater, pile or jacket
- ❑ Three to four pairs of synthetic or wool socks
- ❑ Extra footwear to be worn at camp

Personal Optional

- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Vest (synthetic, wool or down)
- ❑ Wind pants
- ❑ Sleeping bag liner
- ❑ Vapour barrier liner
- ❑ Bivouac sack
- ❑ Snow saw/knife
- ❑ Shovel
- ❑ Candle lantern
- ❑ Bandana or small towel
- ❑ Journal
- ❑ Book
- ❑ Small musical instrument
- ❑ Tent games (e.g., cards)

Group

- ❑ Route/area info (e.g., guidebook)
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Shovel(s)
- ❑ Extra waxes and klister
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Insulation for stove bottom
- ❑ Lanterns and/or candles (long nights)
- ❑ Pots and lids
- ❑ Cooking utensils (e.g., pot lifter/vice grips pliers, can opener, cutting board, mixing bowls, spatula, leather gloves)
- ❑ Garbage bags
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dish towels)
- ❑
- ❑ Snow shovels
- ❑ Cordage/rope and carabiner for stringing up food at night, or for possible rescue applications

Group Repair Kit

- ❑ Multi-tool or small tool kit including vice grip pliers, needle-nosed pliers, screwdrivers, wire cutters and scissors
- ❑ Epoxy
- ❑ Wire (e.g., 2 mm braided steel)
- ❑ Pole repair kit: 2 aluminum angle splints (12 cm long) or flexible sheet metal (e.g., pop can), hose clamps, spare basket
- ❑ Ski repair kit: metal or plastic scraper (ski splint), spare ski tip, spare bails/bindings/cables, unidriver and bits (including a drill bit), steel wool, extra binding screws, c-clamps
- ❑ Snowshoe repair kit (e.g., 3 m lamp wick, extra bindings)
- ❑ Spare pack parts (e.g., assorted fasteners and buckles, 2 cord locks, pack strap webbing (2 m or 2 cm wide))
- ❑ Tent pole repair kit (e.g., pole sleeve or hose clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide), sticky both sides)

Group Optional

- ❑ Sled or pulk
- ❑ Water carrier
- ❑ Packable lantern
- ❑ Axe
- ❑ Saw (e.g., folding or wire pocket style)
- ❑ Snow saws/knives
- ❑ Grill, Dutch oven and/or reflector oven
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Thermometer
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Altimeter
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirror for day; flares or strobe for night)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

Extended trip: All overnight plus the following:

Personal

- ❑ Consider items on Personal Optional list for Overnights as above
- ❑ Extra band-aids and Moleskin or other blister protection
- ❑ Spare bulb and batteries for headlamp/flashlight/camera/avalanche transceiver
- ❑ Spare eyeglasses/sunglasses
- ❑ Personal sanitary supplies

Clothing

- ❑ Extra change of clothing
- ❑ Extra insulation layer(s) (e.g., warm jacket and pants)

Personal Optional

- ❑ Daypack for trips from base camp
- ❑ Sled/pulk

Group

- ❑ Consider items on Group Optional list for Overnights as above
- ❑ Back-up water purification system
- ❑ Hand soap (bar or bottle of liquid)
- ❑ Additional fuel
- ❑ Extra garbage bags

Group Repair Kit

- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Alpine Skiing/Snowboarding

Day trip Lift-serviced

Personal

- ❑ Skis/poles/boots or snowboard/boots
- ❑ Ski or board ties (to prevent runaway gear)
- ❑ Helmet (highly recommended, required in terrain parks)
- ❑ Wrist guards if snowboarding (highly recommended)
- ❑ Daypack
- ❑ Full water bottle (at least 1 litre) and/or thermos with hot fluids
- ❑ Healthy, high energy snacks and/or lunch or means to buy food at facility on hill
- ❑ Goggles/sunglasses/glacier glasses with good UV protection (side shields beneficial on snow)
- ❑ Sunscreen and lip protector
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Supplies for blister protection/treatment
- ❑ Whistle

And if in mountain resort:

- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter
- ❑ Knife
- ❑ Ski area map

Clothing

- ❑ Warm hat, toque or tube scarf (ear band acceptable if conditions mild)
- ❑ Gloves or mitts (as weather suggests)
- ❑ Underwear
- ❑ Long underwear top and bottoms
- ❑ Long-sleeved shirt, sweater, or pile (fleece)
- ❑ Ski jacket/ski suit or wind shell (depending on conditions)
- ❑ Ski pants or wind pants (depending on conditions)
- ❑ One or two pairs of warm socks (synthetic or wool)
- ❑ Footwear for non-ski/board time

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Personal Optional

- ❑ Vest (synthetic, wool or down)
- ❑ Other clothing items identified above (e.g., extra gloves, mitts, buff/tube scarf)
- ❑ Toe/hand warmers
- ❑ Camera
- ❑ Note pad and pencil

Group

- ❑ Watch
- ❑ External communications device (or access to one on-site)

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

_____

_____

Group Optional

- ❑ Thermos of hot fluid
- ❑ Additional communications device(s) (internal and/or external)
- ❑ Other items suggested by terrain, season, group and/or program objectives (specify):

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_____

Other Items: suggested by terrain, season, group and/or program objectives (specify):

_____

_____

Camping

Overnight trip

Personal

- ❑ Backpack, duffel
- ❑ Stuff sacks/garbage bags, etc. to organize and waterproof gear in pack
- ❑ Sleeping bag(s)
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Full water bottle(s) (at least 1 litre)
- ❑ Healthy, high energy snacks
- ❑ Sunglasses (with good UV protection)
- ❑ Sunscreen and lip protector
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon)
- ❑ Toiletries (soap, hand sanitizer, toothbrush and paste, dental floss, comb, toilet paper, etc.)
- ❑ Insect repellent (in bug season)
- ❑ Personal medications (with a note of explanation)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife

Clothing

- ❑ Sun-shielding hat
- ❑ Underwear
- ❑ Long underwear (top and bottoms, synthetic or wool)
- ❑ Shirt
- ❑ Long pants
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket (synthetic, wool or down)
- ❑ Wind shell
- ❑ Rain jacket (with hood or separate rain hat) and rain pants
- ❑ Three to four pairs of synthetic or wool socks
- ❑ Sturdy walking shoes, runners or light boots

Personal Optional

- ❑ Shorts
- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Vest (synthetic, wool or down)
- ❑ Wind pants
- ❑ Gloves or mitts (synthetic or wool)
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Camp chair
- ❑ Sleeping bag liner
- ❑ Bivuoac sack
- ❑ Umbrella
- ❑ Bug hat/shirt/suit (in really “buggy” areas)
- ❑ Thermos of hot fluid
- ❑ Lantern
- ❑ Map(s)
- ❑ Compass
- ❑ Camera
- ❑ Binoculars
- ❑ Note pad and pencil
- ❑ Bathing suit
- ❑ Bandana or small towel
- ❑ Small musical instrument
- ❑ Book
- ❑ Tent games (e.g., cards)
- ❑ Small pillow

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Area map
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Bear spray and holster/leader and/or bear bangers (in bear country)
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Pots frying pan(s), tea/coffee pots)
- ❑ Cooking utensils (e.g., pot lifter/vice grip, pliers, tongs, measuring cups and spoons, wire whisk, veggie peeler, knives for paring/slicing/chopping, juice jugs, serving spoons, ladle, colander, salt and pepper shakers, herbs and spices, rubber globes, spatula, cutting board(s), mixing bowls, leather gloves)
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dishtowels)
- ❑ Hand soap/hand sanitizer
- ❑ Garbage bags
- ❑ Cordage/rope and carabiner for stringing up food at night, or for possible rescue applications
- ❑ First aid kit
- ❑ External communications device

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Camping Overnight *(continued)*

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (10 m of 2 mm diameter)
- ❑ Cable ties (locking plastic ties)
- ❑ Epoxy
- ❑ Multi-tool or small tool kit including knife, vice grip pliers, screwdrivers and scissors
- ❑ Wire (2 mm braided steel)
- ❑ Tent pole repair kit (e.g., pole sleeve or hose clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch)
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/ speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide, sticky both sides))

Group Optional

- ❑ Water carrier
- ❑ Axe
- ❑ Saw
- ❑ Folding table and/or chairs
- ❑ Lantern (with extra mantles or battery operated)
- ❑ Additional kitchen utensils (as per previous page)
- ❑ Grill, Dutch oven and/or reflector oven
- ❑ Mallet or hammer (for driving tent/tarp stakes)
- ❑ Small broom for cleaning tents
- ❑ Slop bucket and J-cloths or old pantyhose to strain grey water)
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirrors for day; flares or strobe light for night)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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Extended trip: All overnight plus the following:

Personal

- ❑ Consider items on Personal Optional list for Overnights as above
- ❑ Spare bulb and batteries for headlamp/flashlight/camera
- ❑ Spare eyeglasses/sunglasses
- ❑ Personal sanitary supplies

Clothing

- ❑ Change of clothing
- ❑ Extra insulation layer(s) (e.g., warm jacket and pants)

Personal Optional

- ❑ Daypack for trips from base camp
- ❑ Journal
- ❑ Book
- ❑ Tent games (e.g., cards)

Group

- ❑ Consider items on Group Optional list for Overnights as above
- ❑ Back-up water purification system
- ❑ Additional fuel
- ❑ Extra garbage bags

Group Repair Kit

- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)

Group Optional

- ❑ Solar shower

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

Winter Camping

Overnight trip

Personal

- ❑ Backpack, duffel
- ❑ Stuff sacks/garbage bags, etc. to organize and waterproof gear in pack
- ❑ Sleeping bag(s)
- ❑ Sleeping pad (ensolite, thermarest, etc.)
- ❑ Full water bottle(s) (at least 1 litre)
- ❑ Healthy high energy snacks
- ❑ Sunglasses (with good UV protection)
- ❑ Sunscreen and lip protector
- ❑ Flashlight or headlamp and batteries
- ❑ Eating utensils (cup, bowl, spoon)
- ❑ Toiletries (soap, hand sanitizer, toothbrush and paste, dental floss, comb, toilet paper, etc.)
- ❑ Personal medications (with a note of explanation)
- ❑ Extra water bottle and/or thermos
- ❑ Warm sleeping bag (or two lighter bags and/or blankets)
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)

Personal First Aid and Survival Kit

- ❑ Band-aids
- ❑ Whistle
- ❑ Space blanket/garbage bag
- ❑ Metal cup/container
- ❑ Matches/lighter and firestarter (in waterproof case)
- ❑ Knife

Clothing

- ❑ Warm hat, toque, tube scarf and/or earband
- ❑ Underwear
- ❑ Long underwear (top and bottoms, synthetic or wool)
- ❑ Shirt
- ❑ Long pants
- ❑ Warm long-sleeved shirt, sweater, pile (fleece) or jacket (synthetic, wool or down)
- ❑ Wind shell
- ❑ Three to four pairs of synthetic or wool socks
- ❑ Two to three pairs of mitts or gloves
- ❑ Turtleneck, tube-scarf, bella clava or other neck covering
- ❑ Warm winter jacket or parka
- ❑ Wind pants or ski pants
- ❑ Warm boots and/or booties

Personal Optional

- ❑ Extra warm hat, toque, tube scarf and/or earband
- ❑ Vest (synthetic, wool or down)
- ❑ Wind pants
- ❑ Gaiters
- ❑ Sit pad (e.g., 40 x 40 cm ensolite)
- ❑ Sleeping bag liner
- ❑ Bivuoac sack
- ❑ Thermos of hot fluid
- ❑ Shovel
- ❑ Candle lantern
- ❑ Map (s)
- ❑ Compass
- ❑ Camera
- ❑ Binoculars
- ❑ Note pad and pencil
- ❑ Bandana or small towel
- ❑ Small musical instrument
- ❑ Tent games (e.g., cards)
- ❑ Book

Notes: *Label all personal items. Leave junk food, electronic devices and other prohibited items at home.*

Group

- ❑ Area map
- ❑ Tent(s)
- ❑ Tarp(s)
- ❑ Water purification system
- ❑ Food
- ❑ Stove, windscreen and fuel
- ❑ Pots and lids
- ❑ Cooking utensils (e.g., pot lifter/vice grips pliers, can opener, cutting board, mixing bowls, spatula, leather gloves)
- ❑ Dishwashing kit (e.g., wash tubs, biodegradable soap, chlorine bleach, scrubber, washcloth, dishtowels)
- ❑ Hand soap/hand sanitizer
- ❑ Garbage bags
- ❑ Cordage/rope and carabiner for stringing up food at night, or for possible rescue applications
- ❑ Tent(s)
- ❑ Snow shovels
- ❑ First aid kit
- ❑ External communications device

Group Documents

- ❑ Trip plan
- ❑ Risk management plan
- ❑ Emergency plan
- ❑ Itinerary card
- ❑ Passenger list(s)
- ❑ Participant health/medical forms
- ❑ Permits, licenses or other documents (specify):

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Winter Camping Overnight *(continued)*

Group Repair Kit

- ❑ Duct tape
- ❑ Cordage (10 m of 2 mm diameter)
- ❑ Cable ties (locking plastic ties)
- ❑ Epoxy
- ❑ Multi-tool or small tool kit including knife, vice grip pliers, screwdrivers and scissors
- ❑ Wire (2 mm braided steel)
- ❑ Tent pole repair kit (e.g., pole sleeve or hose clamps and splints)
- ❑ Stove repair kit (e.g., jet-cleaning tool, spare jet, stove wrench, spare filter, oil for pump leather)
- ❑ Water filter cleaning tools and spare parts
- ❑ Superglue
- ❑ Rubber bands
- ❑ Sleeping pad patch kit or sandpaper (med. grit), alcohol swab, urethane adhesive and patch)
- ❑ Sewing kit (e.g., safety pins, self-adhesive nylon repair tape or stick-on patch, needles and/or awl/ speedy stitcher, thread or dental floss, thimble, zipper sliders, velcro strips (10 cm long x 2 cm wide, sticky both sides))

Group Optional

- ❑ Water carrier
- ❑ Hand soap/sanitizer
- ❑ Lantern and mantles or candle lantern and candles
- ❑ Axe
- ❑ Saw
- ❑ Grill, Dutch oven and/or reflector oven
- ❑ Clothes pegs
- ❑ Field guides
- ❑ Star chart
- ❑ Additional communications device(s) (internal and/or external)
- ❑ GPS receiver
- ❑ Snow saws or snow knives
- ❑ Sled or pulk
- ❑ Thermometer
- ❑ Insulation for stove bottom
- ❑ Lanterns and/or candles (long nights)
- ❑ Visual signaling devices (e.g., smoke cannisters or signal mirrors for day; flares or strobe light for night)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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_____

_____

Extended trip: All overnight plus the following:

Personal

- ❑ Consider items on Personal Optional list for Overnights as above
- ❑ Spare bulb and batteries for headlamp/flashlight/camera
- ❑ Spare eyeglasses/sunglasses
- ❑ Personal sanitary supplies

Clothing

- ❑ Change of clothing
- ❑ Extra insulation layer(s) (e.g., warm jacket and pants)

Personal Optional

- ❑ Daypack for trips from base camp
- ❑ Journal
- ❑ Book
- ❑ Tent games (e.g., cards)
- ❑ Spare sunglasses
- ❑ Second head lamp, flashlight and/or additional spare batteries and bulb

Group

- ❑ Consider items on Group Optional list for Overnights as above
- ❑ Back-up water purification system
- ❑ Additional fuel
- ❑ Extra garbage bags

Group Repair Kit

- ❑ Seam sealer
- ❑ Additional stove repair kit items (e.g., filter, filter wire, plugs, gaskets, spare O-rings, etc., as per stove model)

Other Items: suggested by terrain, season, group and/or program objectives (specify):

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Telecommunication Devices for School Trips

Fifteen years ago, few teachers/leaders or service provides working with youth carried any external communications devices (e.g., cell phones, personal locator beacons, satellite phones, VHF radios); tools that allowed the group to contact search and rescue authorities, secure weather reports, do group check-ins with home base, or other applications. Few even carried any internal communication devices (e.g., cell phones, Family Radio Service (FRS), walkie-talkies) to facilitate communication between leaders in a group. The only common exception was the use of avalanche transceivers for those traveling in avalanche terrain.

Communication technology trends are changing rapidly. Reasons include:

- The number, quality and accessibility of technologies has improved;
- The ranges of the devices have grown;
- Prices have come down;
- The size and weight of the devices has been reduced, so they are more appropriate for backcountry applications;
- The size of batteries has decreased while their power output has increased and there are good solar chargers available as well to serve devices or recharge batteries;
- The public has embraced technology (e.g., cell phones, computers, tablets) in their personal, school and professional lives;
- Most professional outdoor recreation guides carry communication devices when leading in remote or semi-remote areas;
- There is a growing body of search and rescue reports of individuals/groups who used communication technology to enhance their survival in a wilderness emergency and those who had poor outcomes, at least in part traceable to an absence of this capacity;
- Workplace health and safety regulations require that employees working alone in remote environments (i.e., with no one available and willing to provide assistance) are provided reliable external communications technology; and
- The public has a higher overall expectation that if safety on an organized trip can be enhanced through technology, that it should be carried.

Whether and what technology to use remains an individual or board decision, based on the objectives and risk assessment of the program/activity, access to, and feasibility of appropriate technology for the area to be visited. With the systemic improvements noted above, we are seeing a fast-emerging range of affordable, accessible, user-friendly technologies that blanket the province with their ranges. A leader could be found negligent for failing to carry such a device if a situation arose where this lack led to excessive delays securing external assistance in an emergency. To that end, the carriage of an external communications device is highly recommended on all school trips into remote or semi-remote terrain and recommended on all school trips of any nature.

Caution!

Carrying a form of external communications technology is not to be viewed as justification for inadequate trip planning, risk assessment and reduction, decision-making, or emergency preparedness. A communications device should be seen as an insurance policy, to be used only as needed (e.g., contacting search and rescue personnel in the event of an emergency, securing weather forecasts on an extended trip).

Selecting the Appropriate Technology

The most commonly available external communications technology is cellular phones. Most teachers/leaders today have a cell phone or access to one. However, teachers/leaders may want or need to consider a wider variety of other available technologies. In some cases, this will be necessary due to the unavailability of or unreliability of cellular phone range. Additional external communications devices include items such as personal locator beacons (PLBs), PLBs with Global Positioning System (GPS), PLBs with GPS and satellite messaging, satellite phones, satellite GPS messengers, and various two-way radio services. New technologies are constantly being developed so the list and descriptions provided here are not to be considered definitive.

It may be possible for districts/school authorities and/or other groups involved in adventure pursuits to co-operate and create a pool of units, to obtain sponsorships for these devices, or to purchase low-cost demo equipment or retired rental or refurbished units. Renting is also an option with some systems and should be considered if unsure which system will best meet the school's needs.

With advances in technology, most portable telecommunication devices are very similar in terms of size, weight, power, recharging capabilities, talk and standby time and temperature related functioning. Where there are significant differences, these are related to: purchase and operating costs; communication range; dependability; remote area coverage; voice clarity; data transfer capacity; and user-friendliness of the devices.

The following handheld devices are the best choices currently available, depending upon the geographic area involved.

- Cellular Phone: These digital devices rely on sending signals to cell towers. The units are commonly available, inexpensive and user-friendly. They are a good choice in or near an urban area or in an area where their range has been verified. However, coverage in many rural and remote areas in Canada is often not available or reliable or available with some provider(s) but not others. Several cell phone service providers have maps available on their websites that show their coverage area.
- Personal Locator Beacon (PLB): For most outdoor group travel beyond reliable cell phone range, one of the simplest and best technologies is a Personal Locator Beacon. A PLB is relatively versatile, inexpensive and lightweight and provides minimal intrusion into the experience un-less it is needed. At that time, it can become a lifesaver. The added onboard GPS receiver permits the beacon to transmit its exact coordinates, so facilitates timely and accurate rescue response. One other notable benefit is the absence of operating subscriptions.
- Satellite Emergency Notification Device (SEND): The technology that outdoor travel groups that want or need two-way communication capacity most often consider is a SEND, such as a satellite messenger phone or global satellite phone. The less expensive messenger units allow a few limited levels of message transmission (e.g., non-emergency "I'm OK", "Help" messages to request assistance without activating EMS, and "911" emergency distress messages, plus GPS coordinate transmission allowing near real time tracking). High end units (e.g., global phones) operate almost at the level of a mart phone one might use at home including features like local and long distance calling within North America, and some text, voicemail and email capacity. A group using a global phone can secure weather forecasts/alerts, and post messages about their trip on social media. Consider operating plan costs in addition to purchase cost.
- Satellite Phone: These units were, for many years, the best devices available for reasonably dependable, versatile, user-friendly application over an extensive coverage area in Canada, and they remain a solid option. To reliably use any devices that rely on signals bounced off satellites, particularly in mountainous or heavily forested areas, one must have line of sight to the sky. Sat phones are still expensive to purchase compared to some of the PLB or most SEND units described above and they carry operating plan costs as well, but rental may be a reasonable option for schools that do few trips.

- Radio Phones (both amateur (ham) radio and commercial radio): These are good communication devices, reasonable to purchase and they have no airtime costs. The user does need to secure a licence, which does have a cost attached. Also, with the emergence of satellite phone technology, radio towers are slowly being phased out. Finally, their range distance is limited to line-of-sight to a repeater that must be within 60 km, or a digipeater in a vehicle which may offer range up to 100 km.

Other potentially useful devices to consider taking into the field include:

- Other portable digital device (e.g., tablet or laptop) with phone and/or text messaging capacity;
- Global Positioning System (GPS) for navigation;
- Family Radio Service (FRS) for intra-group communication (e.g., lead-sweep);
- Transceivers for avalanche search (required in avalanche terrain); and
- Marine VHF for securing marine weather reports, forecasts and warnings signalling distress.

Utilizing Communications Technology

Learn how to use any unfamiliar technology, download maps before departure, and if possible, test the selected device(s) during a site pre-visit or ask area managers about any issues with the proposed technology on the route. In addition to range or line-of-sight issues, technologic devices are not always reliable (e.g., they break down, lose power, suffer weather and temperature interruptions, get lost or damaged). If in a remote area, bring an extra set of batteries for the device (in a watertight container) or a solar charger and have one or more back-up means of signaling for help (e.g., flares, smoke flares, brightly coloured rescue fabric, mirrors).

Other Considerations

1. The individuals (minimum of two) in the group responsible for use of the telecommunications equipment should be experienced with the specific model of equipment being taken into the field. They should also be familiar with the battery life and recharging process. They should know how to care for the equipment in extreme temperature conditions if relevant.
2. A number of fully-charged extra batteries should be carried to ensure power for the time expected in the field. Two complete sets of batteries is the minimal standard practice. Alternatively, a solar charger and one set of batteries may be used.
3. All device displays can be hard to read when the device is cold: the liquid crystal thickens in cold temperatures. Thus, cold temperature precautions must be taken, such as carrying the device and batteries inside one's coat, next to the body, or in one's sleeping bag at night. With advances in technology, any newly purchased communication device is capable of operating from –20°C to +50°C. Even though some specifications state -30°C to +55°C, field experience suggests that almost nothing works, including batteries, in temperatures below -20°C. Lithium ion batteries lose their charge almost immediately if exposed to these temperatures for any length of time. Thus, it is recommended that in winter, one first completes all programming or directional work in a warm environment, such as a tent or inside a coat, and then quickly makes the call outdoors.
4. The technological advancements related to telecommunication devices is dynamic and rapid. Thus, it is recommended that annual research be undertaken to reaffirm or reconsider any technologies used.

Group Check-Ins

The Occupational Health and Safety Act requires a system be implemented to verify the well-being of any worker operating alone or in isolation under conditions that present a risk of disabling injury if that worker

may not be able to secure appropriate timely emergency assistance. Even where not directly required by provincial statute and regulation, this practice should be considered.

School adventure programs will virtually always involve more than one adult present. However, it is still suggested that consideration be given to providing for a scheduled daily call by/to a designated responsible contact back home and these calls can be documented to verify the health and safety of the group. Content of a check-in may include current location, condition of the group, weather and route conditions, planned changes to itinerary/route, any incidents of note, and next check-in time. The home contact person must know what action to take if the field contact fails to call in or if they cannot reach that person (record all contact efforts) including provisions for emergency rescue.

The more remote the trip, the more relevant it may become to carry a redundant emergency communications device, to ensure emergency assistance can be secured and to help avoid situations where one device fails, and a home contact person initiates an unnecessary rescue.

Water Treatment

Due to the worldwide presence of pathogenic bacteria, protozoans and, in some areas, enteroviruses, there are few places completely free of contaminants in untreated water. Consuming untreated water, even in sparkling clear, apparently pristine mountain waters, is a gamble that should not be taken with program participants.

The water-borne pathogens (disease-causing micro-organisms) of greatest concern are, ranked from largest to smallest:

- Protozoa including Giardia lamblia (the cause of Giardiasis or “beaver fever”) and cryptosporidium (which causes Cryptosporidiosis). The more common cryptosporidium are smaller than giardia and more resistant to disinfectants, but all protozoa (single-celled parasitic organisms) are larger than one micron. Common symptoms of Giardiasis include diarrhea, cramps, nausea, bloating, flatulence, weight loss, poor appetite and fatigue. Symptoms of Cryptosporidiosis include stomach cramps, watery diarrhea, headaches, dehydration and weight loss. Most individuals carrying protozoa will remain asymptomatic and only a few will become severely ill. Children and individuals with suppressed immune systems are at higher risk of complications.
- Bacteria (e.g., E. Coli, Dysentery and Campylocateriosis) are present in virtually all untreated water and they can cause illnesses such as diarrhea and dysentery. Most bacteria are about 0.5 microns, although some, such as campylobacter, are 0.3 microns or smaller.
- Enteroviruses (intestinal viruses such as Hepatitis A and rotovirus) are simpler and generally smaller than bacteria. Symptoms are similar to Giardia but tend to be short-lived. They may be treated, but generally the body’s immune system eliminates them. While discomforting, because of their short-term effect on the digestive system, enteroviruses are less of a concern in backcountry travel in Canada than other pathogens noted. Viruses are generally not an issue in Canada or the US, so protection from them is not a high priority in backcountry water treatment systems.

Drinking Water: Safety Precautions

- avoid drinking water directly from lakes, rivers and streams, even those that appear pristine,
- seek sources that show little evidence of human or animal use, where possible,
- seek calm, clear water (less sediment to filter and Giardia and Cryptosporidium tend to sink in calm water so there is less likelihood of picking them up. Also, UV radiation from sun on the surface of still water helps purify it,
- avoid collecting water from waters near beaver dam/house areas, brackish stagnant water, water with a lot of algae or shallow water,
- if there is a lot of sediment in the water, you can scoop a pot of it and let the sediment settle before filtering the clearer water on top. Alternatively, the container of water can be poured through a cloth to filter out some of the sediments,
- avoid contaminating backcountry water sources or groundwater with human waste,
- bring sufficient quantities of treated water from home or a local source or treat water,
- wash hands thoroughly and often, especially after going to the bathroom or before preparing food or eating, and
- peel or wash fruit and vegetables that will be eaten raw with water treated for protozoa.

Water Treatment Methods

For trips involving groups and of longer duration, a portable means of treating water found en route becomes necessary (can't carry enough water from home). Methods typically include boiling, filtering, or chemically disinfecting. A filter mechanically pushes water through a filter that strains out protozoa and bacteria. A purifier, which generally involves chemicals (or UV light), eliminates protozoa, bacteria and viruses. Because there are advantages and disadvantages to each system available, a decision must be made regarding the most appropriate method for the group. The following table may be of some assistance in arriving at this decision.

Method	Description	Advantages	Disadvantages
Boiling	Bring water to a full, rolling boil. Add a minute of boiling time for every 400 m of elevation above sea level	• Inexpensive – fuel only • Completely effective against protozoa, bacteria and viruses • Affects the taste of the water minimally	• Takes time and uses fuel (adds weight) • Inconvenient during the day • Time needed for water to cool
Filtration	Pump - water is forced through a hand-held filter (usually ceramic) with very small pores.	• Filters remove protozoa and most or all bacteria • Easy to use on the trail regardless of water depth • Highly reliable • Does not affect taste	• Average filtration rate • Often ineffective against enteroviruses • Somewhat expensive
	Gravity feed – water is scooped into one bag and drains down through a hose and filter into a second (clean) bag	• Filters remove protozoa and most or all bacteria • Very fast to use to filter a lot of water, so great for a group • Quite easy to use • Does not affect taste	• Hard to scoop water from shallow sources • Often ineffective against enteroviruses • Expensive

Method	Description	Advantages	Disadvantages
	Squeeze bag – water is scooped into a bag and squeezed back out of the bag though the filter 'cap'	• Filters remove protozoa and most or all bacteria • Easy to use on the trail • Does not affect taste • Light and inexpensive	• Very slow filtration rate; not a group option • Often ineffective against enteroviruses
Chlorine	Chlorine dioxide tablets or drops are added to the water to disinfect it	• Light and inexpensive • Readily available • Easy to use • Effective on protozoa, bacteria and viruses	• Water must sit for 30+ mins. before use • Doesn't eliminate particulate in water • Large concentrated doses can be toxic
Iodine	Either crystalline iodine solution or iodine tablets are added to the water.	• Readily available • Inexpensive • Easy to use • Effective against viruses	• Water must sit for 30 mins. before use • Negative effect on water taste and colour • Doesn't treat Crypto. • Large concentrated doses can be toxic so not for long term use

For backcountry travel in Canada, generally a filter or Chlorine dioxide or a combination of these two systems is all that is required for the most demanding users. The filter gets rid of particulate and Cryptosporidium and the chemical eliminates viruses. If only one system is to be used, filtration is preferred because of its immediate effectiveness against protozoa. Where a filter is the primary tool relied upon, a chemical back-up system should be carried in the event the filter malfunctions.

Both filters and chemicals are adversely affected by particulate matter in the water. Filters will require more frequent cleaning and have a shorter life when used with turbid water. Very cold water reduces the effectiveness of chemicals; more time will need to be allowed for the chemicals to take effect, as per the manufacturer's instructions.

For a group that is in a base camp situation where fuel weight is not an issue, and only going for a few days annually, simply boiling water can serve the group well and prove inexpensive and reliable.

Enroute Leadership

Once off-site, the group is a self-sufficient operational unit in the environment and is dependent upon the judgement, experience, skills and equipment it brings. Good group management, organization and communication are essential from the beginning till the end of the trip. There are several procedures and factors to be considered when organizing and leading the field trip to use time to best advantage, minimize energy expenditure, and promote enjoyment of the experience. These are outlined below.

Route Selection/Distance

The route selected and distance to be traveled each day depends upon many factors, including:

- The group (e.g., age, fitness, technical skill, maturity),
- Program objectives (e.g., personal physical and mental fitness, outdoor skills development, environmental studies),
- Program process (e.g., traveling, mini-lectures, skills practise, simulations),
- Mode of travel selected (e.g., hiking, cycling, canoeing), and
- Anticipated environmental conditions (e.g., terrain, elevation changes, weather).

Route/distance decisions are made as part of planning the trip and will have been outlined on the itinerary card. (link to Itinerary Card). In developing the card, all the above factors will have been considered. The card should be consulted regularly and adhered to as much as possible (in the event someone needs to locate the group), recognizing the need to remain flexible and to adjust the plan if circumstances dictate such is necessary. There is no point pushing a group to exhaustion or injury for the sake of sticking to an arbitrary, and for whatever reason, no longer appropriate goal. Be prepared to reassess and, if necessary, re-route to a more manageable distance.

Remember, it is the quality, not the quantity, of travel that is important. Set conservative distance objectives so students have sufficient energy to be safe and functional in camp. Retain an adequate safety margin to deal with problems (e.g., illness, injury, equipment malfunction) arising late in the day.

Pace

The actual distance a group travels per hour, or its pace (i.e., kilometres/hour or KPH), is dependent on the same factors noted above for distance. Within upper objective limitations, how fast a group CAN TRAVEL is highly influenced by how fast it WANTS TO TRAVEL. Take guidebook estimates with a grain of salt; the larger the group, the bigger the grain of salt. Learn the natural pace of the group based on shorter outings with and extrapolations from experiences with similar groups on similar trips. It is completely natural for different individuals in a group to have different natural paces; acknowledge that, but let them know that, for safety, the group will generally travel as a unit.

Guidelines

- Regardless of the mode of travel, the ideal pace is generally one that any member of the group will be able to keep up for the duration of the travel period (e.g., the full day, with 5-10-minute breaks every hour or so).
- Encourage students to listen to their bodies; to let their legs, lungs and hearts set the pace. Remind them to slow down if their legs start feeling leaden, if they are breathing too hard to carry on a conversation, if they are sweating excessively, or if they feel their heart racing.
- Set the pace according to the slowest member's ability. Keep that person near the front of the pack. If it can be done diplomatically, perhaps relieving a particularly slow person of some of his or her load and sharing it among the stronger, fitter members of the group may reduce everyone's frustration.
- Speed-demons need clear limits and perhaps extra tasks to help utilize some of their boundless energy; load them down with more gear or have them do reconnaissance ahead or short side-trips (keeping in mind their age, maturity, physical ability and implement appropriate safety measures).
- Start the group out slowly, only increasing speed as muscles warm up to meet the demand.
- SLOW and STEADY is far preferable to dash and drop. Repeated exposure to oxygen debt leads to more cumulative fatigue, often with little appreciable difference in total distance covered over the

day. Encourage people to slow down and enjoy the scenery, each other's company and the experience.

- Adjust the pace to the terrain or water. Hiking uphill, breaking trail while ski touring or paddling into the wind can all slow the pace significantly.
- Instruct the students in rhythmic breathing for all activities and safe, efficient travel techniques; e.g., the rest step in uphill hiking, spinning in an appropriate gear when cycling (set RPM and heart rate and select a gear on that basis), emphasizing rotating the upper body vs. pulling with the arms to paddle a canoe.
- The kilometers will often click by effortlessly when students are engaged in singing, playing games or talking than when they are focused on the work they are doing. Keep some ideas ready, particularly for later in the day.
- Drink and snack often along the way to minimize fatigue. Adequate hydration is essential (at least a litre per three hours on the trail/water; more in hot, dry conditions). Frequent snacking is preferable to a single large lunch in preventing energy crashes.

Rest Stops

The objective of interjecting rest stops is to prevent exhaustion, assist with group management, facilitate instruction, and add to the comfort and enjoyability of the experience by the students. Over breaks, group members may:

- Review the map to identify their current position and reassess their objectives for the day, and be briefed regarding the upcoming section of the route,
- Rehydrate and refuel,
- Be taught elements of relevant course content or learn natural and/or cultural history of the area,
- Deal with personal health (e.g., hot spots or blisters) and equipment issues (e.g., repairing a broken hip belt),
- Socialize,
- Do a buddy check (e.g., fatigue, hypothermia/hyperthermia), and
- Adjust clothing layers.

Guidelines

- Select an appropriate site for a rest stop. Choose a sheltered spot out of the wind and weather and of sufficient size for the whole group to be together. Get off the trail and stay to one side of it, if possible, to allow other groups easy passage.
- If traveling as a single group, avoid 'Slinky stops', where the bulk of the group starts off just as the last person catches up. Start the break when the last person arrives. Communicate clearly how long the break will be so people put on a layer. Announce when there are three minutes left, meaning that it's time to pack up.
- Take the first break of the day within 10-20 minutes of starting out to facilitate clothing and gear adjustments.
- In the early hours of the day, take short (5-10 min.) breaks approximately hourly. Later in the day, increase the frequency of breaks, but keep them short (e.g., 30-40 minutes travel per 5 minutes rests). Long breaks allow for more lactic acid build-up in muscles, and once cooled off and tightened up, it takes much more effort to get them moving and warmed up again.
- Encourage students to put on a clothing layer when they stop, so they will stay warm and comfortable.

- Before leaving a rest stop, tell the group when and/or where the next one will be. This gives the weaker members a clear goal to shoot for and something to look forward to.

Portages

- Most of the information related to pace and rest stops can be adapted to time on the portage trail.
- Try to minimize "dead time" for group members. For example, if the group has one-and-a-half total loads, split the group. Have half drop their load at the halfway point and return to the start for the last pile. The other half of the group takes their load the full portage, returns to the midpoint for the dropped gear and everyone should finish at about the same time.

Leadership Responsibilities En Route

Group management on the trail/water involves a constant effort to balance two conflicting desires; keeping everyone close together and allowing each individual to travel at their own natural pace.

Rationale for keeping the group members within contact of the teacher/leader include:

- Eliminating the potential for individuals to get lost or to leave someone behind,
- Ensuring the leader, who presumably has the most experience, is in a position to assess any hazards and establish appropriate safety precautions,
- Ensuring that, should anyone become ill or injured, that the group's first aider and/or external communications device is within easy access,
- Facilitating the use of teachable moments and other educational opportunities as they become relevant, and
- Role modelling good group travel for future recreational involvement in the activity.

Rationale for allowing a looser form of group management with more mature, skilled students may include:

- It takes a lot of the leadership team's energy to keep everyone close together,
- Students kept close together may tend to chat more (frequently about things at home rather than on the trip), ignoring their surroundings and activity experience, and
- When kept in a tight group, students tend to rely on the formal leader to do all or most of the ongoing navigation, risk assessment and management, and other decision-making for them, whereas when they are more spread out, they tend to assume more responsibility for themselves and may develop better decision-making capacity and a higher level of self-confidence and sense of self-determination outdoors.

The teacher/leader needs to establish a system that allows him or her to select a position anywhere desired within the group. The position selected for the formal leader will depend upon consideration of:

- The group's capacity and maturity,
- The program objectives and process, and
- Characteristics of the route, terrain and weather.

For example:

Leader in front – best when the route is unclear and/or where hazards are anticipated that will need to be assessed and managed by an experienced person.

Leader in middle – appropriate when the route is known and/or obvious, of low risk, and where group members can be relied upon to adhere to other safety systems (e.g., staying with a buddy, stopping at pre-determined rest stop locations/times).

Leader at back – sometimes desirable if there is a wide variation in the abilities of group members. Use of this system requires a well-defined low-risk route, an obvious regrouping point, a pre-determined time/location to stop, and/or intra-group communications systems (e.g., whistle signals, cell phones, FRS radios/walkie-talkies) between the leader and other(s).

Leader stationary – necessary when the group must contend with a hazardous location or situation. The leader positions him or herself in an appropriate spot to assist group members over or past the obstacle, thereby reducing the risk involved. It is important to keep an eye on the participants who have been assisted and are waiting to continue. They may be prone to horseplay and accidents borne of boredom or impatience.

Leader floating – in an ideal scenario, with a mature group on sufficiently easy terrain, the leader moves up and down the line at will, connecting with individual group members one-on-one and talking/working with them before moving on to others. This approach requires a fit leader who has not over-encumbered him or herself with too much group gear. It offers the advantage of building the leader/participant relationship and providing the leader with a better sense of how each youth is responding to the trip's demands.

Lead and sweep – regardless of where the formal group leader is positioned in the group, it should have an identified lead and sweep. The lead, stationed at the front of the group, knows the route and no one goes in front of that person. The sweep brings up the rear of the group; encouraging slower members, helping solve any problems (e.g., dispensing minor first aid or repairing equipment) and making sure no one gets left behind. Either position may be occupied by a leader, assistant leader, other adult supervisor or responsible student. A lead-sweep system helps minimize the potential for group members to get lost or injured en route, or excessively spread out.

Group Management Procedures

In addition to selecting appropriate positions in the group for the leader and establishing identified lead and sweep people, there are a variety of additional strategies and techniques that can be used to enhance safety en route. These include:

- Ensuring the students are informed and knowledgeable regarding the route and any anticipated hazards;
- Introducing various landscape features and landmarks along the way;
- Established a regrouping policy; e.g., every 50 minutes, at all trail junctions, at river/stream crossings, at an easily identifiable landmark feature;
- Ensuring students know who the lead and sweep are for each travel period, what their roles are and how to use them;
- Establishing a buddy system;
- Establishing a system where each person/buddy pair/boat sternsman checks behind them frequently to ensure the next group member(s) are in sight and/or sound; and
- Ensuring that the signal system(s) to be used (e.g., whistles, paddle signals, hand signals) are known by all group members.

Addressing Subjective Risks in the Field

- Following are some recommendations that fall from understanding the propensities of the students in the group:
- Identify the competent, robust, alert, connected students and ensure they are adequately challenged, lest they become complacent.

- Identify any inattentive, awkward, or disaffected individuals in the group and plan appropriately for these students; they are particularly at risk.
- Watch for any "abdicators" in the group (who tend to leave all the decision making to the teachers/leaders or other students) and stay close to them during more hazardous times. Provide them the "psychological belay" they need to feel safe.
- Ground the "immortals" in the group. They exude youthful enthusiasm, but their inexperience and lack of appreciation and respect for real risk can lead them to place themselves and/or others at risk.
- Look for a reasonable level of anxiety in students; remind them that they are responsible for their own safety (and, by extension, that of the group), and do check-ins, when appropriate, to ensure that instructions are understood and acknowledged.
- Be particularly vigilant when "gearing up" or "gearing down" versus being "on the edge". When there is a risk(s) clearly evident, everyone tends to focus and perform. But, when the adrenaline stops flowing, distraction, inattention and/or complacency can contribute to incidents related to less obvious hazards.

Help all "higher maintenance" students by sharing a positive attitude, by role modeling an appropriately cautious approach to risk, and by verbalizing perceptions, decisions and feelings. Also, focus on the commitment of individuals to the group – success is the whole group benefiting from the experience. Be watchful, flexible, patient and humble, while not being overcautious.

Setting Up Camp

The potential for accidents, injuries and environmental damage increase when the group is tired. Set up camp before getting to the point of exhaustion. If the leader has to ask if the group is ready to camp, it is likely time to do so (unless reasonably close to a specific campground the group is expected to camp in). Once selecting the campsite, work to ensure an efficient, safe camp is established.

Guidelines

- Pitch camp with sufficient daylight remaining to complete essential tasks.
- If group members are damp from sweat and the temperature is cool or dropping quickly, they should be encouraged to change into dry clothes before setting camp. It's much harder to warm up after getting chilled than to avoid the condition in the first place.
- Follow area rules and regulations with respect to site selection and use.
- Apply minimal impact attitudes and technologies when selecting and setting up camp.
- Assign tasks to be completed, supervising as necessary or remaining available to assist as requested.
- Encourage group members to keep their clothing and gear organized; neatness reduces loss or damage.
- Reinforce a "safety first" attitude in group members' minds.

Group Assignments

When camping in a single large group, it may be most effective and efficient to assign task areas to individuals or small groups, as listed below. When camping in small, independent sub-groups, the logistical tools below need to be managed by each small group. The in-camp program and/or camp fire, if held, may be exceptions. The leader needs to consider which, if any, elements need to receive constant visual supervision (e.g., relative novices fueling and lighting stoves or other appliances) and how to structure the operation to ensure this occurs.

Shelter

- Type, number, and location(s)

Kitchen

- Site selection and boundaries
- Food preparation
- Cooking
- Clean-up
- Food storage and leftover management

Stove and/or Fire

- Site selection/location
- Fuelling
- Lighting and maintaining
- Extinguishing

Water

- Safe source
- Purification

Hygiene

- Personal hygiene
- Latrines
- Garbage and waste water

In-camp Program (educational, social)

- Technical skills instruction (e.g., stove use, knots, survival skills, crafts)
- Environmental studies (e.g., natural history walks, astronomy)
- Debriefings (e.g., of the day, of the trip, of any incidents)
- Games, skits, campfires, singsongs
- Briefing for the next day

Breaking Camp

Getting up, packed up and on the trail/water in good time and safely requires a re-application of many of the task areas identified above, with efficiency as a priority. Have an effective means of getting people up and moving, especially if an early start is necessary; one or two morning dawdlers can compromise the whole group's safety and success later in the day when the group rushes to make up time lost on the front end.

Morning campfires tends to contribute to socializing rather than active packing; avoid them if possible. The teacher/leader (or a capable designate) is responsible for checking every kitchen area, meeting area and tent site and ensuring that all fires are out, latrines and sump holes are filled, all items of clothing/equipment are picked up and all garbage is packed out.

Emergency Procedures

The teacher/leader should be able to wake up in the morning and say, “This is a good day for a member of our group to get hurt or ill. We are healthy, well hydrated, in good morale, and we have a solid emergency response plan ready to go.” Any problems affecting the group’s capacity to respond to injury or illness should be addressed.

Despite good trip planning and careful attention to risk assessment and the management of the activity, a group may suffer an emergency or critical incident (a crisis situation and its impacts on the people involved). Examples include a lost person(s), a student taken seriously ill, a motor vehicle accident, an act of violence, an emotional crisis, or other incident.

The lead teacher or a designate with superior emergency training will be responsible for assuming management of the situation until rescue personnel (e.g., ambulance, police, search and rescue, fire) arrive, at which time the emergency agency will take control of the situation. The staff, volunteers and service providers must then work to support the efforts of the lead agency.

It must be appreciated that, in a remote or wilderness setting, it may take some time for search and rescue personnel to arrive on-scene (hours or sometimes even days) and the leadership team must know that it has the capacity to manage the crisis in the interim. All staff, volunteers and service providers should be briefed regarding the emergency plan.

The Safety First! Guidelines provides common considerations and procedures. Following here are more detailed protocols for the general management of outdoor emergency situations and specific tools to help in that process. Incident response will vary somewhat according to the time, place, activity, group, and nature of the problem. However, the basic principles will remain the same.

Incident Response

Good pre-trip planning is the most essential element in minimizing the potential for an incident (a lost student, a preventable illness, an unintentional injury (accident) or stranding) and to handling such eventualities quickly, effectively and safely should they occur. It is important that the teacher/leader planning the trip anticipate, in a general way, the types of incidents that may occur, and prepare psychologically and physically. Relevant pre-trip planning and rescue and emergency training can greatly benefit confidence and competence in an emergency situation. Carrying appropriate emergency equipment supports successful outcomes and minimizes fear and frustration.

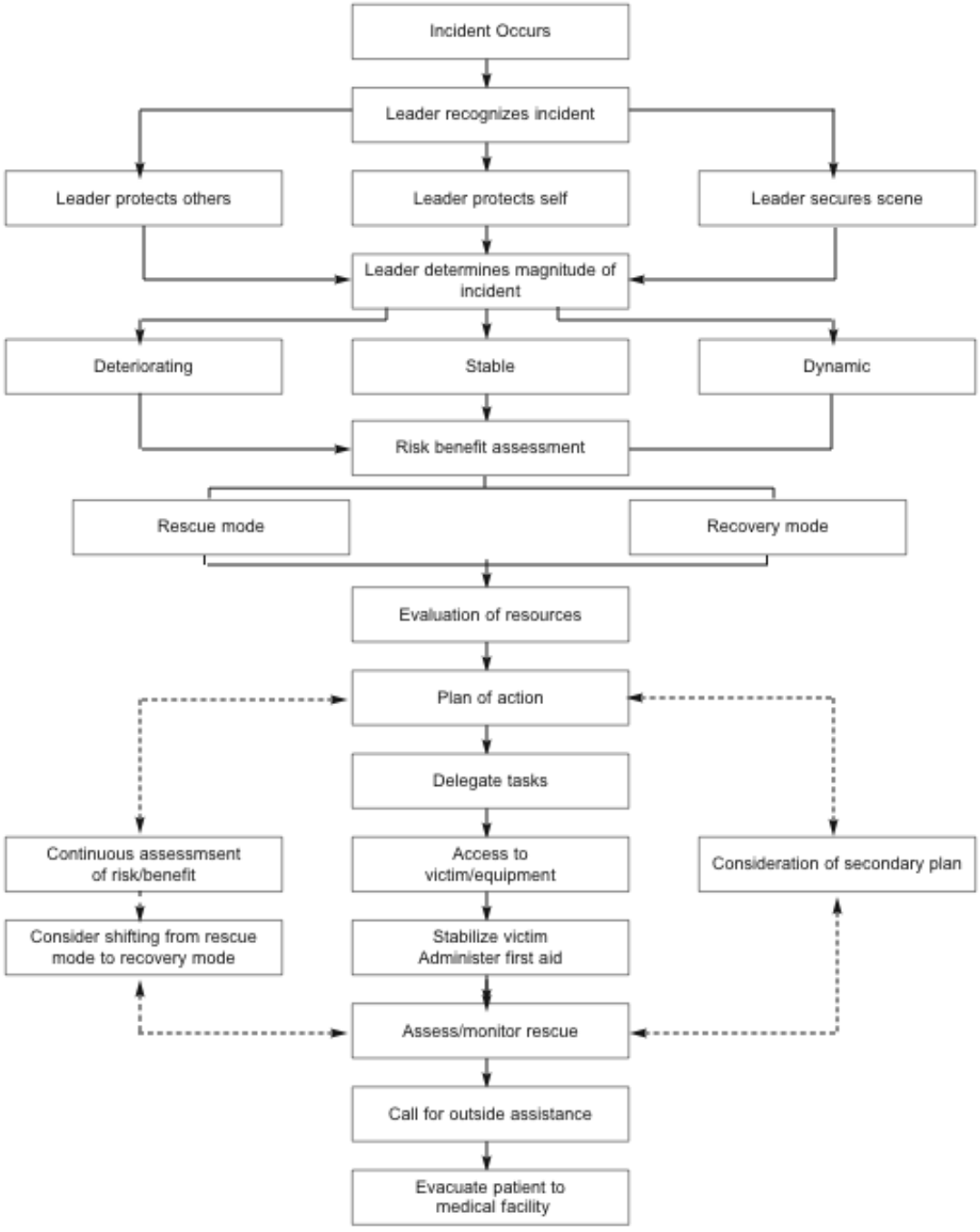
While the mechanism of the incidents will vary, the response generally involves a pre-determined sequence of assessments and decisions that are common to all incident responses. These can generally be summarized in the following ten-step process:

Ten Steps to Successful Search and Rescue

1. Incident Identification
2. Incident Assessment
3. Resource Evaluation
4. Search and Rescue Plan Development
5. Task Delegation
6. Progress Monitoring
7. Plan Adaptation
8. Administration of First Aid
9. Contact Outside Assistance
10. Evacuation

The following flowchart illustrates the ten steps, including key elements and feedback loops.

FLOW CHART OF THE TEN STEPS TO SEARCH AND RESCUE



Modified from: McKown, D. (1992). Canoeing Safety and Rescue. Calgary, AB: Rocky Mountain Books.

1. Incident Identification – Don't just do something, stand there!

Whenever someone gets lost, stranded or hurt, STOP and ASSESS the situation. This involves recognition that a problem exists. The sooner this occurs after the incident, the more likely a successful outcome.

The teacher/leader or emergency response designate takes charge of the situation, including:

- Safeguarding the group members involved as rescuers as a priority (do not initiate a rescue for which the rescuers are not trained or one in which the risks to their personal safety cannot be sufficiently mitigated – call in the professionals),
- Protecting the unaffected members of the group,
- Identifying the exact location of the casualty(ies) (if dealing with a stranded or injured participant in relatively known location), and
- Communicating the situation to other leaders/supervisors.

Note: the terms 'casualty(ies)' and 'victim(s)' are used, quite interchangeably in the search and rescue and first aid literature, to describe a person(s) injured, ill, lost or stranded.

2. Incident Assessment

The next task is to assess the nature and magnitude (seriousness) of the situation. This includes determining whether the circumstances are stable, deteriorating or fluctuating (i.e., dynamic). It is also important to determine the likelihood of success (benefit) versus the risk to the health and safety of the rescuers engaged in the rescue. This is the risk/benefit analysis.

Where the incident is recent and the casualty has a high chance of survival if found/ rescued, and the group has the capacity to assist, groups operate in "rescue mode". They work hard and fast and assume some personal risk.

When the rescuers are operating in "recovery mode" (i.e., where substantial time has passed and there is little chance of rescuing the casualty alive), the risk/benefit ratio shifts, and the rescuers slow down and take fewer personal chances. The members of a school group will not be involved in recovery operations. Only trained search and rescue personnel should be engaged at that stage.

3. Resource Evaluation

The next step is to consider the resources (personnel, equipment and supplies) available. This includes:

- Identifying members of the group who can assist the teacher/leader in managing the situation and their role-relevant skills, and
- Listing equipment and supplies at hand that will or may be of use.

4. Search and Rescue Plan Development

This is the point at which the general procedure and specific techniques to be used are identified. The plan will operationalize the mobilization of the resources identified above.

5. Task Delegation

Once resources have been identified and a plan is in place, the teacher/leader needs to allocate the resources available to best effect. This includes minimizing personal involvement in any single aspect of the rescue, so the big picture is not lost. In addition to assigning an individual(s) to conduct the search/rescue, other people need to be delegated to:

- care for the rest of the group (including getting and keeping them busy with necessary tasks related to group maintenance (e.g., shelter, cooking),

- monitor group members for signs of shock or acute stress reaction, and
- support the rescuers (e.g., inventorying resources, preparing messengers' packs).

6. Progress Monitoring

The teacher/leader's job switches at this point to observing and evaluating the progress of the search and rescue effort. This includes ongoing re-evaluation of the risk/benefit ratio, and determination of any change in status of the search/rescue effort from rescue mode to recovery mode. The latter is obviously a very difficult decision to make, but it must be done if there is little chance of survival of the casualty (e.g., non-breathing for an hour or more) and exhaustion, shock, or other complications face the rescuers.

7. Plan Adaptation

Consider the relative success of search/rescue efforts and modify if the original plan fails or if the situation changes. Implement alternative plans as appropriate.

8. Administration of First Aid

Begin casualty assessment and first aid follow-up as soon as possible. See *First Aid and Emergency Follow-up* section below.

9. Contact Outside Assistance

Sending for help is generally a low priority early in a rescue effort unless it is obvious that the group does not have the skills or equipment to manage the situation. It is usually better to wait until sufficient information has been gathered to provide to the external rescue agency. Exceptions involve situations where it is clear early on that the group does not have the capacity to carry out a safe search and/or rescue. See *Sending for Help* section below.

10. Evacuation

The rescue is not complete until the casualty has been evacuated to an appropriate location (e.g., medical facility). See *Evacuation* section below for considerations and procedures.

Lost or Missing Person Procedure

Procedure If Lost/Missing

The students should be instructed to tell an adult where they are going and when they'll be back and to always carry basic survival equipment. For trips into semi-remote or remote areas, they should also be briefed on what to do if lost or separated from the group (see Survival in Self-reliance in the Outdoors Instruction Resources).

Procedure if a Group Member is Lost/Missing

Given that it generally takes at least an hour or more to mobilize search and rescue teams and get them to the site, the group's immediate efforts often offer the best chance of a quick and successful search and/or rescue.

If a member of the group gets separated:

- Have established back-up procedures to be initiated in the event that the person doesn't return on time. Prompt response will minimize the size of the search area.
- Assemble the group and determine who is missing.
- Communicate the situation to other leaders/supervisors.
- Establish an information base by questioning the group and have a scribe document the responses and mark locations noted on the map. Some questions might include:

- Who saw the person last? Where? When?
- What was the missing person doing?
- What was the physical and emotional condition of the person? Did he or she complain of feeling tired? Sick? Mad? Sad? Was he/she hungry or thirsty, bored, etc.? Check the person's health/medical statement to see if there is anything of note there.
- Was there any likely destination(s) the person may have gone to (e.g., the bathroom, a side trip, a walk, a viewpoint)?
- What direction was the person heading in when last seen?
- What was the missing person wearing and what equipment did they have with them? Be specific re: colours, fabrics, footwear (tread if possible), etc.
- What knowledge, skills and experience does the missing person have related to outdoor travel, camping, survival, the terrain in the area, etc.
- Identify people in the group who can assist the leader in managing the situation. Assess the state of the group in relation to conditions; e.g., time of day, weather, fitness, skill, knowledge of the area, etc. Only use the students to assist where they have the capacity to help safely.
- Look at the map to see if there is a way to cordon off the immediate area to help keep the person from wandering too far away; e.g., send pairs of hikers out on trails with whistles and have them attach notes on trail direction/junction/trailhead signs for the reader to stop and stay put.
- Initiate a search of all likely locations nearby (e.g., tents, washrooms, nearby viewpoints).
- Make a determination based on the situation re: how long to search prior to contacting external assistance. Consider the age, maturity and condition of the group, remaining daylight, weather conditions, terrain demands, equipment available in the event the group gets caught out overnight, etc.
- Initiate a search of potential on and off-trail accident sites within a set distance (distance determined by group capacity; not likely more than three kilometers). Potential sites could include a waterfall, canyon, steep slope along trail, river crossing, etc. If this step is not within the group's capacity and/or conditions are not favourable, do not initiate it and instead contact the authorities for help.
- If deciding to evacuate the group, leave a leader and group member or two with an external communications device at the point the person was last seen to wait for the search and rescue authorities.

Footprinting

While not a particularly common or required activity before taking a group out, one that has helped rescuers locate a lost person more quickly involves preparing a record of the size and tread pattern of group members' footwear. A quick and easy way to record footprints of group members prior to venturing under human power into semi-remote or remote terrain is as follows: Place a sheet of tinfoil on a piece of soft material such as a towel. Have everyone put on the shoes they plan to wear on the trip and in turn step on the foil. Mark each set of prints with the person's name. Repeat for each change of footwear. A cell phone or camera can be used to take photos of these impressions, the length and width and person's name added to a file and the file shared with the home contact person and one copy kept with the teacher/leader.

Actions to Follow When Initiating a Search

If a search is to be carried out:

- Retrace steps or take a backbearing to the point last seen.
- Establish a base camp.

- Create audio (e.g., calling, whistling, car horns) and/or visual (e.g., smoky fire) signals.
- Define the search area from the last known point by considering time missing (distance could have traveled), terrain, number and complexity of trails nearby, prominent landmarks, natural boundaries (e.g., an uncrossable river), hazardous locations, limitations of the search group (knowledge, skill, fitness), etc.
- Consider typical lost person behaviour. For example:
    - a lost person locating a trail is as likely to run the wrong way as the right one,
    - a lost person is likely to stay on a trail, but unlikely to backtrack on that trail,
    - sometimes a lost person will ignore a trail or cutline, traveling in a straight line instead,
    - most lost persons will go downhill and/or downstream, although some go up trying to get a better view,
    - not all lost people will stay put at night, even in the absence of a flashlight, and
    - if searching for a despondent person, ignore the above. This is a SERIOUS EMERGENCY. The subject will not likely travel far but will not likely act to ensure his or he survival and may not even answer searchers. Increase the saturation of the searchers and tell them not to expect a response to calling and rely on visual clues.
- Have a scribe recording all significant information (e.g., missing person description, search area, procedures followed, search teams, and times).
- Form several hasty search teams of 2-3 people. Pair up inexperienced searchers with experienced and ensure each searcher is equipped with adequate clothing, water map and survival equipment to take care of him or herself. Ensure each group has the equipment and knows the signalling system to be used (e.g., cell phone numbers, FRS channel).
- Instruct searchers to avoid contaminating the missing person's tracks in the event that search dogs are called in.
- Send group members out to block off possible exits from the defined area.
- Leave notes at all directional/trail junction signs and trailheads to stop and stay until help arrives.
- Complete the hasty or reconnaissance search of the most likely trails, locations, shelter spots, etc., and regroup at a specific time and place; definitely well before dark. Ensure each hasty team carries a watch.
- Minimize conversation; listen for calls from the missing person.
- Encourage searchers to look for clues rather than just the person(s) missing; there are always more clues than victims. Look for things like footprints, stick arrows drawn on trails or in clearings, notes or material attached to trees, etc. Mark all clues that are found; preserve all vital evidence.
- Wait at the base camp or designated regrouping location till all searchers have returned. Ensure they are all warm and dry, well-watered and fed.
- If missing person is not found, activate plan to contact search and rescue personnel (e.g., police, parks office) and prepare to assist them as they assume control of the situation. Collect a "scent article" for search dogs by inverting a plastic bag over a hand and then picking up a clothes item (e.g., sock, hat), pulling the bag down around the object to avoid contaminating the scent.
- Contact the principal or designate with details of the incident and discuss a plan for dealing with the rest of the group, follow-up, etc.
- See Other Follow-up Activities and Considerations later in this section.

Rescue Procedure

- The specific techniques to use in getting to a casualty in jeopardy and extricating them from their circumstances will vary depending on the environment (e.g., mountainside, forest, river), activity (e.g., rock climbing, canoeing, skiing) and nature of the incident (e.g., fall, caught in logjam, buried in avalanche). However, a few general considerations bear mention in approaching and contacting the casualty, including:
- **SELF-PROTECTION**. Safeguard the approach to protect the rescuer from injury (e.g., rope up on steep terrain). If lacking the knowledge and experience to do the rescue safety, don't do it. Call out for help.
- **COME PREPARED**. Take along the first aid kit and other necessary equipment.
- **APPROACH SAFELY**. Don't cause further injury to the casualty (e.g., rockfall).
- **BE UNDER CONTROL**. Be calm, rational and have breathing under control when approaching the casualty.

Contact the Casualty

Communication is essential during approach and contact with the casualty. Reassurance, concern, gentle touch, and sure actions will decrease the casualty's anxiety, help prevent shock and aid in recovery.

If possible, assess the casualty on the spot. However, if there is danger in doing so (e.g., ongoing hazard posed by storm, rockfall, avalanche, shifting ice), then the first priority should be to move the casualty to a safer location before initiating first aid.

First Aid and Emergency Follow-up

Reading this section will not eliminate the need for first aid-trained persons to attend on any outing, especially those of a more remote or otherwise higher care nature.

Recommended first aid procedures are continually being revised to provide the most up-to-date medical opinions of the best care by a first responder. With this in mind it is prudent to maintain an adequate level of current first aid training consistent with the Safety First! Guidelines. The information shared here is presented as a summary of key common steps recognized, based on a review of the body of knowledge related to wilderness first aid and emergency management.

Primary Assessment of the Casualty

In a priority action approach, the first aider takes care of the most life-threatening problems first, then moves on to the less significant issues. Attending to the priorities, the "ABC DE'S" is a good memory tool.

PRIMARY ASSESSMENT	
Airway and Cervical Spine	Check if casualty is breathing. If not, remove any obstructions and **open airway** by an appropriate method (i.e., **jaw thrust** without head tilt if a cervical spine injury is possible).
Breathing	**Look, listen and feel** to determine if breathing and initiate **rescue breathing** immediately if not.
Circulation: Bleeding & Blood Pressure	Check for a **carotid pulse**. If none detectable, and CPR trained, start CPR. If heart beat and breathing are present, check **nail-bed refill** (if it takes more than 2 secs. for colour to return after compressing, then blood pressure may be low). Wearing latex or nitrile gloves, check for **severe bleeding**. Slide a hand beneath the body, carefully to check for wet spots. Treat severe bleeding with **pressure** on and around the wound.
Dehydration	Dehydration can complicate many other conditions, particularly in children. **Signs and symptoms** include: thirst; dry tongue; fatigue; nausea; sleepiness; pale, cool, clammy skin; faster pulse;

	pinched skin on back of hand slow to flatten out; little urine and dark in colour. Unless consciousness is abnormal, **give small amounts of fluids**.	
Exposure (generally cold):	Look for signs and symptoms of cold injury (e.g., hypothermia). **Cover the casualty** from underneath and above to keep them warm. Protect from the elements.	
Shock	Expect and act to prevent or treat shock. Shock is decreased oxygen flow through the organs due to a drop in blood pressure. While there are many potential causes of shock, the key is to anticipate, recognize and treat it.	
	Common Shock Signs & Symptoms	**Treatment of Shock**
	pale, cool, clammy skin weak and rapid pulse rapid shallow breathing vacant stare bluish lips and fingernails dizziness, nausea and sometimes vomiting air hunger anxiety and nervousness confusion	lie casualty down ensure a good airway control bleeding treat obvious injuries keep warm raise feet 15-25 cm. EXCEPT in cases of suspected head or spinal injury keep warm loosen constrictive clothing give small amounts of fluids if EMS arrival not imminent turn head to side if vomiting or bleeding from mouth (unless suspected spinal treat gently and reassure begin CPR if casualty stops breathing/heart stops

Secondary Survey of Casualty

After life-threatening concerns have been addressed and the casualty stabilized, conduct a thorough head to toe examination, check vital signs and secure a medical history. The tables and form below provide summaries and memory tools to help with this assessment process; first one general table and then three explanatory tables to go into more depth. Descriptions are, of necessity, kept very brief. It is assumed that the reader has sufficient first aid training to understand the terms presented, rationale behind each item, and the subsequent first aid treatment procedures indicated. If not, additional training is highly recommended.

HEAD-TO-TOE	VITAL SIGNS	MEDICAL HISTORY MEMORY TOOLS
Look Listen Feel Smell Ask	Level of Consciousness Heart Rate Blood Pressure Skin Respiration Temperature Pupils	Chief complaint (OPQRST) SAMPLE AEIOUTIPS

Head-to-Toe Examination

Following is a more detailed table expanding on the head-to-toe examination aspect of the secondary survey. Conduct the exam slowly and systematically, wear gloves and talk to the casualty regarding what is being done. If not of same gender as the casualty, have an observer (e.g., the scribe) present who is of his or her gender. The first aider is looking for obvious wounds (e.g., cuts, lacerations, abrasions), but also less obvious signs of injury. The first aider will not only look at the body part being assessed but will frequently check on the casualty's response to that part being touched (e.g., wincing in pain).

THE FOCUSED EXAM AND HISTORY: HEAD TO TOE EXAMINATION	
LOOK for wounds, bleeding, unusual movements or shapes, deformities, penetrations, excretions, vomit, response to pain on touching LISTEN for abnormal sounds, such as crepitus and airway noises FEEL for wounds, rigidity, hardness, softness, tenderness, deformity SMELL for unusual odours ASK if anything hurts or feels odd or numb; ask what happened to get clues re: potential injuries or conditions	BE ALERT FOR: Head – airway, ears, nose for fluid or blood, depression, swelling, facial injury, teeth Neck – airway, cervical spine, swelling, irregularity, pain Shoulders – deformity, pain, mobility Arms and hands – deformity, pulse, mobility, sensation, strength, temperature Chest – deformity, asymmetry, painful or difficult breathing Abdomen – tenderness, rigidity or guarding, distension, bruising or discolouration Back – pain, possible spinal injury Pelvis – pain, instability, hip mobility Legs & feet – deformity, pulse, mobility, strength, sensation, foot colour, temperature and pulse

Vital Signs

Assessing vital signs provides the first aider with objective baseline indicators of the functioning of body's essential systems. Ongoing monitoring of vitals provides information on the progress of the casualty over time. Vital signs should be taken and recorded every 15 – 20 minutes if a serious injury or illness is suspected.

VITAL SIGNS	
Sign	**What to Assess**
Level of Consciousness (LOC)	Record highest level of AVPU = casualty is **A**lert, responds to **V**erbal stimulus, responds to **P**ain, or casualty is **U**nresponsive
Heart Rate	Pulse, rate, rhythm, force
Skin	Colour, temperature & moisture
Respiration	Rate, rhythm, character
Temperature	Record oral or ear temperature with a thermometer
Pupils	Size, equality, reactivity to light
Blood Pressure	Not likely to be recorded specifically in the backcountry; poor nailbed refilling and weak, thready pulse indicate low blood pressure

Medical history

Finally, secure an accurate medical history related to the casualty's condition to aid in determining the nature of the problem(s) and appropriate treatment.

MEDICAL HISTORY		
Memory Aid	**Explanation**	
Chief Complaint (OPQRST)	**O**nset: Did the pain come on suddenly or gradually? **P**rovocation: What caused the injury, or brought on the illness? **Q**uality: Describe the character of the pain (e.g., sharp, dull, throbbing)? **R**egion/**R**adiation: Where is the pain located and does it move or radiate? **S**everity: Casualty's rating of the pain on a scale of 1 – 10 (high). **T**ime: When did the pain start? What's its frequency and duration?	
SAMPLE	**S**ymptoms	What and how is the casualty feeling?
	Allergies	What, if any, allergies does the casualty have?
	Medications	What, if any, medications is the casualty on?
	Past History	What medical problems has the casualty had? Ask & check health/medical form and check for medic alert tags.
	Last oral intake	When did the casualty last eat and drink?
	Events	Were there any unusual circumstances over recent days that may be relevant to the casualty's condition?
AEIOUTIPS	**A**lcohol **E**pilepsy **I**nsulin (Diabetes) **O**verdose **U**nderdose **T**rauma (injury) **I**nfection **P**sychology/**P**oison **S**troke	These remaining steps in the medical history can contribute to understanding potential causes of unconsciousness. Ask questions and look for clues that either rule out or confirm the presence of the condition. If casualty is unconscious, ask group members if they are aware of the person having any medical conditions, check the health/medical form and review the results of the Vitals, Chief Complaint and SAMPLE assessment.

Make Provisional Diagnosis and Provide First Aid Treatment

Once the primary and secondary examinations have been completed, the first aider can make a "provisional diagnosis"; a best guess as to the casualty's condition. If no medical advice is available, first aid can then be administered up to the level of care the individual has been trained to provide.

If the group has external communications capacity (e.g., cell phone, PLB, satellite phone) and the casualty's condition appears serious, the first aider may choose to solicit a medical opinion and/or arrange for a Medevac of the casualty. When talking to a doctor to secure medical advice:

- Give the casualty's gender and age (and name if specifically asked for it).
- Read from the written checklists, the data and observations recorded there. Do not provide your provisional diagnosis.
- Describe your situation; i.e., where you are, what the local weather is like, what kind of shelter the casualty has, means available to transport the casualty and transportation time, relevant medications you have available, type(s) of assistance requested (e.g., advice regarding treatment, transportation, paramedics, litter, drugs). See below for more information regarding arranging Medevacs.
- Write down everything the doctor tells you to do and ask questions if unsure about anything. Read back what you have written to ensure it is accurate and to give the doctor time to consider additions or clarifications. The doctor may wish to provide step-by-step directions for treatment of the casualty as you carry them out.

Plan of Action

Consider the following variables in determining the course of action:

- Nature of the casualty's injury(ies)/illness,
- Capacity of the leadership team and group (e.g., knowledge, skill, experience, fitness, equipment, water, food),
- Time available (daylight hours remaining),
- Terrain (likely evacuation route, distance),
- Weather, and
- Response time of external emergency response agencies.

Casualty-related criteria for evaluation include:

- **Serious threat to life or limb** – e.g., unmanageable airway, acute respiratory distress, escaping air (chest wound), major bleeding, circulation emergency (e.g., suspected heart attack, stroke), shock, deterioration in level of consciousness (loc), suspected spinal injury, head injury (especially if affecting loc), seizure, diabetic emergency, severe orthopedic trauma (e.g., fractures, etc., affecting distal circulation, movement or sensation), unmanageable cold or heat related condition.
- **Serious malaise** – e.g., serious progressive infection, sustained fever, severe dehydration, or diarrhea,
- **Pain** – severe, sustained or worsening pain, abdominal or chest pain not likely of musculo-skeletal origin,
- **Scarring injuries** – cuts, lacerations, serious abrasions particularly affecting the face, head and neck,
- **Mechanism of injury** – serious incident, regardless of obvious signs and symptoms (e.g., a fall from more than 5 meters or any other significant fall (consider body parts) and surface involved, third-degree or other serious burns, any trauma precipitating any loss of consciousness,
- **Psychological** – unstable individuals who pose a threat to themselves and/or others, or any individual suffering debilitating emotional distress or anxiety, and/or
- **Other** – any other situation that does not appear manageable or that involves deteriorating condition of the casualty despite ongoing attention.

Then select an appropriate course of action. Common options to select from include:

- Staying put and treating the casualty until ready to proceed (e.g., injury, illness or condition manageable by the group – this is the most common course of action as the serious situations described above are, fortunately, rare events),
- Group evacuating the casualty (including self and assisted evacuation, simple carry, or litter carry); only if very short distance and casualty in condition to be moved,
- Teacher/leader or other support driver gets to group or meets up with group to drive casualty out to medical aid, to parents/guardians, or other appropriate place,
- Calling for external EMS or other assistance using external communications device if present and working or sending runners to secure external assistance.
- EMS or relevant authorities meet group at trailhead or other access point and assumes care and transportation of casualty from there.
- SAR comes to casualty's location by ground, water or air as appropriate and assumes responsibility for search, rescue and evacuation.

Be prepared to modify the plan as necessary, considering the condition of the casualty(ies), rescuers, and environmental factors (e.g., weather, terrain, available light). Err on the side of caution; act sooner rather than later, but don't rush. Take time to brief the group, prepare for action, and proceed.

Following is a brief explanation of considerations related to each of these options.

Staying Put

If the casualty's condition is not too serious, he or she is responding well to treatment and the group has the luxury of time, a decision may be made to simply take a layover period until the casualty has recovered sufficiently to travel again.

If this decision is made, continue to monitor and record vitals (less frequently as the casualty's condition improves). Provide the casualty with lots of T.L.C.; keep them warm, give plenty of fluids (unsweetened, no caffeine), keep them clean, and give them lots of emotional support. When the casualty's condition has improved sufficiently and it does not appear that self-propelled travel will be too painful or will worsen the injury or condition, they may head out or continue the trip on their own steam. The group will provide whatever assistance is needed (e.g., other group members divying up and carrying the casualty's gear).

Evacuating the Casualty

If the situation is of the sort that a rest period is not likely to resolve, then the question becomes how to get the casualty out with greatest regard for the safety of the rescuers and the casualty.

Evacuation by the group of an immobile injured/ill casualty is demanding and exhausting work. The terrain and distance to transport will determine the feasibility of such an evacuation. Other considerations include estimates of the time it will take in relation to the time of day, weather and forecast, ability to continue monitoring and providing first aid treatment to the casualty while underway, what to do if the casualty deteriorates, and the number and fitness of the people needed to help. Then factor in things like what if it takes longer than anticipated; is there a sufficient cushion to even start out. It would be foolhardy to try to move an injured person over rough terrain on foot for any great distance; secure external help in such cases.

If moving the casualty to a location accessible by EMS or a source of mechanized transport, select an appropriate method. Consider the casualty's size, nature of their injuries, terrain, distance, weather and group capacity. Options for transporting the casualty include one or two-person carries, carrying/dragging the casualty in a sleeping bag or bivy sack (an option on snow), or building an improvised stretcher (necessary if the casualty needs to be kept immobilized over any distance). If using a litter, pad it first and ensure protection of the casualty(ies) eyes and head, and secure the casualty inside the litter. Ensure constant monitoring of the casualty: nausea and vomiting are not uncommon on a bumpy ride. Plan for frequent rotations of the litter-bearers.

In a canoe or similar craft on relatively easy water over a reasonably short distance, evacuation may be quick, simple and safe. Monitor the condition of the casualty. Determine whether the rest of the group will accompany the evacuees or remain camped.

Sending for Help

If remaining stationary and phoning/sending runners for help, consider the casualty's condition, the group, the messengers if any are sent, and the type of rescue expected. Rescues are not risk-free endeavours, so be confident that one is indicated for the health and safety of the casualty.

If phoning/radioing, know who to contact; e.g., nearest parks office if in a national or provincial park or RCMP for most out-of-park situations. They will contact all necessary rescue services (e.g., search and rescue, ambulance, fire).

Once on the line, provide the contact the following information:

- The name and on-site contact number of the person calling, and the number of another contact in case the first device fails.
- The exact location of the casualty; e.g., coordinates or map number/name and grid reference, names of and distances to several local landmarks.
- The number of people needing help; i.e. ensure the casualty(ies) are attended by an adult from the group to medical facilities or wherever parents/guardians will assume responsibility.
- The total approximate weight to be transported.
- The extent of injury or illness; i.e., read out from the Casualty Report Form(s) or summarize what was found and what the trend in vitals has been (i.e., what's improving and what's not).
- Note specifically if the injury(ies)/illness is believed to be life-threatening and/or if a head or spinal injury is suspected.
- Answer questions that help the authorities determine the best course of action.
- If they will be coming, discuss details of the meeting place or landing site. Establish where emergency responders will arrive and by what means (e.g., helicopter, ATV, vehicle, float plane, boat, snowmobile). Provide the map number and grid reference, and compass bearing and distance from known landmarks (including one from the last prominent landmark on a linear feature like a road, river or trail if in indefinite terrain).
- Information on the location of the group, if not at the same place as the casualty.
- Cloud ceiling (low, medium, high or estimate in meters) and visibility (in kilometres) if Medevac is coming by air.
- Also, discuss specifics regarding marking and/or preparation of the landing site (e.g., use of signal fires/smoke signals, bright objects or an H (if expecting a helicopter) to indicate the site, hanging a wind-direction indicator, clearing brush, ensuring a firm, relatively flat surface, trampling snow, laying a log pad if necessary). The site cleared should be at least 20 meters square.
- If a helicopter Medevac is to occur, remember that while these aircraft are very versatile, they do have some limitations (e.g., can't fly in cloud, dark, storms). Have a back-up plan and tell the rescue service contact what it is and when you will act on it.

Sending Messengers

Today, with the high level of external communication device supported adventure trips, the need to physically send messengers out to get help has been significantly reduced and SAR response times right along with it. However, technological devices can fail, can be lost or damaged, or otherwise not available. If sending messengers out to secure emergency responder assistance or at least to where they can get a communication device to work to make a call, try to send at least three and ideally four people. If one is injured, one can stay with that person while the other two continue. One should be a leader (not the lead teacher or primary first aider if possible) and the others can be mature, fit students. The messengers should have:

- An awareness that their first priority is their own safety; their second is getting help. They need to be directed to take a specific route that they can safely travel in the weather, terrain and light conditions anticipated.
- Sufficient water, food, first aid supplies and gear to bivouac if not highly confident they can get out without being required to overnight.
- A map with the precise location of the casualty and pick-up point and/or a note with the location information, as per above.

- Information on the location of the group, if not with the casualty, and what the group will be doing (e.g., staying put, evacuating separately, timelines, etc.).
- Information regarding where the runners are to go and who to call when they reach a phone; likely a cell phone, but if a pay phone, credit/debit card to make a few calls (911 is generally a free call, but if they are to contact the home contact person and/or others, they may need a credit/debit card or coins).
- Directions to be prepared to give their names, phone number and exact location of where they are calling from to the person receiving the call. Tell them to check the phone's capacity to receive calls and if it will, direct them to ask the rescue coordinator taking the call if they need them to stay by the phone in case the rescuers need to call back for more information.
- WRITTEN information regarding the casualty(ies)' condition (e.g., copy of the Casualty Report or summary), details of the pick-up point (e.g., terrain features, markers, ground surface to expect), specific information regarding what is needed (e.g., how many passengers will need to be carried), and the back-up plan if external rescue has not arrived by a set time.
- Direction regarding where the runners are going to meet up with the rest of the group. Direct them not to speak to anyone regarding the situation except for the rescue service they contact and the sponsoring organization contact(s) they are to call.
- WRITTEN information needed to notify everyone who needs to know of the incident; e.g., home contact person, principal or designate's contact name and number, casualty's emergency contact (may be called by principal or designate). Information given the principal or designate, or home contact person should include: the nature, date and time of incident; location of incident; names of casualty(ies) and outlines of injuries/illness; names of others involved so that parents/guardians can be reassured they are safe; action taken so far; action yet to be taken and by whom.

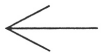
If a helicopter rescue or Medevac is expected, instruct the group regarding safety near helicopters prior to its landing; e.g., stay well back during landing until directed by the pilot to approach, approach from downhill vs. uphill, stay low on approach, and hold onto loose objects. Follow the pilot's directions once on board.

It may be necessary to move the casualty a short distance to meet the rescue personnel. If so, leave plenty of time and be prepared to stay there awhile in case the rescuers are delayed. Attach a copy of the *Casualty Report* to the casualty before transport.

Ground to Air Signaling Systems

In addition to reducing the likely need to send runners, the presence of external communications devices proves valuable in minimizing the time and effort needed to communicate with an aircraft. If, for some reason, audio contact cannot be secured with search and rescue authorities, it may be necessary to create one or more signals on the ground that will be visible from the air. A smoky signal fire can bring help to the site quickly. A signal mirror works well in bright sunlight and signal flares work well in cloudy conditions (so try to bring both).

Communicating more specifically with people in an aircraft may require the use of ground-to-air communications. These symbols may be stamped out in the snow or sand or constructed with branches or stones. Always, BIGGER is better. The common symbols that may be needed include:

	REQUIRE ASSISTANCE		PROBABLY SAFE TO LAND HERE
	REQUIRE MEDICAL ASSISTANCE		NO
	REQUIRE FOOD AND WATER		YES
	PROCEEDING IN THIS DIRECTION		ALL IS WELL

Handling a Poison Emergency

If a student gets into a harmful substance (e.g., prescription or non-prescription medications, or other harmful substances) stay calm and act quickly.

Swallowed Poison

- If the casualty is unconscious, not breathing or having difficulty breathing, having convulsions or seizures, call EMS immediately and initiate CPR.
- If a child is found with an open or empty container of a non-food item, take the container as it may assist EMS/medical staff determining the source of the reaction.
- Do not make the child vomit as that may cause further damage.
- If the child does not have these symptoms call the Poison Centre. They may want to know:
    - your name and phone number,
    - the child's name, age and weight,
    - any medical conditions the child has,
    - any medicine the child is taking,
    - the name of the item the child swallowed; read it from the container and spell it, and
    - the time the child swallowed the item, if known (or when the child was found, and the approximate amount the child swallowed).

Poison on the Skin

If someone spills a chemical on his or her body:

- Rinse the skin with cold to room temperature water for a least 15 minutes;
- Remove any affected clothing, and
- Call ems or the poison centre.

Poison in the Eye

If a person gets a poison in his or her eye:

- Flush the individual's eye by pouring a steady stream of cold to room temperature water toward the inner corner and continue flushing the eye for 15 minutes; and

- Call ems or the poison centre.

To avoid a poison emergency, it is best to store medicines, household products and other toxic items in their original containers, out of reach of children.

Emotional Crisis

Youths and others are not immune to having emotional crises in the backcountry. In fact, sometimes the reality of the environment and group travel context will raise issues in the individual that surface in anti-social behaviour. Recognizing that the teacher/leader is not a trained psychologist, the priorities are to protect the individual and group from harm and to help the individual regain control. Considerations and steps involved include the following:

- Determine that the student is in crises (e.g., emotional turmoil where the individual lacks the personal capacity to cope without some help).
- Identify people in the group who can assist, either with the person in crisis and/or with managing the rest of the group while you deal with the individual.
- Approach in a caring manner, establish rapport (a positive, trusting relationship with the person in crisis), and isolate from the group.
- Allow the individual the opportunity to express/vent their emotions. Listen carefully and avoid minimizing or reframing the individual's concerns.
- Help the individual identify and discuss the precipitating event(s) that upset them.
- Help the individual plan a strategy for coping until they get home. Help the individual regain composure and empower them to help themselves (e.g., set clear limits, discuss inappropriate behaviour, allow simple choices, enforce consequences for inappropriate behaviour).
- Diffuse the situation with the group by discussing what happened, why and coming to a resolution that allows ongoing group functioning.
- If the individual's behaviour is seriously disruptive or violent, the group's safety is paramount. Secure medical advice and/or arrange an evacuation of the person in crisis by whatever means is most appropriate and expedient.

Fatality

In spite of everyone's best efforts, a tragedy may occur, and a death may result. Priorities will focus on comforting and supporting others present (ensuring they are safe), treating the deceased with dignity, communicating with the school/school authority, and recording the circumstances. There are several things to consider in this event, including the following:

- Identify people in the group who can assist in managing the situation. Have one move the rest of the group to a safe location to minimize emotional trauma to them. Ensure they are observed and monitored for signs of shock.
- In dealing with the casualty, first determine if the person is really deceased. If far from medical help, the chance of resuscitating someone whose vital functions have ceased are slim. However, there is a reasonable chance of saving a seemingly dead casualty of drowning, electric shock (e.g., lightning), choking, drug intoxication or diabetic reaction. In these cases, continue to attempt resuscitation until certain they are having no effect or risking exhaustion.
- With the exception of the above situations, you may reasonably suspect death if:
    - there is no response to any pain stimulus;
    - there is no breathing or heart beat detectable;

    - the casualty's pupils are mid-sized or large and do not change size when exposed to light/dark;
    - the casualty does not blink when the surface of an eye is touched with a piece of tissue;
    - the body is cool (even in a warm environment), stiff (rigor mortis); and
    - blood is sinking into the lowest parts of the body (leaving a bruised appearance).
- If the circumstances of death are unknown or homicide is possible, confirm the death while remaining careful not to disturb anything more than necessary. Leave the body as it was found; rope off the area for 30 meters around and protect it; notify the police. Record, in detail, what you have seen and done and cooperate with the authorities in every manner possible upon their arrival.
- If the death has occurred from observed trauma or illness:
    - treat the body and all observers with dignity and sympathy;
    - close the eyelids and straighten the body for transportation before it stiffens;
    - cover the body and protect it from animal disturbance;
    - notify medical or police authorities;
    - record your observations, including the time they were made; and
    - identify the body with name, next of kin, and the time and date you first examined it.
- When calling police or authorities, avoid using the deceased's name over the phone. Avoid talking to the media.
- Ensure students do not use their own cell phones to call or text message notes or photos they take to family, friends, media, etc. This will require a 'no cell phones or other external communication devices by students' policy is in place, understood and accepted. Or a policy that the students accept that these devices may be brought, but must all be relinquished upon request without sending out any messages or images, no questions asked (harder to control, likely to get more resistance from students because they are upset and want to communicate with home, and some may have already sent damaging material before the devices are collected). Students with phones or tablets can make it almost impossible to manage the information flow out so parents/guardians and the media hear about the incident from school sources first.
- If sending runners for help, give them explicit instructions not to discuss the incident with anyone except the police and the principal or designate.
- Get word to the principal or designate, including all relevant details of the incident.

Incident Debriefing

Following a serious injury, illness or death, it is important to provide an opportunity for the remaining group members to discuss the incident and begin moving to closure. This should occur within 24 hours, either in the field or after coming out. The purpose is to help ensure, in both the short and longer term, that none in the group have been dangerously traumatized. Most boards and school authorities will have access to professional psychologists and grief counsellors to conduct debriefings and support those affected by a fatality or other serious incident, once everyone has been evacuated.

Any on-site debriefing a teacher/leader offers in this situation does NOT include a critique of performance or effort to identify causal factors. Rather, the objectives and process are focused solely on providing a forum to discuss the impact of the incident, allowing group members to share and validate their experiences, emotions and thoughts. This facilitates an opportunity for the leader to gauge the well-being of the students. A potential process could include the following process.

- After attending to their physical needs for warmth, food and drink, gather the group in a quiet place.

- Set a tone of support and clarify the purpose of the debriefing.
- Begin by having each group member talk about his or her experience of the incident (were they present or not and what were they doing at the time). This helps fill gaps in the story and serves to bring a sense of closure to the incident.
- Next, have each person share their first thoughts after the incident was resolved (i.e., after the adrenaline stopped flowing). This often provides clues regarding the emotional and physical impact of the incident.
- End with a brief talk about incident stress and the physical and emotional signs and symptoms that can occur (e.g., anxiety, fear, fatigue, sleep disturbances, change in appetite, irritability, memory lapses, indecision). Let them know that these reactions are perfectly normal and not to worry if they occur. Offer to help them secure additional support if they feel they need it.

Other Short-Term Follow-up Activities and Considerations

Additional considerations after a serious injury, illness or death occurs includes the following:

- Lead teacher or designate to write down accurately and as soon as possible, all relevant facts and witness details and preserve any vital evidence; keep a written account of all events, times and contacts after the incident.
- Secure written witness statements as soon as is practicable.
- Complete an appropriate incident report form.
- The lead teacher and principal or designate should discuss and plan for follow-up trauma support for students, staff, volunteers and families (if and as appropriate).
- Assess the situation and determine if the trip will continue or not (this may occur in dialogue with the principal or designate, along with discussion of whether additional supervision is needed at the site).
- The principal or designate will typically notify and keep the parents/guardians and family members informed of the evolving situation (work with the police re: notification of family following a fatality).
- The principal or designate will contact the district superintendent and/or other board executive as per board policy).
- Staff should know the types and limits of information they may share with the family, the public, and the media. Staff, volunteers and students should avoid speaking with the media; refer media inquiries to a designated board member or media contact.
- Do not discuss legal liability or fault with other parties or offer to pay an injured person’s expenses.

Off-site Incident Report Forms

Such forms will be employed to report medically treated injuries and accidents, potentially serious intentional injuries (inflicted by self or other), and incidents (e.g., student(s) lost or stranded for more than 30 minutes, major equipment problems, significant near misses). Complete and submit the appropriate form(s) as required to the Principal, district office and School Protection Program. Retain copies of related documents and co-operate with any post-incident investigation.