Jon Francis Foundation

EDUCATE / ADVOCATE / EMPOWER / GUIDE

Outdoor Health + Safety Handbook

2nd Edition

Be Safe, Be Smart and Be In Charge of Your Destiny

“It’s not what we gather, but rather what we scatter that defines our life.”

– Jon Francis

The Jon Francis Foundation is the community’s most knowledgeable source for outdoor health and safety education. This important document was made possible by generous grants from the following sponsors:

The Kitchings Family Foundation

The Kitchings Family Foundation was established in 1961 to support charitable organizations that benefit the public welfare.

Lakeview Health Foundation

The Lakeview Health Foundation is committed to being the eyes that see and the ears that hear the health and wellness needs of the community.

Joe’s Sporting Goods is committed to staying active within our community by participating, organizing, and donating our time and efforts to a wide variety of events and organizations.

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In this Guide

+ The health benefits of outdoor activities
+ Alone or with others, learn how to enjoy the beautiful and inspiring outdoors safely
+ Outdoor safety and survival planning - “Never Go Unprepared or Unaware”
+ Increase your knowledge, skills, problem solving and empowerment
+ Prevent backcountry loss, accidents and injuries
+ Venture into and enjoy the wilderness with your family and friends

Wilderness Safety Video

The Jon Francis Foundation Wilderness Safety Video contains important and potentially life-saving information, created to keep you safe in the outdoors while you enjoy the beauty and benefits of nature.

Watch the video on our website
www.jonfrancisfoundation.org/prevention

Introduction

Greetings and welcome to Jon Francis Foundation Wilderness Health and Safety Education Handbook.

Remember your first outdoor adventure — camping, canoeing, hiking, or fishing — the exhilarating feeling of connecting with nature? As you know, there are thousands of people who enjoy the outdoors — from "cabin country" and state and national parks to solo hikes in remote backcountry areas.

Most will return safely and carry fond memories. And most will receive both mental and physical benefits. Unfortunately, some will experience a mishap, an accident, or possibly a life-threatening situation. In addition, an astounding 2,300 Americans are reported missing every day, including both adults and children.

Jon Francis

The Jon Francis Foundation (JFF) was created after a life-changing, personal tragedy in the wilderness. The loss of Jon Francis deeply affected Jon's family, friends and many communities.

Jon Francis was smart, young and strong. He was a gifted and ultra-fit athlete. A long distance runner who earned all-state, all American and voted a High School National Champion.

He was also an experienced wilderness camper, hiker and mountain climber.

And Jon was my son. Raised in Minnesota, Jon moved out west to Utah and Idaho where he served as a youth minister and a bible camp counselor.

And he continued and deepened his love affair with nature – God's creation.

At only 24 years old, Jon died in a mountain climbing accident while descending from the summit of The Grand Mogul, in the Sawtooth Mountains in Central Idaho.

Searching for Jon

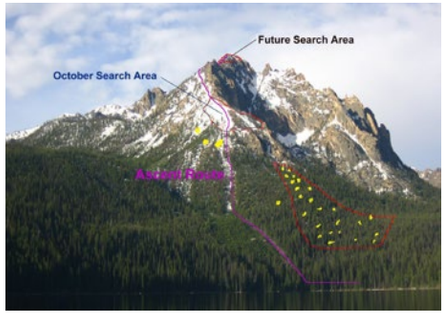
The search to find Jon's remains and bring him home took us over a year.

We desperately needed to resolve our unresolved loss and to understand what led to his disappearance and tragic death. Why did an intelligent, strong, and experienced young man die in the wilderness? What happened?

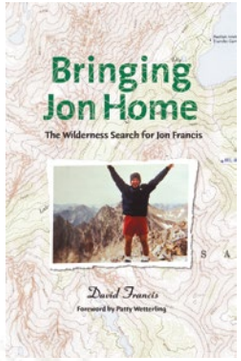
The "accident reconstruction", as our Search Manager called it, was painful but necessary. Most accidents are not an Act of God. Most accidents happen because people make mistakes.

You know the reasons:

- Errors in judgment
- Risk taking
- Lack of knowledge
- Inadequate preparation
- Overconfidence
- Impatience
- Impaired judgment



We diligently documented the search and our lessons learned. This would become Jon's National Award Winning Memoir: *Bringing Jon Home - The Wilderness Search for Jon Francis*.



To honor Jon's memory and to bring some good from his loss, we created the Jon Francis Foundation.

One of our top missions is PREVENTION.

We pass on our hard-earned knowledge to others to prevent injury, loss and death in the wilderness.

Since 2007, we have spoken – live – to over 5,000 people about wilderness safety. For many years we held a full day, fun, backcountry safety camp called Camp Jon.

We are now investing our time and energy into a video in the hope that we can reach many more thousands of adults and children and help keep you safe in the backcountry. What follows is basic but extremely valuable information that will give you the knowledge and preparation necessary to go out, enjoy the beauty and benefits of the wilderness, and return safely.

Getting lost or injured will ruin your trip. Not returning will cause others pain and unnecessary suffering.

Let's get started.

David Francis

Executive Director
Jon Francis Foundation

The Jon Francis Foundation is dedicated to saving lives through wilderness health and safety education, empowering families who have suffered the loss of an adult loved one in the wilderness and advocating for legal protection for missing adults.

The Jon Francis Foundation is a Minnesota nonprofit corporation and an IRS 501(C) (3) charity. Our EIN is 20-8188863. Your gift is tax deductible and your support is greatly appreciated.

Our Mission: Promote Health, Wellness, Enjoyment and Safety

Outdoor, backcountry and wilderness activities greatly promote health and well-being. There are countless positive benefits to experiencing the outdoors.

Outdoor Activities Promote Well-Being

People engaging in physical activities outdoors experience mental and emotional revitalization with reduced feelings of tension, confusion, anger and depression. Studies involving outdoor-located activities correlated to improvements in mental well-being: compared with exercising indoors, exercising in natural environments was associated with greater feelings of revitalization, increased energy and positive engagement, together with decreases in tension, confusion, anger and depression. Spending more time in the natural environment fights to counteract the negative outcomes of modern living, such as obesity and depression.

Outdoor Recreation and Children's Health

Children who spend time outdoors are healthier, overall, than their indoor counterparts. Two health consequences of insufficient physical activity are obesity and Attention Deficit Hyperactivity Disorder (ADHD); another childhood phenomenon that has broad implications for wellness has been called Nature Deficit Disorder.

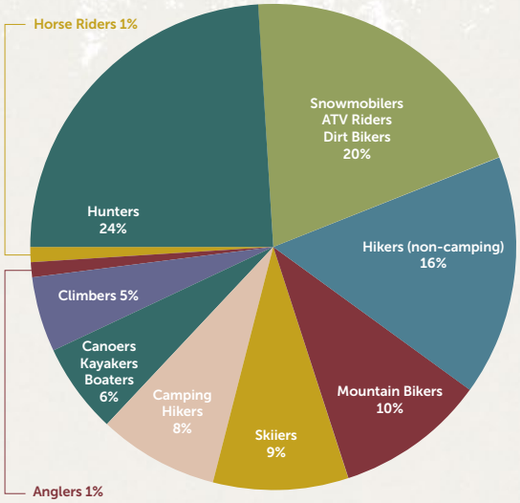
Family and individual pursuits in the backcountry are incredibly helpful to improve ones health and quality of life. Family or group time in the outdoors should be enjoyable, bonding and memorable experiences. Unfortunately, however, there are also some risks and hazards.

Many people, far too many, get, injured and sometime die in the wilderness each year. Through educational materials and training, we aim to ensure that anyone can enjoy the benefits of time spent outdoors while maintaining health and safety.

Who Goes Missing or Lost in the Wilderness?

Most people believe that only high adventurers like alpine mountain climbers and solo trekkers get injured or lost in the wilderness. Some do of course.

However, the majority of people who suffer injuries or go missing in the wilderness are our neighbors, friends and family members in our community. Note that the majority (79%) of the injured and missing are hunters, people on motorized vehicles, bikers, hikers and skiers.



The Jon Francis Foundation Backcountry Safety and Survival Essentials

This is a long document. However, it is worth every word. It could save your life. Read on.

The Jon Francis Foundation is dedicated to saving lives through wilderness safety education. Much of the following highly valuable information is provided with permission from the Mountain Rescue Association in their "General Backcountry Safety" manual, prepared by Charley Shimanski, MRA Education Director.

The first and most obvious rule of safe backcountry use is to carry equipment that might become necessary in emergencies. Every backcountry user, even on seemingly insignificant day hikes, should carry the most basic equipment; commonly referred to as The "Ten Essentials." The key word is "essentials." The survival equipment, clothing and other resources you carry will increase your chances of surviving in an emergency and (increases) your chances of being found if lost in the wilderness.

1. Navigational aids

Topographic map and **magnetic compass**: Too often, backcountry users venture deep into the backcountry without a map and compass. The fact that they are able to safely venture back out is usually pure dumb luck. With a map and compass, it is much easier to identify your location and direction of travel. This is especially important in the event that you become lost.

Consider investing in a **Global Positioning System (GPS)** as a back up to your map and compass. Spend the time to learn how to use your GPS correctly.

2. Flashlight (with extra batteries and bulb)

How far do you suppose you could safely travel at night in the backcountry without a flashlight? Could you signal others, if you saw a campsite far away? A flashlight makes travel at night possible and aids in signaling when lost.

3. Extra clothing (including mittens, hat, jacket and rain gear)

Hypothermia is the most common killer of backcountry users. Inability to maintain body heat can quickly rob an unsuspecting victim of all energy and common sense. Since severe weather may present itself very quickly in the backcountry, extra clothing should be carried to help maintain body heat.

4. Sunglasses

Especially in the winter, ultraviolet glare from the sun can cause blindness. Worst of all, the backcountry user may not realize this is happening until it is too late. A good pair of sunglasses, designed to limit ultraviolet light, will eliminate this risk.

5. Extra food and water

These items will maintain energy levels in the case of an emergency and help maintain body temperature in cold weather. While you can survive three days without water and three weeks without food, your energy levels will be seriously depleted without these.

6. Waterproof matches (in a waterproof container)

Waterproof matches, available from most backcountry supply stores, are capable of igniting in high winds and/or blinding rain. Building a fire may be impossible without these. Fires are critical since they not only provide heat, but also make the job of search and rescue teams easier by providing a visible signal.

7. Candle/fire starter

A candle burns much longer than does a match. This is helpful when trying to start a fire, especially if your firewood is wet.

8. Pocket knife

There are a multitude of applications for a pocketknife in emergencies. The common Swiss Army Knife is so-called because it is standard issue for the Swiss Army, which has devised 246 uses for their standard 7-instrument knife.

9. First aid kit

Proper first aid care is difficult, if not impossible, without a good first aid kit. Backcountry shops carry several brands of small, lightweight first aid kits including small first-aid manuals.

10. Space blanket (or two large heavy-duty trash bags)

These items can help provide shelter in an emergency and can be used as a raincoat or a windbreak. The additional warmth they provide far outweighs their minimal weight.

11. Signaling and communications devices

A whistle allows a lost person to signal for help and provides a clue to searchers who are within hearing distance.
A reflective mirror helps the lost person to signal to search aircraft, helicopters and searchers for help.
A two-way radio aids communications between team members and with searchers.
A cell phone: many wilderness and mountainous areas now have cell phone service. Take advantage of the coverage by carrying your cell phone. But don't rely on it! **A Personal Locator Beacon (PLB)** might be useful in an emergency. Consider learning about and making an investment in this new technology. They are a great gift for your friend or loved one who is involved in wilderness activities. There is documentation that PLBs have saved lives.

JFF recommends and can train students on Garmin's inReach Satellite Communications Device "inReach satellite communicators allow you to stay safe and connected anywhere in the world. From outdoor enthusiasts and boaters to hunters and recreational pilots, inReach allows you to send and receive messages, trigger an interactive SOS, track and share your trip anywhere in the world. Give your friends and family peace of mind knowing they can contact you no matter where the adventure takes you."

12. Leave a trace (please)

Plan your trip and follow the plan. Take the time to research safe routes and then write a short note with your trip plan and leave it with someone. Do not leave your friends, loved ones and searchers to guess about your destination, route of travel and your plan to return. This information can be vitally important in a search and rescue operation.

Season-specific Gear

This list of "Essentials" assumes your trip is a summer excursion. At any other time of the year, be sure to bring more of the right kind of clothes. When choosing your equipment, remember that the body's ability to maintain its core temperature is critical to your survival in the wilderness.

Go Out Prepared

A large percentage of people could have survived had they carried and used the essentials. When you venture into the backcountry, you are often many miles away from civilization. Emergencies often present themselves at times when qualified help is many hours away. This simple fact underscores the need to carry emergency equipment.

Clothing

The Backcountry Is No Place for Calvin Klein

Since hypothermia is the most common cause of accidental death in the backcountry, proper clothing is essential to every backcountry user from novice to professional. Hypothermia results when the body loses more heat than it can generate. Effective dressing is the simplest way to avoid hypothermia in the diverse weather of the backcountry.

Effective dressing means more than simply owning the most expensive parka and the fanciest rain gear. World-class mountaineers have long known the value of specialized techniques in mountaineering dress.

LAYERING

At any time of the year, the most effective way to dress is by "layering". This method has been proven, not only on Mount Everest but in the cold northern regions of Minnesota as well. Layering simply means wearing one thin layer of clothing over another over another. Many experienced winter mountaineers do not carry a heavy down parka into the backcountry and for good reason. If they become warm underneath a down parka, removing the parka leaves them extremely exposed. Rather, they will carry numerous lightweight layers.

The advantage of layering is that one can add and remove protection from the elements in small increments, thus balancing heat generation with heat loss. In addition, layering traps dead air for additional weight-free insulation.

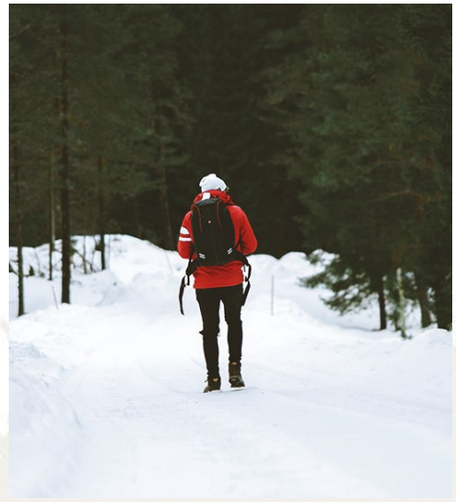
COMPOSITION OF LAYERS

The body is a source of heat, which you want to retain within your clothing. It is also a source of moisture, in the form of perspiration that, in many situations, must be kept away from the skin due to the cooling effect of evaporation. For this reason, the layers of clothing near your body should be thin and porous to hold in heat and wick away perspiration.

Middle layers should be thicker in insulating quality to hold in more heat, yet be able to dissipate the moisture further away from the body. Finally, the outer layers should be thick enough to prevent heat loss and still protect the inner layers from the external elements.

The most effective outer layer is waterproof, yet allows water vapor (perspiration) to escape. Most conventional rain-gear does not allow water vapor to breathe, thus the body's perspiration is held within the layers of clothing, increasing evaporative heat loss and saturating clothes. The key to mastering the layering system is to add or remove layers of clothing at just the right times.

Remove a layer before you begin sweating; add a layer before you get cold. By doing so, you can balance the amount of your body's heat generation with heat loss. Conserve your sweat, not your water!



EXTRA CLOTHING

In discussing the "ten essentials," we have suggested carrying additional clothes. This simple suggestion should not be overlooked, since a warm, balmy morning at the trailhead often turns into a cool, windy chill on the summit.

Five Methods of Heat Loss

Just as the body constantly produces heat, it constantly loses it. There is a simple reason why we wear clothes, besides to preserve our own simple modesty. Since human beings are warm blooded, we must rely on our own bodies for internal heat. Most warm-blooded creatures are protected from the elements by a coat of fur.

This fur helps preserve warmth by trapping air and providing a layer of insulation. Humans, on the other hand, have no such coat of fur. This means, quite simply, that we must maintain a suitable artificial environment close to our skin that allows for the retention of the body heat that we create internally.

Five Ways We Lose Body Heat

There are five mechanisms through which body heat may be lost: conduction, convection, evaporation, radiation and respiration.

CONDUCTION

Conduction is the transfer of heat through direct contact. If you were to sit on a slab of ice, your body heat would move through your clothes to the ice below.

Wet clothing robs your body of heat through conduction as well. In fact, wet clothing will do so MANY times faster than dry clothing. This is why we should remove a layer of clothing before we begin sweating.

CONVECTION

Convection is the transfer of heat through the movement of air. The body tries to create its own insulating layer. This means that the body warms the air close to the skin. If this thin layer of warm air were to remain intact, our bodies would maintain their own insulating layer and clothes would be unnecessary.

Unfortunately, wind brushes this warm air aside with little effort. The body must then generate another warm layer of air. In even moderate winds, the body does not have a chance to keep up with this loss of heat.

EVAPORATION

Evaporation occurs when we sweat and the tiny droplets of liquid are converted into vapor. This conversion from liquid to vapor results in a net heat loss. That is, the surface on which evaporation occurs will lose heat (which explains why you feel a bit cold when you step out of the shower, before drying off).

The body sweats because its internal temperature is too high and it wants to cool down. Sweating will occur even in winter, if the backcountry user does a poor job maintaining ventilation through clothing. When the clothes become wet with sweat, further heat is lost through conduction.

RADIATION

Radiation is the movement of rays of heat from a warm object to a colder one. At temperatures as warm as 40 degrees Fahrenheit, fully one-half of the body's heat can be lost by radiation from an uncovered head, since blood vessels in the head lie close to the skin. Hats and balaclavas (facemasks) are essential to prevent this loss of body heat.

We may burn over 50% more energy in winter than summer

RESPIRATION

We lose our body heat naturally, simply through respiration. Furthermore, we may burn over 50% more energy in winter than we would in summer. This is partially explained by the fact that we are breathing extremely cold air, warming it and saturating it with water vapor. As much as one-third of our body-heat loss can occur through breathing. Breathing through a scarf or balaclava helps by "pre-heating" the inspired air.

Map and Compass "Did I Bring The WHAT?"

All experienced backcountry users know how to use a map and compass, right? Wrong! Some do. Most do not. In fact, the number of search subjects found without either is startling. The invention of the Global Positioning System (GPS) has actually made matters worse in that some backcountry users think a GPS unit replaces the need for a map and/ or compass.

Map and compass work is important for reasons beyond safety. In addition to promoting your safe and efficient travel through the wilderness, experienced topographic map-readers can determine the most picturesque backcountry campsite while sitting at their kitchen table, simply by studying the topography around their proposed sites.

Furthermore, accurate map and compass work can reduce the amount of time spent looking for campsites or parking lots. Students of this program should follow up with a local "Map and Compass" course. These are generally available through local outfitters. A short course in map and compass is contained in the video.

Thank you to our sponsor Joe's Sporting Goods

The Right Gear

Going into the backcountry unprepared is risky - especially if you go out without the proper equipment to keep you comfortable and survivable. Over the years, I have accumulated a vast collection of wilderness camping gear. My collecting began when we went family camping, wilderness trekking in the Boundary Waters Canoe Wilderness in northern Minnesota and then in my yearlong mountain search for my son Jon.

I have hiked and camped with children, friends, family, experts, search and rescue professionals, park rangers and mountaineers. Each time my collection of outdoor gear got better.

A generous sponsor of the Jon Francis Foundation and Camp Jon is Joe's Sporting Goods (joessportinggoods.com) in St. Paul, Minnesota. Joe's is a family owned business started in the 1930s, and staffed with experts for every type of outdoor pursuit (hunting, fishing, skiing, hiking, camping, etc.)

I have lifted from Joe's online catalogue a list of backcountry gear that should be in everyone's possession if you intend to go out into the backcountry. Of course, this is not all that is available or recommended.

Consider this a starter kit.

Gear Starter Kit

SHELTER

Tent

Mosquito Net

Canoe/
Camp Chair

WARMTH AND COMFORT

Sleeping Bag

Sleeping Pad

Emergency
(Space) Blanket

CLOTHING

Base Layers
Top and Bottom

Pants

Hoodie

Outer
Waterproof Shell

Sun Hat

Warm Hat

Gloves

Polarized
Sunglasses

Sun and Skin
Protection

First Aid Kit

Waterproof
Hiking Boots

Shoes

Socks

CAMPING AND HIKING ESSENTIAL EQUIPMENT

Backpack

Water Filter

Hydration Pack

Tools

Cookware

Food Packs

Insect Repellent

Camp Stove
and Fuel

Matches/Container

Headlamp

Head Net

Waterproof
Flashlight

Map and
Compass

Garmin inReach

TWELVE ESSENTIAL 'SYSTEMS'

1. Navigation (map and compass)
2. Sun protection (sunglasses and sunscreen)
3. Insulation (extra clothing, torso & head)
4. Illumination (headlamp/flashlight, & extra batteries)
5. First-aid supplies
6. Fire (waterproof matches/lighter/starter)
7. Repair kit and tools (multi-knife, multi-tool, etc.)
8. Hydration (extra water, or purification means)
9. Nutrition (extra food, condensed/high calorie/high energy)
10. Emergency shelter (plastic tube tent/garbage bag)
11. An electronic navigation (GPS) Device
12. A signaling device

Backcountry Preparedness/ Accident Avoidance

Planning Your Trip

Often, recreationalists venture into the backcountry with little or no pre-planning. This occasionally results in catastrophe as they do little to prepare for the severe conditions that they may encounter. With even a seemingly insignificant day-hike, the time to plan a trip is before leaving home. There are numerous things that should be done before starting out on your trip.

LET OTHERS KNOW

One important rule too often forgotten is to let others know exactly where you are going, with whom, and when you can be expected back. I hate to sound maternal, but search and rescue teams often spend hours driving around on back roads looking for a subject's vehicle before they know where to enter the field to begin a search.

By letting someone know EXACTLY where you intend to go, when you expect to return and where your vehicle will be parked, you can eliminate the possibility of searchers having no idea of where to look. Should your plans change in route to your destination, stop and notify that person of your new itinerary.

In addition, if you leave pertinent information on the dash of your car (e.g. name and phone number of your contact in town, location of travel/ campsite and so on) search teams will have a very timely idea of your plans. Otherwise, search teams can be of little assistance when all that is known is that you "went camping somewhere in the Gore Range."

Whenever possible, utilize trailhead and summit check-in logs. These generally exist at most popular National Forest trailheads and atop many popular mountain summits.

Utilize trailhead and summit check-in logs when possible

PLAN YOUR ROUTE BEFORE

Sir Edmund Hillary became the first man to stand atop Mt. Everest in 1953 (at 29,035 ft., the highest mountain in the world); many climbers had tried using various routes. A few of these mountaineers died trying. To this day, the South Col route on Mt. Everest remains the prominent Everest route.

Careful planning based on earlier attempts combined with detailed study of the risks of various routes led the 1953 British Everest Expedition to choose the now famous South Col route. It is not by accident that this route is so popular. Repeatedly, it has been proven the safest and easiest route.

Likewise, popular routes to the summits of mountains in the United States are based on similar exhausting study by early mountaineers. Detailed in mountaineering books, as well as on many topographical and trail maps, these trails should be closely followed. Any deviation by inexperienced mountaineers can lead to disaster.

In addition, backcountry users should stay on maintained trails as part of the Leave No Trace ethic of mountaineering. Backcountry preparedness begins with prior knowledge of the anticipated route...types of terrain, technical skills needed, length of the route and amount of available shelter along the trail.

Know Your Physical Limitations

Disorientation results when the body is cold, oxygen deprived and/or fatigued. Know the physical limitations of each member of your team, especially if any member has a predisposing medical condition that could possibly require immediate care while on the trip (e.g. diabetics and persons with heart conditions).

Among your considerations should be the following: Altitude acclimatization of each party member. A mountain resident at 12,000 feet is accustomed to 68% of the oxygen to which someone living at sea level is accustomed. Since air density decreases as altitude increases, more work is required to breathe at higher elevations. The intercostal muscles surrounding the lungs must work harder when the air density is lower. High elevation residents have already strengthened these muscles and changed their blood chemistry to accommodate inspiring less oxygen. Mountaineers who live at sea level would therefore experience greater difficulty catching their breath when climbing to 14,000 feet than would the resident of the mountains, even if the flatlander is in better physical condition.

Additional problems can develop as well, including Acute Mountain Sickness, Pulmonary Edema and Cerebral Edema. These complications are serious and can result in coma and death, and at elevations far lower than 14,000 feet.

Based on these facts, plan the difficulty of your route based on the knowledge that each team member may be accustomed to a different concentration of oxygen. Know your team members' comfort level near steep ridges. Although most backcountry trails are not technically difficult, some may involve hiking moderately close to a steep ridge with an imposing severe drop.

This could create anxiety on the part of recreationalists who are not accustomed to such relatively unprotected slopes, even if the trail is five feet wide and perfectly flat. In addition, the lack of a flat horizon on high peaks may make balance more difficult for those who are not accustomed to such terrain. This can lead to increased anxiety, panic and perhaps nausea on the part of inexperienced backcountry users. Imagine yourself standing on a five-foot wide ledge at the top of a 30-story building. Scary, isn't it, even if the ledge is five feet wide?

The team's most experienced backcountry user should stop and ask each of the team members whether they feel comfortable with the exposure when encountering severe pitches. If some team members do not feel comfortable, they must be given the option of turning back. If team members do turn back, they should always travel in groups of two or more and the team leader must be certain that they are equipped with a map, compass and survival equipment. This reduces the risk of a lone hiker becoming disoriented and lost.

Maintain a Chemical-free Body

Not surprisingly, many rescues are performed each year on victims who have altered their body chemistry with alcohol and/or other drugs. If these substances are an active part of your life, remain in the safety of less severe

terrain. If you think going UP was hard...

Many inexperienced backcountry users become intrigued by small, seemingly simple pitches of technical rock and decide to challenge themselves by attempting to climb them without technical equipment. After all, if the first ten feet was THAT easy. The startling surprise comes when they reach a point at which they cannot continue up and realize that descending the same pitch will be much more difficult than the ascent they just completed.

The reason is simple. In ascending a pitch, the foot placements are easily visible somewhere between the feet and waist level and one never HAS to look down. In descending, the foot placements are now below the feet, perhaps 6-8 feet below the eyes and are not easily discernable. What makes this realization more alarming is that in order to find those footholds, the climber must look down more often.

At this point the inexperienced technical climber, without any fall protection (such as ropes, anchors, and a belayer) is faced with the grim reality that a fall would be very dangerous. Adrenaline now overtakes the body and the leg and arm muscles that are holding the person in place quickly become fatigued as a result.

The moral, based on many seemingly unnecessary rescue missions, is this: Unless you are carrying technical rock hardware and are experienced at technical pitches, stay off them and enjoy a safe hike.

After all, a helicopter ride back to the nearest hospital is not worth the long and painful several hours wait (with broken bones or ruptured internal organs) for the rescue team and helicopter to arrive. Believe me, trauma center helicopters are a lousy way to see the backcountry.

Not so surprisingly, a large percentage of rock climbing accidents occur with novice climbers.

Think Before

"Prepare" is defined in Webster's Dictionary as "to make ready beforehand for some purpose, use or activity." The inclusion of the word "before" in this definition is not by accident. One way of assuring the success of your trip is to remember the "Rule of Befores":

1. Listen to a weather forecast **before** planning a trip
2. Tell people where you are going and when you will be back **before** you leave
3. While on the trail, drink before you get thirsty and eat **before** you get hungry.
4. Add a layer of clothes **before** you get cold; remove a layer of clothes **before** you get hot
5. Make camp **before** you need camp
6. Find protection from foul weather **before** it arrives

By doing these things, you will find yourself always thinking ahead. Think ahead at all times and you will rarely find yourself unprepared. Test your equipment under controlled conditions prior to actual use. Do not put yourself in a position in which you discover that your equipment is inadequate while in the backcountry.

If, for example, you plan to use a three-season sleeping bag in conditions of extreme cold, test the sleeping bag in a safe place, such as your own back yard, in similar weather conditions. This way, if the sleeping bag does not perform as expected, a warm bed offers a safe alternative.

Follow this method with all backcountry equipment to be used.

Test your equipment under controlled conditions prior to first use

Protect Against Giardia

Giardia is a microscopic parasite that exists in water sources nearly everywhere on the planet. It cannot be seen with the naked eye and once ingested, its symptoms read like a "Who's Who" of digestive system ailments: abdominal cramps, diarrhea, and loss of appetite, nausea, flatulence, vomiting, weakness and fever. One's digestive system is never quite the same after a battle with giardia.

The disease begins with fecally contaminated surface water and the parasite thrives in cool, clear water. Elk, deer, beaver, muskrat, dogs and humans are all known carriers, which helps explain why it has overtaken literally every water supply on Earth. Once ingested, the microscopic cysts multiply in the intestines at a phenomenal rate. A victim of giardiasis may excrete billions of the tiny parasites in a single day.

Carriers of the disease may be "asymptomatic;" that is, they show no signs of the disease themselves, but can spread it to less tolerant individuals. Since humans are known carriers, human waste should ALWAYS be disposed away from water sources to reduce possible future contamination of those water supplies.

To reduce the risk of infection, all water to be consumed should be boiled for several minutes (increasing boiling time at altitudes above 10,000 feet). If boiling is impractical, chemical treatments or portable filter systems (available at backcountry outfitters) should be used.

The giardia parasite is so small, it is possible to contract the disease from a toothbrush dipped in a stream or from bottle cap threads. For that reason, you must be meticulous with your water treatment.

All water should be treated or drawn through a water filtering system to protect against Giardia.
Photo: backcountry.com

Though giardiasis may not present itself for five to seven weeks after ingestion of the parasite, it has been known to occur much more quickly. The only treatment in the field for a victim showing signs and symptoms of giardiasis is to quickly transport the individual to a medical facility.

Because of diarrhea and vomiting, hypovolemia (reduced level of body fluids) can be a serious complication, so periodic intake of treated fluids should be encouraged. Sometimes victims of giardiasis may be so incapacitated that they are unable to walk. In this case, a rescue team should be sought to assist in evacuation.

Keep the Team Together at All Times

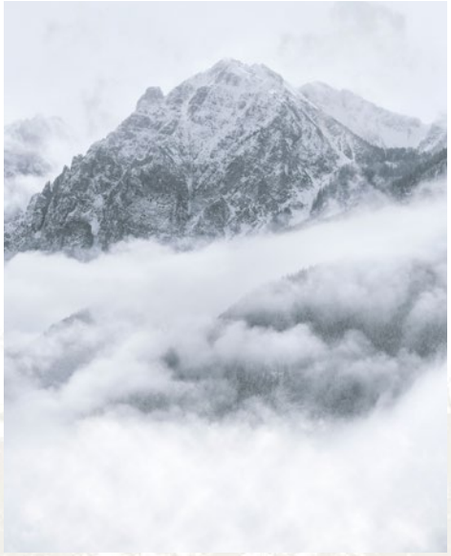
Throughout this program, we refer to every group of backcountry travelers as a "team". The word "team" implies a group of people working together for the benefit of the whole. If you consider yourself part of a team and constantly stay aware of the other team members throughout your trip, especially in cases of extreme weather, accidents can be easily avoided.

As with any team, a "team leader" should be chosen for all backcountry trips. Your team leader must be perceptive of the individual abilities and experience of each team member. This person must know that the only real goal for a backcountry adventure is the safe return of each party member. The team leader need not be the most skilled mountaineer, but rather the most trusted and most respected backcountry user.

Of the hundreds of searches performed in the United States by Mountain Search and Rescue teams each year, most are conducted for subjects who have been separated from a group of people and usually from shelter and survival equipment.

The rule is simple: do not wander away from the team! In Kansas, for example, roads are

easily found just about everywhere. Fly over western Colorado just once and you will realize this is not true of mountainous states. In the words of Dorothy trying to find her way home, "Toto, I don't think we're in Kansas anymore." If team members must separate from the rest of the team, they should always do so in groups of two or more. In addition, they should carry and be skilled in the use of a map and compass. This will reduce the risk of any individual becoming lost. Also, make certain to mark on the map the precise location of the team.



"If You Don't Like the Weather, Wait Ten Minutes"

"Today's forecast calls for clear skies in the morning. Highs will be in the mid to upper-seventies. Increasing clouds with localized thunderstorms by late afternoon in the mountains." God only knows how many hundreds of times we hear this mountain weather forecast in the summer. Day after day, it is the same story. In addition, day after day some percentage of the mountain peaks and valleys experience severe thunderstorms in the late afternoon.

Backcountry weather in specific valleys or ranges is relatively difficult to predict from distant Weather Service offices using even the most modern instruments. It is generally easier for the backcountry traveler to predict the weather from the particular valley.

When hiking in the mountains constantly watch the sky and take note of the size, height, form and movement of clouds. Changes in these characteristics are meaningful. With relative ease, one can predict local storms in the mountains through basic observations. This is important so that your team can be quickly guided off the mountain to a place of safety. In the winter, cyclonic storms usually arrive with substantial warning.

They are not as local and can be more easily predicted by the Weather Services. Still, and particularly because of the time of year, one should always be prepared for the worst possible weather. In winter storms, the imminent dangers of lightning are replaced by frostbite, hypothermia, lack of visibility and the inability to travel as quickly, due to the snow cover.

What to Do if You Get Lost

Imagine... it is a beautiful day. You have taken your camera and headed out for a short hike away from your campsite. The wild flowers are compelling and you wander about aimlessly for a few hours. Two rolls of film later, you begin to head back for camp. Suddenly, nothing looks familiar. You look around for a while, trying to find something, anything, that looks familiar. As dusk approaches, your heart beats faster and you become very anxious. You have nothing but your camera and two spent rolls of film and without a flashlight, it will be impossible to find your way back. Your head sweats and your heart pounds feverishly as you begin to feel the panic associated with being lost.

Discovering you are lost in the backcountry can be a frightening experience. This feeling can be compounded by the five basic fears: that of being alone, darkness, animals, suffering and of course death.

STOP!

The moment you realize that you are lost, the most important thing you can do is: **STOP** (Sit, Think, Observe and Plan).

Do not run off frantically looking for a way out. Rather, stop and assess your situation! Use your head, not your feet. At this point, your brain is your most important piece of survival gear. The first ten minutes of being lost are when most lost persons make their mistakes.

Whatever you do, do not panic. In most situations, you can survive three days or more without water and three weeks without food. Force yourself to breathe deeply and slowly. Rest assured that by remaining calm and relaxed, your chances of survival, which are quite good already, have increased by 50 percent.

Your primary goal now is to stay alive, not to find your way out. Help will be on the way soon after you are reported missing. Sheltering the body and conserving energy is your greatest concern right now.

YELL!

When you first discover that you are lost, stay where you are. Yell or blow a whistle three times to signal to your party or any others within earshot (a whistle will carry farther than your voice and requires less energy). Wait several seconds, then turn 90 degrees and try again. Do so several times in every direction. If you have no whistle, yell "HELP" rather than a friend's name. Doing so will help assure that your distress call is not ignored.

If someone yells back, let him or her come to you. Rock walls and valleys play strange tricks with echoes and you may lose your potential rescuers by attempting to locate them. In addition, your rescuers are most likely a group of people, so they will have a better chance of finding you than vice versa.

If you do hear someone - yell back, no matter how faint his or her call may be, stay put and keep yelling. They may sound far away only because they are facing away from you and have not yet ascertained from where you are yelling. If you are near a loud stream, move away before calling or whistling for help. Be certain to mark your way back to the stream, however, as you may want to follow that stream later if your calls go unanswered.

The same is true for windy areas where a howling gust can be quite loud. Remember, someone may hear your call at times when you cannot hear his or her reply, especially in windy areas. Do not give up yelling or whistling simply because a reply is not heard.

STAY PUT.

When setting up a search, mountain rescue teams follow certain priorities and make certain assumptions about their subjects. These assumptions are based on behavior patterns of lost subjects. An understanding of these assumptions may help guide you to a place that is searched early. The first members of a search party are quickly dispatched to the point at which the subject was last seen (strangely enough, referred to as the "last seen point").

They follow trails and streams near this last seen point, yelling the subject's name and blowing whistles. This simple fact is reason enough to just sit still and wait for rescuers to find you. Unfortunately, few stay put. Less than 30% of lost persons are found within one mile of the last seen point.

Additional rescuers search areas of high probability near the last seen point. Statistics on behavioral patterns of lost hikers have shown that 88% walk downhill when lost, 73% find and follow a trail or path and 82% are found in open areas.

Based on these facts, field teams often search downhill from the last seen point before spreading the search out in other directions.

Air searchers are generally used soon after you are reported missing and weather permits flying. Plan to stay near open areas and be ready with signals.

What if You REALLY Blew it?

In the unfortunate circumstance in which you were hiking alone and forgot to tell anyone where you were going, you would be well advised to try to find your own way out. After all, search teams cannot look for you if nobody knows you are lost or, for that matter, where you went. In this case, consider the following: assuming you are still at the point where you first discovered you were lost and you have tried whistling or yelling numerous times in all directions, look around for any memorable landmarks, which may help you determine the direction in which you were traveling.

Look around for any memorable landmarks, which may help you determine the direction in which you were traveling

Your goal is to SLOWLY retrace your steps. Listed below are some clues to help in this effort:

DETERMINE MAGNETIC ORIENTATION

Do you have a map and compass? If so, try to identify your exact location and the best direction of travel to return to a nearby road or trail. You may recall that some items on the list of ten essentials are a map and compass. Right now that $10-$15 expense looks like a bargain, doesn't it?

If you do not have a compass, there are still several methods you can use to help determine magnetic orientation. The most accurate method can only be done during a sunny day: Place a 3-foot long object (stick, ski pole, etc.) in the ground, upright, in a cleared area. Place a marker in the ground at the end of the stick's shadow line. Wait 15 minutes and place another marker at the end of the shadow line. Repeat this process until you have five markers in the ground.

Now lay another stick alongside the markers. This stick points west in the direction of the first marker, east in the direction of the last marker. Granted, this takes over an hour, but it may be time well spent.

Besides, by the time you have finished, someone may have found you. If so, simply tell them you are studying the effects of solar radiation on vertical sticks! If you do not have a compass and the sun is NOT visible, you may still be able to determine magnetic orientation. Tree bark may be moist on the north side, dry on the south side (determine this by looking at many trees, not just one!).

The limbs of trees may be heavier on the south side as well. Is the direction of shadows any help in determining your magnetic orientation? During midwinter in most United States backcountry, the sun comes up from the east/southeast horizon and takes a more southerly path across the sky before setting in the west/southwest. This means your shadow points to the west-northwest in the early morning, towards the north at noon and towards the east-northeast in the late afternoon and evening.

At the vernal and autumnal equinox (March 21 and September 21) the sun rises due east and sets due west. Is the presence of hills, slopes, peaks or valleys any help in determining your earlier direction of travel? Can you remember what you saw the last time you had a panoramic view before becoming lost?

UTILIZE OTHER CLUES

Can you find your own footprints and backtrack? (Make a footprint and study it.) Do you remember any clouds you faced as you hiked before you became lost? Can you find them again? They may help you determine the direction in which you were traveling (do not use this method if you have been lost for over an hour).

\One of the most successful methods of self-rescue is called the "wagon-wheel" approach. Starting at your present location, follow a given compass bearing for about two hundred steps. If along the way, you find no clues to help you identify your location turn 180 degrees and walk the two hundred steps back to your initial location. Then, take a compass bearing 45 degrees from the first bearing and repeat this process over and over.

Your goal is to always stay as close to your original position as possible. Walking aimlessly may take you further and further from any recognizable landmarks.

Once you have determined that you are completely lost and have no idea of your earlier direction of travel, do whatever possible to find a trail or stream. Keep in mind that if followed downhill, trails and streams generally lead to civilization at some point. If a road is encountered, regardless of its condition, follow it downhill. Even if the road appears to be an abandoned wagon trail, it will likely lead somewhere.

If, for any reason, you do leave a road you encountered, mark the point from which you left the road with sticks, stones, strips of clothing or perhaps a note indicating the date and time and your direction of travel. At some point, a searcher will probably cover that road. Throughout your ordeal, periodically whistle 3 times or yell for help, especially in places where rock walls or hills may help carry the sound.

MAKE A SHELTER

When lost in the backcountry, you must prepare for darkness well in advance of nightfall. If you must spend the night, utilize whatever is available for shelter. When doing so, keep in mind that what is underneath your body is often more important than what is above it. At night, the ground is usually colder than the surrounding air. Shelter yourself from the ground with additional clothes, tree branches, brush, wood or anything that helps trap air.

LEAVE CLUES! CLUES! MANY CLUES!

Throughout your ordeal of being lost, pause every few minutes and contemplate how to make yourself "bigger" by signaling methods and by leaving clues. You can signal your distress in a variety of ways. Stamp SOS in large open areas such as snowfields or grassy meadows (be sure not to spell it backwards or upside-down, as this easily confuses rescuers). Pile downed tree branches in rows or place boughs in tramped snow. Create "arrows" from downed wood to indicate your direction of travel.

Anything unnatural (such as piles of wood or rocks) will act as a clue to searchers. If a helicopter or airplane passes overhead, signal it using the bottom of a can or a mirror.

The truth is that searchers are looking more for clues than for victims. There are always more clues than victims and once clues are found, the size of the search area is reduced. To make the job of searchers easier, leave clues such as clear footprints, arrows drawn with sticks, notes attached to trees or anything you can think of to signal rescuers. If you spent all your time leaving clues and less time trying to hike out (when you probably do not know which way to hike anyway), you will probably decrease your time lost significantly.

Fire Building

Can you build a blazing fire with damp wood and one match?

The ability to build a fire when lost is extremely helpful for reasons beyond the obvious warmth it provides. The light from the fire helps search teams at night when their task is much more difficult. During the day, a smoky fire will attract searchers as well.

The key to fire building is to assume that no matter how many matches you actually have, you will need some later to start another fire. With practice, you can learn the skill of building a roaring fire with ONE match, ONLY

one and ALWAYS one. To do so, follow these simple guidelines:

Always carry wind resistant and waterproof matches (you may recall that one of the "Ten Essentials" is waterproof matches... another cheap investment at this point, isn't it?).

First, collect your firewood and start to build your fire BEFORE darkness and BEFORE you get cold.

CHOOSING A SITE

Choose a site well protected from the wind. Clear the ground down to the soil and dig a small pit. This pit helps protect your fire from wind, aids in positioning the twigs and collects red coals as the fire continues.

Now gather rocks and surround the pit with them. The rocks offer additional wind protection, but more important, they absorb heat from the fire and increase the radiative heat.

COLLECTING WOOD

As you collect wood, keep in mind that no twig is too small when attempting to start a fire. Break the wood down to manageable pieces, some as small as toothpicks. You MUST have very small twigs to start a fire efficiently with only one match. And remember, YOU MUST TRY TO DO THIS WITH ONLY ONE MATCH!

(If small twigs are unavailable, pieces of torn clothing or lint from pockets may be substituted.) Gather enough wood for a long-lasting fire. If the ground is wet, dried pine needles underneath the top layer of needles might be available. If it is raining, look UP for dried firewood.

Most trees have dead lower branches that remain dry during the early stages of a rainfall. Never try to start a fire with fresh, green pine needles. You will simply waste your matches.

Remember; use your matches as if your life depends on them. IT MAY! (A candle, another item of the "Ten Essentials", is extremely useful in starting a fire and conserving matches.) Until you have a large bed of red-hot coals, do not rest secure in the belief that you have built a successful fire. Monitor the fire, blowing on it whenever necessary, adding more twigs and logs and protecting your woodpile (and marshmallows!) from future rain by covering them with branches.

BUILD A VISIBLE FIRE

Since searchers often utilize airplanes and helicopters, you should try to create a visible fire. At night, add as much wood as is reasonably safe to create a big fire. During the day, add items that create smoke. Rubber items work well for this, as do fresh branches of green pine needles.

A smoky fire can be visible for many miles. Practice this skill on your next camping trip, or for that matter in your fireplace at home. This valuable skill may help you avoid a cold, wet evening spent staring at a book of used matches and a lifeless pile of firewood.

Several years ago, two snowmobilers who survived four days in a blizzard with no matches, yet they were found next to a roaring fire. How did they do it? Simply by ingenuity. After gathering firewood, they tore up long strips from the snowmobile manual, dipped them in the gas tank and held them next to the spark plugs as they started the snowmobiles...instant fire!

What to do When a Team Member is Lost

If the team has lost a member of the party, the team must evaluate the need for additional support based on the weather conditions as well as the health and preparedness (e.g. ten essentials) of the lost party. Keep in mind it may be a matter of hours before a search and rescue team can be assembled and dispatched into the field.

Mountain search and rescue teams in the United States are generally volunteer organizations and do not charge for the services they provide. Cost should not be considered when assessing the need for a search party.

If additional support is necessary, be certain to clearly indicate on a topographic map the exact location of the "last seen point" before leaving this location. This is essential. In addition, mark the actual location with a piece of clothing and, if possible, encircle a sample of the victim's footprint with rocks, twigs, rope, etc. Unless the team is quite large, dispatch the ENTIRE remainder of the team to the nearest public road, leaving markers along the way, such as strips of brightly colored clothes or unnaturally placed logs or rocks

These markers will help search teams find the last seen point and may help the lost party find their own way out. Once at the road, send one or two people to find a phone and call the sheriff's office immediately. The rest of the team should remain on the road, near the trailhead(s), in the event that the lost member hikes out. They should stay there until search teams arrive so the search teams can interview them to learn as much as possible about the subject of their search.

Avoiding the Hazards of Nature

Year after year, many unsuspecting backcountry users are injured or killed in accidents that are the direct result of nature-related problems. Lightning and avalanches as well as heat and cold related problems result in many deaths each year. Unfortunately, many of these accidents could have been avoided if the backcountry users had been knowledgeable and prepared.

When Lightning Strikes

Although we hear more on the news about such weather disasters as hurricanes, tornadoes and flash floods, no element of the weather takes more lives each year than lightning. Over one hundred Americans are killed each year by lightning. Of all the weather hazards in the backcountry, this phenomenon is the most significant.

The National Weather Service has estimated that roughly 2,000 thunderstorms are occurring on earth at any given moment, producing 100 lightning strikes per second. Lightning is a very dangerous yet somewhat avoidable hazard of backcountry use. With a small degree of understanding of the electrical energy of a lightning strike, the backcountry user can better reduce the risk of death or injury.

Lightning almost always occurs in conjunction with a thunderstorm. In fact, the frequency of the lightning can usually be determined by the intensity of the thunderstorm. In a well-developed thunderstorm, strong updrafts and downdrafts create an intense electrical field. The upper section of the storm builds up a strong positive charge, while the lower section develops a negative charge.

Whereas the ground is normally negatively charged, the strong negative charge of the storm induces a positive charge on the ground as the storm passes overhead. Electrical current begins to flow up buildings, trees and other tall objects as the opposite charges attract each other. When the difference between the charges is great enough, the insulating atmosphere between the cloud and ground is insufficient and an

electrical connection is made. The result: a lightning strike.

The current in a bolt of lightning averages 30,000 amperes. Normal household current is 20 amperes. An impressive difference, wouldn't you say? Due to this imposing power, the basic dangers of lightning are not only that of being the subject of a direct strike, but of being in the path of ground currents as the electrons flow to the location of a nearby lightning strike.

Second, only to metal objects, the human body is an excellent conductor of electricity - better than natural substances such as rocks, trees and soil (nearly ALL objects are conductors, however, given the extreme amperage found in lightning).

With few exceptions, a direct lightning strike is fatal. Ground currents, or "indirect strikes", can also be fatal (though not always) and require more knowledge to understand avoidance.

Over one hundred Americans are killed each year by lightning

THE LIGHTNING PROCESS

Lightning is usually a ground to cloud process. The cloud induces a charge in the ground that "pulls" the electrons toward the base of the cloud. The base of the cloud is positively charged, which induces a negative charge to be attracted below it. Electrons flow along the ground and discharge upward when the strike occurs.

Lightning is generally pulled from the most conductive object closest to the source cloud. In the plains states, strikes are generally vertical. In mountainous terrain, however, a diagonal or horizontal strike may reach to a nearby peak. The danger of a lightning strike is as follows:

When lightning occurs, the intense electrical charge (100 billion electrons) is drawn quickly from many directions. As it travels across the ground, the charge passes through any conductive object in its path, including a human body. If this happens, both an entry and exit point result somewhere in the body. The unusually high current will flow through the body in the same way an electrical charge passes through a wire - in through an entry point and out through an exit point. When these points of entry and exit are at opposite extremes (e.g. entry at a hand and exit at a foot) the vital organs of the midsection are subject to extreme electrical shock.

If, however, the current passes from one foot to another, the organs are usually not as prone to damage. In either case, severe third degree burns at the entry and exit points or fourth degree burns of the intermediate muscles and bones can result, depending on the victim's proximity to the strike.

POSITIONING YOURSELF

The key to safety during a potential thunderstorm is to know the most likely point where lightning might strike and to anticipate the path of travel of the charge that is drawn from it. Anticipate the hill on which you are standing will sustain a strike and work to avoid key places on that hill. What places are safer than others?

The general rules are as follows:
Stay away from the isolated or largest trees, nearer the dense, shorter ones. Also, stay farther from isolated trees than the height of the tree. When on an exposed talus or scree field (rock fields with no tree protection) stay nearer the smaller rocks. In open areas, seek a low place such as a ravine or valley, but be alert for flash floods. In all cases, stay away from sources of water (e.g. streams, lakes, puddles or even small pools of water collected on rocks). Water is an excellent conductor of electricity.

Small trees in a ravine, away from water and rock overhangs, would shelter the optimal location. As an electrical charge traveling along the ground reaches an overhang, it will very likely arc across to your body and travel through it rather than along the rock.

If your team is a large group of people, spread out as much as possible to reduce the risk of multiple casualties. If you take shelter in a cave, stay away from the entrance. As the lightning passes through the ground, it will travel near the opening of the cave and will use a body as a bridge to pass from one side of the entrance to the other. When camping, do not take shelter in your tent if it is out in the open or under one of the larger trees in the area. Tents provide no additional insulation.

BODY POSITION

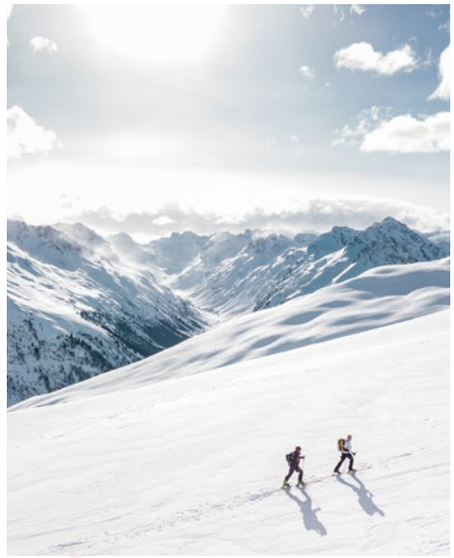
Body position is simple. Avoid positions that would allow the charge to pass through the body. Whenever possible, drop to the position of a baseball catcher – crouched down, on your feet. Try not to place your hands on the ground, as this would increase the chance of entry and exit points resulting at opposite extremes. NEVER lie flat on the ground. At all times, wear shoes and stay on something insulated such as dry clothing, packs, ropes or tree branches. Occupy the smallest area possible.

When there is a hazard of lightning, remove all exposed metal objects from your clothes. These objects become hazardous not only because they present a possible target for a direct strike but also because they will heat up significantly and fuse clothing or flesh as the current passes through the body on an indirect strike.

When you see a bolt of lightning, count how long it takes you to hear the thunder and divide by 5. The result is your distance, in miles, from the lightning. If a thunderclap is heard fifteen seconds after the lightning, you are three miles away from the storm. If both the thunderclap and lightning are simultaneous (and generally extremely loud), you are directly below the storm. If at any time you feel your hair stand on end, lightning is imminent.

Hypothermia...The Most Common Killer of Backcountry Users

On February 1, 1989, the temperature in Butte, Montana dropped from 42 degrees to 4 in one hour. Regardless of the season, a temperature drop of 30-40 degrees Fahrenheit in one hour is not uncommon in the mountains. Add cold rain and wind and nature has mixed the perfect recipe for hypothermia.



WHAT IS HYPOTHERMIA?

Hypothermia is the rapid, progressive mental and physical collapse accompanying the chilling of the inner core of the body. It is caused by exposure to cold, aggravated by wet, wind and exhaustion. Hypothermia has killed more unprepared backcountry users than any other malady. In fact, the state with the most reported cases of Hypothermia is, unbelievably, Florida! The reason is simple. Floridians are generally unprepared for cold weather.

There are a number of ways to avoid hypothermia. The trick to staying warm is to gain more calories than you lose. The body can burn as little as 50 calories per hour while sleeping or more than 1,000 an hour during heavy work. Just as the body constantly produces heat, it constantly loses it. Your body may burn over 50% more fuel in winter than it would in summer. This is because you are inhaling cold air, warming it and saturating it with water vapor.

In fact, as much as one-third of your body heat loss can occur through breathing. Breathing through a scarf or balaclava may help by "pre-heating" the inspired air.

The body also loses heat by perspiration and its subsequent evaporation from the skin. In addition, 75% of the body heat can be radiated from an unprotected head, since the blood vessels in the scalp lie close to the skin.

CREATING BODY HEAT

Clothing and shelter can only conserve body-heat, they cannot create it. Liquids and food are the only "internal" source of heat creation for the body. This is because heat is produced in the body by chemical reactions through the metabolism of food, mainly oxidation of carbohydrates. Muscular activity is a second source of heat, but uses food energy to generate the heat.

THE BODY'S REACTION TO COLD

The body's first reaction to cold is to shiver. Shivering is the first sign of hypothermia and is the body's way of forcing an isometric contraction and triggering a stored glycogen "dump" from the liver. It is the body's attempt to generate heat by rapidly and rhythmically contracting muscles. Despite the fact that shivering is fatiguing, it generally helps keep us warm. It diminishes with oxygen deficiency, breathing of carbon monoxide or the taking of aspirin or alcohol.

The body's ability to maintain warmth is depressed by the lack of water, lack of food, fatigue and shock. After shivering stops, hypothermic victims are confused into thinking they are feeling warmer. THEY ARE NOT. They are dying.

PROBLEMS WHICH INCREASE HYPOTHERMIA DANGERS

Constipation retards efficient metabolism of food and reduces energy levels. This is a dangerous situation in the winter, as the body can no longer take advantage of the energy provided by the "fuel" ingested. Despite what grandmother told you on those cold Wisconsin evenings, alcohol reduces the body's ability to fight cold.

It dilates peripheral blood vessels, blocking vasoconstriction and allowing warm blood to exit the body's core. In addition, the alcohol may actually make the victim feel warm and more competent. The low temperatures will increase the intoxication because brain cell membranes are more fluid because of the increased metabolism.

Smoking or chewing tobacco constricts peripheral vessels, reducing circulation necessary to keep the skin warm. Aspirin also dilates the vessels. Such conditions are conducive to frostbite and hypothermia. In addition, sedatives, antidepressants and neurological problems common in the elderly will all increase the risk of hypothermia.

Hypothermia is a killer in summer as well as winter. It is more often triggered by a combination of wind, wet and cold than by cold alone. In fact, just plain dry cold, even at extremes of -30 degrees, is far more manageable and far more pleasant than 20-degree weather with wet snow and rain falling and a harsh wind blowing. I will take the 30 below any day.

The Hypothermia Lab in Duluth, Minnesota has studied this phenomenon for over a decade. The lab discovered that the human body could adjust its metabolism to adapt to the cold. Studies showed that Eskimos respond to cooling with an almost instant metabolic leap and with skin temperatures that remain remarkably high.

The "Ama", Korean pearl divers who once dived naked into icy waters in search of treasure, had high basal metabolic rates, more efficient tissue insulation and a higher threshold of tolerance before the onset of shivering. One generation after they had started using wet suits, they had completely lost their specialized responses to the cold.

HYPOTHERMIA AND THE MIND

The Hypothermia Lab also found that circulation can be increased by mindpower. Subjects of experiments who thought about how much they wanted to get out of the cold suffered rapidly falling body temperatures. On the other hand, shivering subjects, directed to perform a mental arithmetic task, stopped shivering for short periods. In addition, when people get anxious, they have more problems with temperature regulation. One of hypothermia's strangest manifestations is "paradoxical undressing."

People suffering severe hypothermia are often observed throwing off their clothes, as if they felt they were burning up. This is believed to be because the hypothermic victim's body, which has been vasoconstricted to maintain core heat, may abruptly vasodilate, allowing warm blood to pump briefly through the body's peripheral areas. To the hypothermic victim, who is already mentally foggy, the vasodilation may produce a sense of extreme warmth.

In addition, chemical changes occur in the body that can make the situation more dangerous. First, epinephrine (adrenaline) is released into the bloodstream, which increases the heart rate. This is healthy, since it increases the metabolism. Other chemical changes, however, can cause hypothermic victims to experience vivid hallucinations very similar to those reported by schizophrenics.

This is believed to be caused by increased dopamine in the blood. In addition, researchers have found that spinal and cerebral neurons become hypersensitive when they are cooled just three or four degrees below normal. This can lead to neural misfiring and to seeing things that just are not there.

Believe the signs, not the victim. Team members should monitor each other carefully, even in temperatures of 50 degrees. Any early sign of hypothermia is a serious warning. Take immediate action to correct the situation before it is too late.

Most cases of hypothermia develop in temperatures between 30 and 50 degrees Fahrenheit. Many novice backcountry users simply do not believe such temperatures are dangerous. They fatally underestimate the dangers of being wet and/or poorly clothed at such temperatures.

ENVIRONMENTAL CONDITIONS CONTRIBUTING TO HYPOTHERMIA

When the body is wet; the evaporation of moisture from the skin has a very rapid cooling effect that can be extremely dangerous. Water conducts heat 25 times faster than air. Therefore, heat is lost much more quickly if evaporation is occurring. A wet backcountry user must always change quickly into extra dry clothing as soon as possible.

Staying wet is an open invitation to the dangers of hypothermia. It is equally important to protect yourself from your

own sweat. Working up a sweat on the trail will result in wet clothes by the time a final destination or resting place is reached. Wet clothes will chill the body significantly, especially in conditions of high wind where evaporation takes place much more quickly.

Staying wet is an open invitation to the dangers of hypothermia

THE BODY'S REACTION TO HYPOTHERMIA

Mother often said and (for once) she was right: "If you want to keep your feet warm, wear a hat." Up to 75% of heat loss is through your head and neck, since the blood vessels are close to the surface. If the head, or any other body part, is exposed to cold, the body chills and "shunting" can result. When this happens, circulation to the extremities is sacrificed to assure that the remaining body heat is reserved for vital internal organs.

The result is that the hands and feet receive less warm blood than does the midsection. Shunting occurs because of vasoconstriction. Vasoconstriction cranks up your blood pressure as you chill. As a result, cold can be dangerous for people with heart disease. The key to avoiding this dangerous situation is to be brave (and smart) enough to give up reaching the peak when the first signs of hypothermia present themselves.

Frostnip and Frostbite

The less severe form of frostbite, called "frost-nip", is the classic white spot on the cheek or the nose. It occurs when the outer skin freezes and can generally be taken care of with application of a warm hand. Frostnip stings, but generally causes no more problem than sunburn. Frostbite, however, is the freezing of deep tissues. Vasoconstriction and cold air are not the only factors leading to the problem. Altitude also plays a part.

The higher the altitude, the thinner the atmospheric oxygen becomes and the less there is for the body to use. Since the body's response is to send the lion's share of available oxygen to the brain and central core (shunting), the peripherals are put on starvation rations. At high altitudes cellular metabolism decreases in the extremities due to lower levels of oxygen. When skin temperatures drop below 50 degrees Fahrenheit, the sense of touch and pain are lost.

Frostbite occurs when skin temperatures drop below freezing and circulation to those areas ceases. The water between the cells in the skin and capillaries freezes resulting in tissue damage. Prevention is the key word when discussing frostbite. Keep the extremities warm and avoid restricting circulation with tight-fitting clothes or boots. For additional warmth, draw your jacket arms inside with the sleeves turned inside out and crossed inside of the back of the jacket.

Dehydration

Dehydration occurs when the body has insufficient water to maintain suitable energy levels. Water is as important to the body as is oxygen. The average person needs to replace two quarts of water a day minimum. Heavy perspiration, exposure to extremely warm temperatures, constipation and/or excessive vomiting can easily double this amount. To avoid dehydration, you should drink water regularly, in small amounts, to replenish this supply.

Eating snow for a short period is harmless, but if done to excess it can cause the mucous lining of the mouth to become inflamed and painful. If you have no stove, find a running water source. Dehydration hastens the onset of general fatigue and enhances the possibility of constipation, which is a dangerous situation. Salt helps the retention of body fluids and reduces muscle cramps, so salty foods or salt supplements should be used.

Snow Blindness/Sun Blindness

The eyes are especially sensitive to the brilliance of sunshine especially that which is reflected from snow fields. If unprotected, the eyes can be burned and/or permanently damaged. The burns are so excruciatingly painful that, once a backcountry user has suffered and recovered from this malady, he may never again remove his sunglasses even while sleeping.

The only way to prevent snow/sunblindness is to wear polarized sunglasses, whether you feel you need them or not (radiative light penetrates even clouds and/or fog). Snow blindness can occur in as little as one half hour. There may be no sensation other than brightness to warn the victim. The pain does not occur until well after the damage has been done.

The only way to prevent snow/sunblindness is to wear polarized sunglasses

Altitude-Related Illnesses

Since the average body is accustomed to life at lower elevations, several problems can occur at altitude that are cause for concern. These problems are listed below, ranging from the not so dangerous to the life threatening. Altitude Sickness (a.k.a. Acute Mountain Sickness) Altitude sickness is the most common of altitude related illnesses.

It can affect individuals at altitudes as low as 5,000 feet. Altitude sickness is caused by the lack of oxygen (which can be enhanced in the winter) and can be aggravated by cold, fatigue, drinking alcohol, smoking or chewing tobacco. It is also believed that there is a connection between a disruption of the acid/base balance in the body and alcohol sickness.

Altitude sickness is dangerous only in that it signifies a body's reaction to increased altitude. It can lead to significant complications such as high altitude pulmonary and/or cerebral edema, both of which can be fatal. In its mild states, altitude sickness consists of headaches and difficulty sleeping. Other common complaints include nausea, drowsiness and shortness of breath.

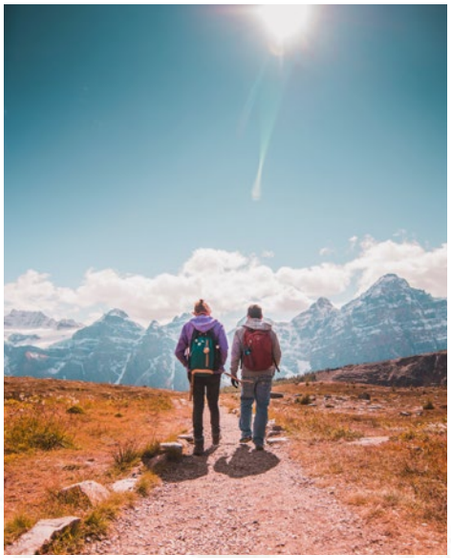
These symptoms could increase in severity leading to violent headaches, vomiting, vertigo and unconsciousness. Some of the more common symptoms of altitude sickness include shortness of breath, legs feeling heavy, dizziness, insomnia, blurred vision, lack of appetite, nausea, vomiting, diarrhea and headaches. For these reasons, altitude sickness is often confused with the flu.

Sleep may be difficult during the first few nights of your ascent. Regular periods of heavy breathing, separated by periods of no breathing at all may wake the sleeper with a sense of suffocation. Hyperventilation may occur, causing the light-headedness, dizziness and tingling in the hands, feet and mouth. Again, avoid foods high in protein for the first few days and reintroduce them cautiously.

Fatigue and cold aggravate altitude sickness. Symptoms usually disappear as the body adjusts to the lower oxygen pressure. To avoid altitude sickness, drink extra amounts of water, not just during ascents, but several days beforehand. About one week before your trip, eat more starches, more long chain carbohydrates and fewer proteins. Reduce the intake of foods that cause an acidic reaction in the body.

Some believe that the use of an antacid tablet would be beneficial as well, though this is open to debate, since antacid tablets are designed to alter the acid/base balance in the stomach, not necessarily in the bloodstream. In addition, climb to higher altitudes at a gradual rate.

Your body will acclimatize to altitude changes, but only at a rate of about 500 feet per day. Strangely enough, it has been shown that residents of high altitudes can suffer from reverse altitude sickness when they spend time at sea level. High iron content and high blood viscosity cause this phenomenon.



HIGH ALTITUDE PULMONARY EDEMA (HAPE)

This is a severe illness whose symptoms are similar to pneumonia with congestion and difficulty in breathing. The symptoms are often confused with altitude sickness, except that pulmonary problems exist. The symptoms will increase in severity in a matter of days. HAPE is simply an accumulation of fluid in the lungs.

Symptoms develop in 6 to 36 hours after arrival at high altitudes and consist of shortness of breath, weakness, coughing and a feeling of tightness in the chest. The cough is constant and can be irritating. The pulse becomes rapid while respiration becomes rapid and constant. Anxiety on the part of the victim only increases these symptoms.

Heat-Related Illnesses (heat cramps, heat exhaustion and heatstroke)

Muscle cramps (a.k.a. "heat cramps") occur when the body's salt content is low. This salt content drops below normal when excessive sweating occurs. Though very painful, cramps are not a dangerous situation.

They are, however, an indication that the backcountry user is doing a poor job of monitoring fluid levels. Salt tablets, available at any pharmacy, should be taken on any trip that will involve excessive exercise. Heat exhaustion occurs when the body is unable to cool itself sufficiently. This generally occurs in warm climates, but can also occur in the mountains.

A victim of heat exhaustion is a victim in trouble. Heat exhaustion is generally caused by too much exertion during hot weather. Symptoms of heat exhaustion include moist, clammy skin, weakness, nausea and possible delirium. Heat stoke occurs when heat exhaustion is not treated. A victim of heat stroke is a victim in a life-threatening situation.

This is truly a medical emergency. The body has become so over-heated that it is generally no longer able to sweat. Without the ability to sweat, the body cannot cool itself. If this victim were an automobile's radiator, steam would be shooting out of the mouth, nose, ears and eyes.

Symptoms of a victim of heat stroke include dry skin, flushed face, nausea, weakness, delirium and eventually unconsciousness. This person's internal temperature is dangerously high and the possibility of brain damage is introduced.

Summary

We have discussed many of the hazards of backcountry travel. The key to safe backcountry travel lies in recognizing these hazards and knowing, in advance, how to avoid them. Avoidance is the only way to assure that your time in the backcountry is a safe and memorable experience.

HAVE A PLAN AND SHARE IT

Maps, compass, route, turn-around time, group briefing, landmarks, alternate pal & route. Tell at least two people your plan, route, departure & return times, other things you know.

KNOW YOUR LIMITS, AND THOSE OF THE OTHERS IN YOUR GROUP

Don't lie to yourself, poor conditioning and bad judgment can kill. In a group travel at the speed of the slowest member. Check each other frequently for fatigue, hydration, energy, orientation, and confidence.

MAKE SURE YOUR EQUIPMENT, CLOTHING, WATER, AND FOOD ARE UP TO THE TRIP

Don't exaggerate capabilities or underestimate requirements. Everyone should have a rain jacket, energy bars, extra water, flash or head light, means to start a fire, and a compass. Check your equipment, NEVER 'store & use'.

ALWAYS BRING ALONG PROPER EMERGENCY EQUIPMENT

If traveling alone, have at a minimum a regular first-aid kit. In a group have an adequate 'community' kit with splint-ties, braces, pads and materials to care for and evacuate someone.

LEARN IN ADVANCE WHAT MIGHT POSSIBLY GO WRONG

Check the weather, fire hazards, winds, etc. Use your computer! Share the information and get advice.

LEARN IN ADVANCE WHAT TO DO IF THINGS GO WRONG

Park Rangers say 'hug-a-tree', in other words stay where you are. Whistles, mirrors, cell phones are priceless. Make a camp and wait it out.

Wilderness Safety Video

The Jon Francis Foundation Wilderness Safety Video contains important and potentially life-saving information, created to keep you safe in the outdoors while you enjoy the beauty and benefits of nature.

Watch the video on our website
www.jonfrancisfoundation.org/prevention

Classic 10 Essentials

In 2003, the group's updated 'systems' approach made its debut in its seminal text on climbing and outdoor exploration, Mountaineering: The Freedom of the Hills, now in its eighth edition. The Jon Francis Foundation believes that this is a good list of essential items for a personal survival kit.

We have added two more.

TWELVE ESSENTIAL 'SYSTEMS'

1. Navigation (map and compass)
2. Sun protection (sunglasses and sunscreen)
3. Insulation (extra clothing, torso & head)
4. Illumination (headlamp/flashlight, & extra batteries)
5. First-aid supplies
6. Fire (waterproof matches/lighter/starter)
7. Repair kit and tools (multi-knife, multi-tool, etc.)
8. Hydration (extra water, or purification means)
9. Nutrition (extra food, condensed/high calorie/high energy)
10. Emergency shelter (plastic tube tent/garbage bag)
11. An electronic navigation (GPS) Device
12. A signaling device

The Jon Francis Foundation encourages you to purchase, learn and carry a hand held signaling device for use in an emergency and to stay in touch. We recommend and can train our students on inReach Technology.

With inReach satellite technology from Garmin, you can send and receive messages, track and share your journey and — if necessary — trigger an SOS to get emergency help from the 24/7 global monitoring center.

What Does inReach Do?

"inReach satellite communicators allow you to stay safe and connected anywhere in the world. From outdoor enthusiasts and boaters to hunters and recreational pilots, inReach allows you to send and receive messages, trigger an interactive SOS, track and share your trip anywhere in the world. Give your friends and family peace of mind knowing they can contact you no matter where the adventure takes you."

Seek Expert Training or Guides

Too often newcomers to the wilderness are "trained" by and travel with relatively inexperienced friends. Seek out professionals in your area and take courses in your areas of interest. Hire an experienced guide before you go into areas that are highly unfamiliar or rugged.

A good way to find a wilderness mentor is to join a local outdoor club and meet people who have been involved in wilderness activities for a long time and can pass on their valuable knowledge and experience.

Repetition is the key to learning. (Information from the Jon Francis Foundation Wilderness Safety Pocket Guide)

Wilderness activities are a source of health, enjoyment and challenge for countless people. But wilderness outings can also result in accidents to those who go out unprepared or make poor decisions in the backcountry.

1. Recognize disorientation early and learn strategies to become reoriented
2. If you become lost, stay in one place. It is very difficult for searchers to find a moving target.
3. Learn how to minimize heat loss and build an improvised shelter
4. Conserve energy
5. If you find yourself in a situation that is beyond your level of comfort or skill, do not hesitate to back off your route and/or turn around. Pressing on when you are at the limits of your skills is a recipe for disaster. There is no shame in not achieving your goal. Consider the trip a learning opportunity. Try it again with greater skills, better information and more enjoyment and success.
6. Thoroughly research your intended route. Check local guide books, Bring adequate maps. Many maps can be down loaded from the internet.
7. Check the forecast, but expect unpredictable weather
8. Plan for problems by bringing the above safety and survival gear
9. Leave a detailed description of your intended route with a trusted friend or family member. Include your estimated time of return. Don't leave your friends, loved ones and searchers guessing about your destination, route of travel or plans.
10. Navigation skills are essential for safe travel in the wilderness
    - As you travel, turn around from time to time to see what the terrain looks like for your return
    - Memorize landmarks
    - Technologies such as GPS are no substitute for good navigational skills
11. Carry the ten essentials
12. Obtain quality training
13. Learn wilderness survival skills
14. Be prepared to turn around
15. Plan ahead
16. Leave an itinerary
17. Learn navigation skills
18. Carry additional safety and survival items
19. Know your limitations
20. You never know when a day trip may become an overnighter
21. Depending on the circumstances of your outing, consider bringing additional safety and survival items such as:
    - Global Positioning System (GPS)
    - Grid Reader or Interpolator
    - Cell phone
    - Two-way radio
    - Personal Locator Beacon
    - Garmin's inReach
    - An emergency shelter such as a tarp, bivy sack, space blanket or large garbage bags
22. Ensure that your fitness, skill and experience levels are sufficient for the outing. When climbing mountains, know and respect the climbing classification system. Train for hard goals. Start slow and work up sensibly to the more difficult and challenging adventures
23. There is safety in numbers. Try always to find at least one partner on an outing. If you choose to go solo, do so well within your limits. Be constantly aware of the consequences of a mistake or problem, since there is no one with you to back you up. Be vigilant. If possible, stay in contact with others via radio or cell phone.

If someone you know is overdue from a trip, contact the local sheriff's office or the ranger station. Do not assume that they are safe or may have extended their trip.

Do not delay. Make the call. Travel with partners.

National Parks Service Rangers Preventive Search and Rescue (PSAR)

The PSAR program started in 1997. PSAR is to help people avoid needing to be rescued by providing education about the potential hazards involved in the outing or hike wherever you are, as well as the time and equipment needed to complete a planned outing or hike. National Park visitors' activities vary widely:

- Destination hiking and sightseeing
- Intermediate trail-hiking and outings (less than ½ day)
- Long day-hikes and outings (½-1 day)
- Overnight outings and camping
- Climbing and mountaineering
- Water sports and recreation activities
- Combinations of the above

All of these activities have resulted in injuries and sometimes deaths that could have been avoided with better preparation, knowledge and planning. PSAR Rangers patrol the entry and upper portions of the main corridor trails, and stop visitors and ask a series of questions about their hiking or outing plans and preparations.

PSAR RANGERS QUESTIONS

- Where are you hiking or going today?
- Do you know how far that is & how long it will take you to complete the hike or outing?
- Do you have enough water & food with you?
- Are you drinking your water regularly?
- Do you have a headlamp or flashlight?
- Do you have a jacket or outer covering?
- Do you know the weather & temperatures to expect?
- Do you have an accurate map of the area?
- Did you tell someone where you are going and when you will be back?

Sources:
Basic Wilderness Safety Guide
From The 600 Members of The National Parks Retired-Rangers Association

Recommended Survival Kit
The Mountaineers, a Seattle-based organization assembled the original Ten Essentials list in the 1930s for climbers and outdoor adventurers.

Water Safety

TOP 10 WATER SAFETY TIPS

1. **Always supervise children in and around the water.** Designate at least one adult to watch at all times.
2. **Never swim alone.** Swimming is safer and more fun with a buddy.
3. **Don't dive or jump into water that you can't see through.** Obstacles like rocks and stumps may be hiding under the surface.
4. **Never turn your back on the ocean.** Big surf and strong riptides can come without warning.
5. **Don't depend on floating toys to keep you safe.** Inner tubes, water wings, and other inflatables are not safe substitutes for life jackets.
6. **Children and non-swimmers should always wear life jackets in open water.** Life jackets only work if you wear them!
7. **Don't prolong the time you hold your breath under water.** Holding your breath longer than necessary underwater can result in a loss of consciousness and lead to drowning.
8. **Swim only in designated swim areas.** Signs are posted for a reason; there may be hidden dangers in non-designated areas.
9. **Don't leave toys or other floatables in an unsupervised pool.** Floating toys may attract children.
10. **Learn to swim.** Find swim lessons in your area and learn the skills needed to be safe in the water.

KEEP KIDS SAFE

Here are several things a parent must know before taking their child to an area with water, courtesy of the Canadian Red Cross.

- Regardless of the location, ensure children are supervised — even those who can swim
- Clear all toys from the water and away from the edge as they tempt children
- Ensure you (or the location you are visiting) has emergency equipment including a first-aid kit and a phone
- When boating, ensure everyone in the boat has their lifejacket on and fastened
- Consider requiring all non-swimmers to wear a lifejacket to keep them at the surface, making it easier for you to supervise them
- Avoid diving unless the individual is properly trained and after making sure the water is deep enough
- Play with care — don't push or jump on others. Even the friendliest "dunking" game is dangerous.
- Never underestimate the power of current: swimmers or waders can be swept away in an instant
- Get trained through swimming and water safety lessons; get your Pleasure Craft Operation if you operate a boat; know how to respond in an emergency by taking first-aid lessons
- Avoid excessive drinking of alcoholic beverages. Be sober. Be safe.
- Just like with any outdoor activities, it is important to stay hydrated by drinking at least a half a cup of water for every half hour out in the sun and to stay protected by reapplying sunscreen every two hours
- Be informed, proactive, safe and smart on the water, so you and your kids will have fun and avoid mishaps

Life Jackets

Life jackets come in many designs, colors, styles, and materials. Some are made to stand up to rugged water sports, others to protect the wearer from cold-water temperatures. Be sure to choose one that is appropriate for your body size, planned activities, and the water conditions you expect to encounter.

Wear your life jacket. When you don't, you're risking your life.

TEST THE FIT

Start with a life jacket that is U.S. Coast Guard-approved. Try it on. It should fit comfortably snug. Then give it this test: with all straps, zippers, and ties securely fastened, raise your arms over your head. The jacket should stay in place and not ride up. Next, have someone lift your life jacket straight up at the shoulders. Again, the jacket should stay in place. If the zipper touches your nose or the jacket almost comes off, it is too loose.

TEST THE BUOYANCY OF YOUR LIFE JACKET

In shallow water or a swimming pool, under supervision and with all straps, zippers, and ties fastened, see how the life jacket floats you. Relax your body and let your head tilt back. Your chin should remain above water so that you can breathe easily. If not, you may need a different size or model, one that provides more buoyancy.

CHOOSING A CHILD'S LIFE JACKET

Be sure to choose a child's life jacket that is U.S. Coast Guard-approved. Check to make sure your child's weight falls within the range shown on the label. To check for a good fit, pick the child up by the shoulders of the life jacket. If it fits correctly, the child's chin and ears will not slip through.

A child's life jacket should be tested in the water immediately after purchase. Children may panic when they fall into the water suddenly. Float testing not only checks the fit and buoyancy but also provides an important opportunity to teach them to relax in the water.

BE SAFE. WEAR YOUR LIFE JACKET.

Most deaths from drowning occur near shore in calm weather, not out at sea during a storm; 9 out of 10 drowning fatalities occur in inland waters, most within a few feet from safety.

Staying Afloat

If the boat capsizes or you fall overboard, follow these rules to stay afloat:

- **Remain calm**: do not thrash about or try to remove clothing or footwear. It is a common belief that persons dressed in heavy clothing or waders will sink immediately if they fall overboard. This is not true. Air trapped in clothing provides considerable floatation, and bending the knees will trap air in waders, providing additional flotation. Thrashing in the water leads to exhaustion and increases the loss of air that keeps you afloat.
- If you are wearing a life jacket, keep it on
- Keep your knees bent
- Float on your back and paddle slowly to safety

Leave No Trace

If you are lost, you should leave lots of clues and traces in nature. However, if you know where you are and do not need a rescue, then we encourage you to Leave No Trace.

Leave No Trace Outdoor Ethics

Leave No Trace Outdoor Ethics is all about teaching people of all ages how to enjoy the outdoors in a safer, more fun way. Safer for people, for animals, plants, and everything that makes our world such an amazing and wonderful place to live, explore and play!

Everything people do outdoors has an impact on the environment. In other words, what we do when we play outside has an effect on nature. Everything Leave No Trace teaches is based on seven basic principles or ideas that help us make good decisions when it comes to outdoor recreation. The original Leave No Trace principles were created for adults who visited "backcountry" or wilderness areas.

Today, these practices have been adapted so that they can be used by everyone, anywhere from the backcountry, to local parks, to your own backyard, and can be applied to any kind of outdoor activity you might enjoy. Each of the Leave No Trace principles is focused on a specific topic and provides detailed information and skills for making less of an impact on nature.

Original Seven Principles

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors

Kids Version

1. Know Before You Go
2. Choose the Right Path
3. Trash Your Trash
4. Leave What You Find
5. Be Careful With Fire
6. Respect Wildlife
7. Be Kind to Other Visitors

A Closer Look at Each Principle

1. PLAN AHEAD AND PREPARE OR KNOW BEFORE YOU GO

This is about how important it is to learn about where you are going and what you will be doing ahead of time. Many things need to be considered before we head outdoors to enjoy ourselves. Some of the questions we might want to have answers for before we go include:

- Where are we going? Are there special rules to follow when we get there?
- What are we going to do? Do we need to bring anything special?
- How long will we be gone? Do we need to bring food or water?
- What will the weather be like? Do we need a jacket? Sunglasses?

2. TRAVEL AND CAMP ON DURABLE SURFACES OR CHOOSE THE RIGHT PATH

Not everyone is heading outdoors for a campout, many of us are going out to ride our bikes, fish, swim or just walk around the park. Most often there are sidewalks, bike trails or other places that will make it possible for us to have less of an impact on the outdoor area we are going to visit. For example, if we are going to have a picnic, or cook hot food, it is best to use an area that is set up for preparing and eating food. Look for a picnic table and a fire ring or grill if we need one.

3. DISPOSE OF WASTE PROPERLY OR TRASH YOUR TRASH

This is something all of us should be thinking about no matter where we are going. Trash and all kinds of waste are serious health and safety concerns. The less trash we create, the better. We need to think about the stuff we bring with us, and other ways we end up with trash or waste.

Things like food and drinks may be the first things we think about when it comes to trash, but it's also important to consider bathroom facilities. What if there isn't a toilet available when you need one? What would you do? What are the rules about this in the place where you are going?

4. LEAVE WHAT YOU FIND

This is about making sure the outdoor place you are visiting stays beautiful, safe and healthy for all living things that visit or live there. There are many things in nature, like flowers or pretty rocks, that we might be tempted to take home with us. It's important to know that if we decide to take them, we are impacting that natural area in a way that could be harmful to the plants and animals that live there, and will also take away some of the natural beauty that other visitors would enjoy.

This Leave No Trace principle also reminds us not to change the outdoor area we enjoy by carving our names on park benches or trees, or making other kinds of graffiti.

5. MINIMIZE CAMPFIRE IMPACTS OR BE CAREFUL WITH FIRE

If you do not need to cook food during your outing, then this principle is very easy to follow. On the other hand, if you do need to cook your lunch or dinner, consider using a stove instead of a wood fire as a gas stove uses less fuel and is easier to cook with. If you don't have a cooking stove, then be sure to use a designated fire ring or grill. Be sure to check the rules about what kind of wood is okay to burn there.

6. RESPECT WILDLIFE

Lots of wild animals live in the parks, even in the city. Birds, squirrels, chipmunks, raccoons and skunks are just a few city-dwelling animals that also live in wilderness areas. It's important that we don't interfere with how wild animals live in nature.

7. BE CONSIDERATE OF OTHER VISITORS OR BE KIND TO OTHER VISITORS

People enjoy many different kinds of outdoor recreation, and many come to the same places to do different activities. Hikers and bike riders may find each other using the same trail. So it's important to be aware and make sure we don't get in each other's way. Most people who visit parks and outdoor places enjoy being in nature. We show kindness by not being overly loud or rowdy when other visitors are there.

Happy trails to you.
May you enjoy the magnificent backcountry and return safely.

Oh. And and put a copy of this Handbook in your backpack.

Jon Francis Foundation

EDUCATE / ADVOCATE / EMPOWER / GUIDE

If you found this information to be helpful, please let us know

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