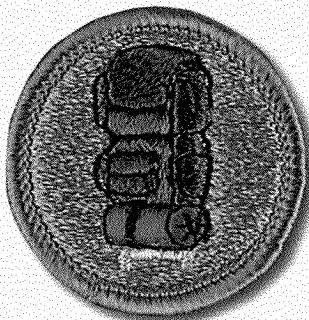
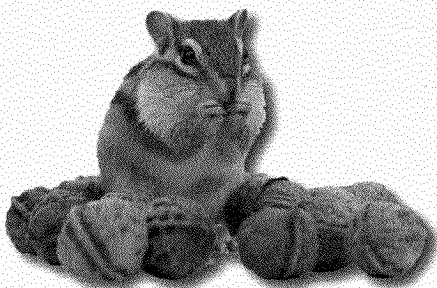


# MERIT BADGE SERIES



# BACKPACKING



BOY SCOUTS OF AMERICA



## How to Use This Pamphlet

The secret to successfully earning a merit badge is for you to use both the pamphlet and the suggestions of your counselor.

Your counselor can be as important to you as a coach is to an athlete. Use all of the resources your counselor can make available to you. This may be the best chance you will have to learn about this particular subject. Make it count.

If you or your counselor feels that any information in this pamphlet is incorrect, please let us know. Please state your source of information.

Merit badge pamphlets are reprinted annually and requirements updated regularly. Your suggestions for improvement are welcome.

## Who Pays for This Pamphlet?

This merit badge pamphlet is one in a series of more than 100 covering all kinds of hobby and career subjects. It is made available for you to buy as a service of the national and local councils, Boy Scouts of America. The costs of the development, writing, and editing of the merit badge pamphlets are paid for by the Boy Scouts of America in order to bring you the best book at a reasonable price.

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BOY SCOUTS OF AMERICA  
MERIT BADGE SERIES

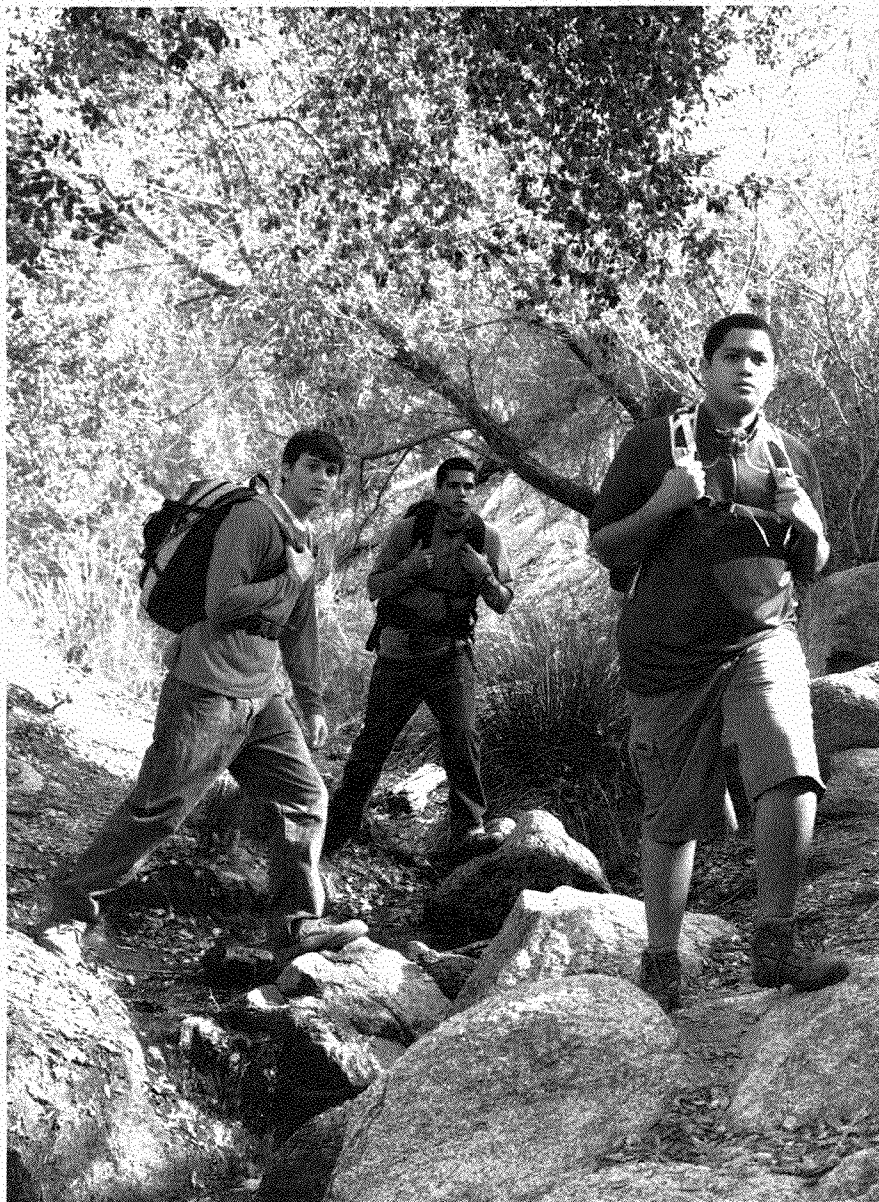
# BACKPACKING



*"Enhancing our youths' competitive edge through merit badges"*



BOY SCOUTS OF AMERICA®



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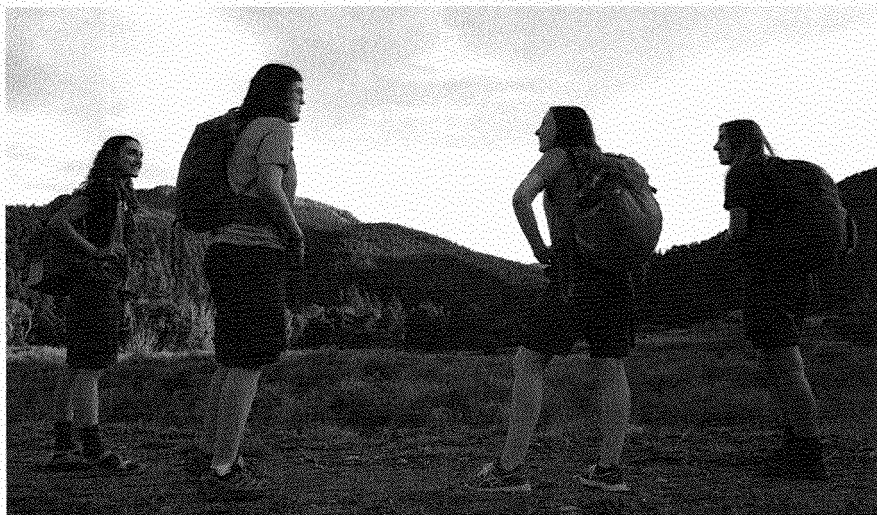


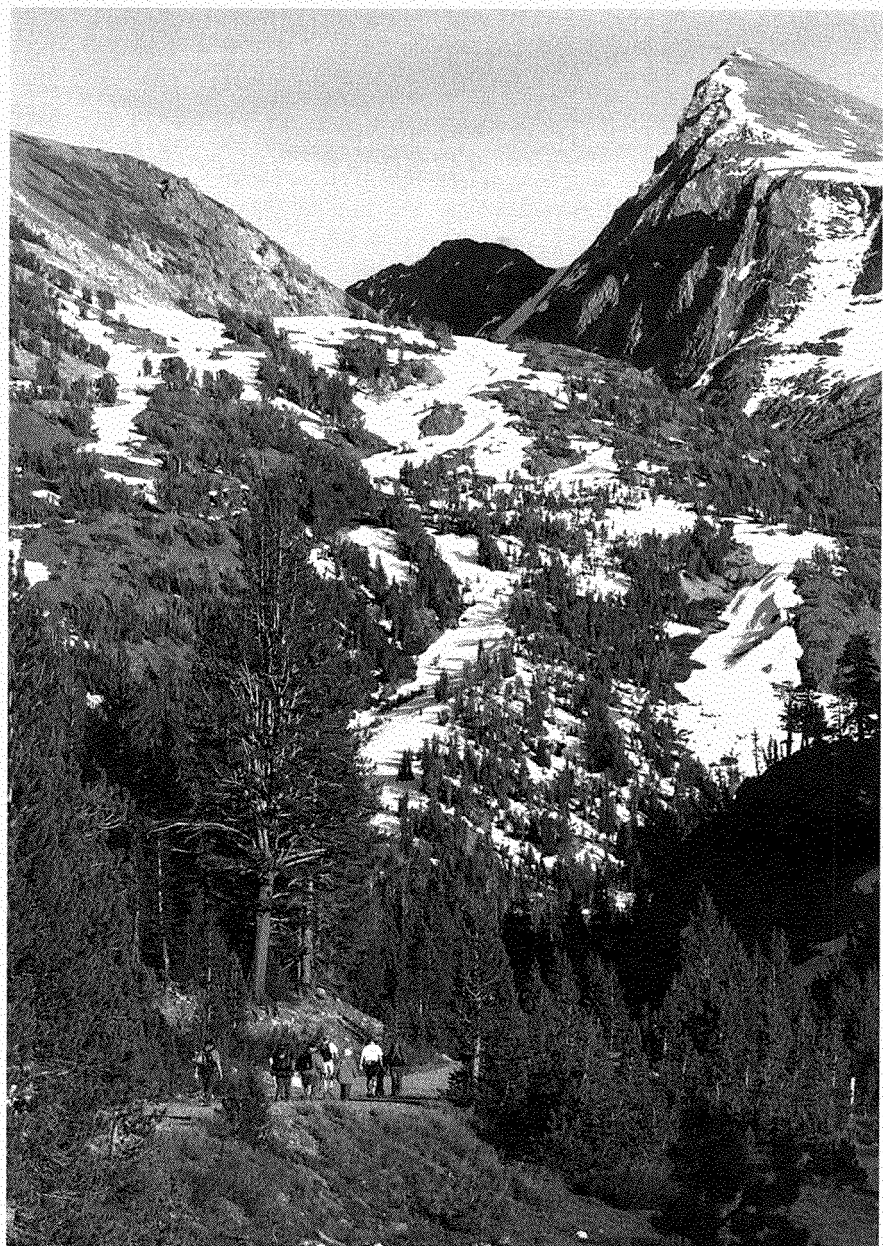
# Requirements

1. Discuss the prevention of and treatment for the health concerns that could occur while backpacking, including hypothermia, heat reactions, frostbite, dehydration, insect stings, tick bites, snakebite, and blisters.
2. Do the following:
  - a. List 10 items that are essential to be carried on any backpacking trek and explain why each item is necessary.
  - b. Describe 10 ways you can limit the weight and bulk to be carried in your pack without jeopardizing your health or safety.
3. Do the following:
  - a. Define limits on the number of backpackers appropriate for a trek crew.
  - b. Describe how a trek crew should be organized.
  - c. Tell how you would minimize risk on a backpacking trek.
  - d. Explain the purpose of an emergency response plan.
4. Do the following:
  - a. Describe the importance of using Leave No Trace principles while backpacking, and at least five ways you can lessen the crew's impact on the environment.
  - b. Describe proper methods of handling human and other wastes while on a backpacking trek. Describe the importance of and means to assure personal cleanliness while on a backpacking trek.
  - c. Tell what factors are important in choosing a campsite.

5. Do the following:
  - a. Demonstrate two ways to treat water and tell why water treatment is essential.
  - b. Explain to your counselor the importance of staying well-hydrated during a trek.
6. Do the following:
  - a. Demonstrate that you can read topographic maps.
  - b. While on a trek, use a map and compass to establish your position on the ground at three different locations OR use a GPS receiver to establish your position on a topographic map and on the ground at three different locations.
  - c. Explain how to stay found, and what to do if you get lost.
7. Tell how to properly prepare for and deal with inclement weather.
8. Do the following:
  - a. Explain the advantages and disadvantages of the different types of backpacking stoves using at least three different types of fuel.
  - b. Demonstrate that you know how to operate a backpacking stove safely and to handle liquid fuel safely.
  - c. Prepare at least three meals using a stove and fuel you can carry in a backpack.
  - d. Demonstrate that you know how to keep cooking and eating gear clean and sanitary, and that you practice proper methods for food storage while on a backpacking trek.
9. Do the following:
  - a. Write a plan that includes a schedule for a patrol/crew backpacking hike of at least 2 miles.
  - b. Conduct a prehike inspection of the patrol and its equipment.
  - c. Show that you know how to properly pack your personal gear and your share of the crew's gear and food.
  - d. Show you can properly shoulder your pack and adjust it for proper wear.

- e. While using the plan you developed for requirement 9a, carry your fully loaded pack to complete a hike of at least 2 miles.
10. Using Leave No Trace principles, participate in at least three backpacking treks of at least three days each and at least 15 miles each, and using at least two different campsites on each trek. Carry everything you will need throughout the trek.
  11. Do the following:
    - a. Write a plan for a backpacking trek of at least five days using at least three different campsites and covering at least 30 miles. Your plan must include a description of and route to the trek area, a schedule (including a daily schedule), a list of food and equipment needs, a safety and emergency plan, and a budget.
    - b. Using Leave No Trace principles, take the trek you have planned and, while on the trek, complete at least one service project approved by your merit badge counselor.
    - c. Keep a daily journal during the trek that includes a day-by-day description of your activities, including notes about what worked well and thoughts about improvements that could be made for the next trek.







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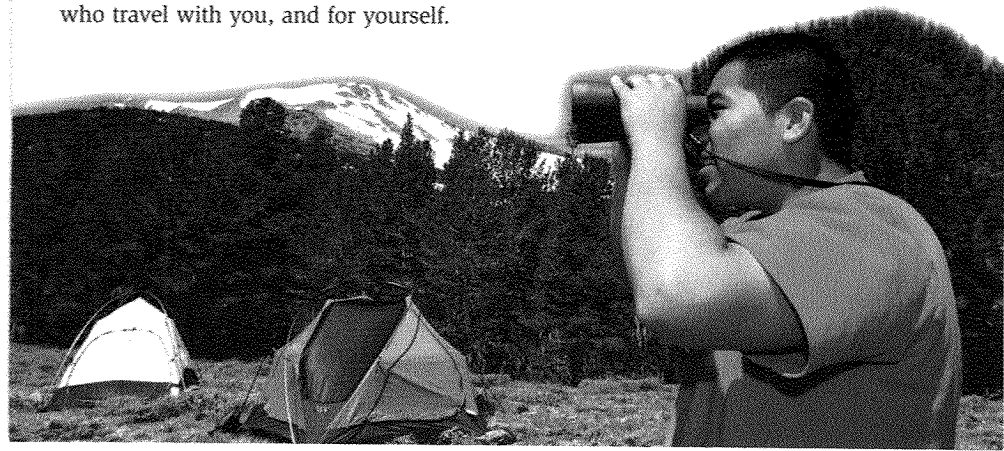
# Introduction

Imagine yourself and a few Scout friends hiking a rugged trail through mountains, along rivers, and deep into forests. Your packs hold all the gear and food you will need for your stay in the backcountry. With map and compass you study the terrain ahead and choose a good place to spend the night. You know from the look of the clouds that an evening storm might be coming, so you waste no time making camp.

After cooking a tasty supper over your backpacking stove, you hang your food from a tree to protect it from animals and then crawl into your tent. The sound of distant thunder lets you know a storm is rolling in. The first drops of rain lull you to sleep. Later, you look out and see the midnight sky blazing with stars.

In the morning you move on, leaving behind no sign of your camp. Your legs become strong and your eyes sharp. You draw on your skills as a hiker, camper, cook, pathfinder, and leader, and you follow no-trace principles.

Earning the Backpacking merit badge will be demanding but rewarding. You will learn what equipment to carry on your back and what knowledge to have in your head. You will discover how to protect the environment by traveling and camping without leaving a trace. Master backpacking's basics and you will develop an even deeper respect for the outdoors, for those who travel with you, and for yourself.







# Planning and Preparation

A backpacking trip requires planning. Anticipating trail conditions, travel distances, weather conditions, the availability of water, and campsite locations will help you and your group put together a plan that is right for the conditions. Your goal is to estimate what to expect in the backcountry and then to prepare so that you are ready for whatever comes your way.

The most useful planning tools for backpackers are a notebook and a sharp pencil. Putting ideas on paper encourages you to think them through. Checklists will help you make sure you don't forget anything. After a trek you can review your notes to see what worked well and what you can improve the next time around.

## Choosing Your Destination

Almost every part of our nation has parks, forests, and other open spaces that Scouts can explore. In choosing a place to go, you first need to collect good information.

Plan your adventure with your group members in mind. Take into account their experience, knowledge, interests, and physical abilities.

Check out backpacking guidebooks at your local library. Contact an office of the Forest Service, National Park Service, Bureau of Land Management, or state or local conservation and recreation agencies. The BSA local council office serving the area where you will be backpacking might also have valuable information.

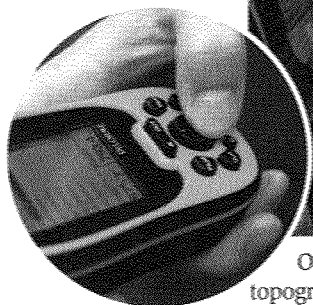
Another very helpful resource is *Backpacker* magazine's website. Visit [www.backpacker.com](http://www.backpacker.com)—with your parent's permission, of course.

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Planning a trek is a matter of looking ahead, anticipating the conditions you will find, and then preparing to meet them.

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Whenever possible, choose a site out of the view of others and away from trails.

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Once you have decided on a general area to visit, obtain topographic maps of the region and identify some possible routes. Find out where you can camp and consider the elevation gains on the trails. Check if you will need permission to cross any private land or if you will need to obtain permits from public agencies. For some popular locations—especially national parks—you may need to reserve a spot as early as six months in advance. So, start planning early for a big summer hike.

Identifying key campsite locations is critical to planning your route and miles traveled each day. Many parks and planned routes already have designated camping areas, and some sites need to be reserved in advance. If an established camping area isn't available, keep the following in mind.

- Find a site that has some elevation, and avoid depressions in the ground so your tent won't end up in a puddle in case of rain.
- Choose a site out of the view of others and away from trails.
- Use the sun to your advantage—morning sun dries tents, and afternoon shade can keep you cool.
- Avoid mosquitoes and other bugs by camping away from low, marshy areas, still water, and tall grasses or ferns.
- Avoid snake-infested areas commonly found in rocky terrain.
- To avoid avalanches and rock slides, don't set up camp at the bottom of cliffs.
- Camp above the high-water mark in dry stream beds or river canyons.

- Be aware of poisonous plants.
- Don't camp under "widow makers"—trees that have fallen onto other trees—or threatening limbs.
- Find protection from high winds among large boulders, rock outcroppings, or dense stands of trees.
- When winter camping, don't build a fire or set up your tent under snow-laden branches.
- Use a topographic map to help you find a good campsite.
- Set up camp during the day so you can identify the best location.

## Pacing Yourself

Plan the distances of your first backpacking treks conservatively. It is better to have too much time to reach a destination than too little. When planning, consider weather, terrain, physical conditioning, and weight of gear. As a group, do you walk with a quick stride or at a leisurely pace with frequent pauses to appreciate the scenery, watch wildlife, and take photographs? Allow enough time to enjoy yourself, stay safe, and have time for activities other than traveling and setting up camp.

Even the best-prepared patrol or crew should plan for unexpected events. Give yourselves extra time for traveling each day in case the weather turns bad, the terrain is more rugged than anticipated, or there is much to see and do. A layover day during a longer trek will allow everyone to rest, set off on side trips, or take the time to prepare a special meal.

**Make your trek plan flexible. Cover the basics so that you have the right gear, enough food, and a workable itinerary, but remember that it is important to be able to adapt to changing conditions in the field. Plan an alternative route in case your original plans fall through.**

## Getting There

Public transportation is sometimes a good way to reach the trailhead to begin a backpacking trip, although traveling by private motor vehicle is often more convenient and practical. If you decide to drive to the trailhead, arrange carpools so that you don't take more vehicles than necessary.

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If you must leave your vehicles at the trailhead, check with land management agencies and local guidebooks first. Find out where you should leave your vehicles and whether you will need parking permits.

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As you prepare your schedule, follow this rule of thumb for a relaxed pace. Plan on a rate no greater than 2 mph. Add an hour for every 1,000 feet of elevation gain. That should give everyone enough time to stop and smell the roses.

Parking is often limited at trailheads to help protect the environment, and many wilderness areas do not allow motorized vehicles. You may need to plan on extra time spent backpacking from the parking lot. Another option might be to arrange to have your group dropped off at one trailhead and picked up at another so that you can complete a route without backtracking.

## The Trip Plan

When your patrol or crew has agreed on an itinerary for a trek, write down your plans. Include who will be going, a detailed description of the intended route, a daily schedule, a list of food and equipment needs, an emergency response plan, and a budget. Leave copies with several responsible adults.

### Trip Plan

**Trip plan of** \_\_\_\_\_

**Where**

Destination \_\_\_\_\_

Route going \_\_\_\_\_

Route returning \_\_\_\_\_

**When**

Date and time of departure \_\_\_\_\_

Date and time of return \_\_\_\_\_

**Who**

Names of participants \_\_\_\_\_

**Why**

Purpose of the trip \_\_\_\_\_

**What**

Gear and other items to be taken:

Outdoor Essentials

Other clothing and gear \_\_\_\_\_

Permits required \_\_\_\_\_

Special equipment needs \_\_\_\_\_

Special clothing needs \_\_\_\_\_

**How**

List the principles of Leave No Trace that relate to your trip. For each one, write a sentence explaining what the patrol will do to follow that principle. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Sample Emergency Response Plan

**Dates of trip:**

**Trip location and description:** [See the trip plan.]

**Group leader:**

**Group members:**

**Medical training level of leaders and members:**

**Resources:**

Location of nearest public telephones:

Group first-aid kit:

Mobile phone number(s):

**Emergency contacts:** [Include telephone numbers of land management agencies, BSA council officials, emergency response system, and search-and-rescue alert numbers.]

**Conditions for activating an emergency response:**

[For instance, if you are a day late.]

**Driving instructions to clinics, hospitals, and other health-care facilities:**

## Emergency Response Plan

An important part of planning any backpacking journey is anticipating what could go wrong. For example, someone in your crew might sustain a serious injury. Developing an emergency response plan in advance gives you and your crew important information to use if you encounter backcountry difficulties. Along with copies of your trip plan, provide copies of your emergency response plan to people in the frontcountry who can assist your group should you need help.

## Crew Organization

The patrol method is an effective way to organize a trek. It allows everyone to take responsibility for making each trip successful, so everyone gets the most out of the experience.

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If you are delayed, notify your contacts so that they don't initiate an emergency response. Upon your return, let them know you are back so they won't report you missing.

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First, figure out how many people should be in your patrol or crew. Find out from land management officials what restrictions and limitations apply, and plan accordingly. In the backcountry, you will find that a smaller group can share equipment efficiently and will not require much space for camping or much time for cooking. A small crew or patrol moves along a trail quickly and will be less likely to cause damage to the land.

As you plan the size of your group, keep in mind its impact on the land, on your safety, and on the quality of the wilderness experience for yourself and for others. Philmont Scout Ranch recommends having seven to 12 individuals (including adults) on a trek—the best number for sharing gear, food, and chores.

Once you have established the group size, the patrol or crew leader will consult with adult leaders and discuss ideas and alternatives with the group. On the trail, the leader must stay aware of how each member is doing and how the entire group is getting along. He or she encourages everyone to be involved in finding the route, choosing campsites, and taking part in completing all the tasks to make a backpacking trip the best it can be.

MEAL	COOKS	FIRE AND WATER	CLEANUP
<b>Friday Dinner</b>	Taylor Sydney	Pat Jordan	Casey Leslie
<b>Saturday Breakfast</b>	Casey Leslie	Taylor Sydney	Pat Jordan
<b>Saturday Lunch</b>	Pat Jordan	Casey Leslie	Taylor Sydney
<b>Saturday Dinner</b>	Taylor Sydney	Pat Jordan	Casey Leslie
<b>Sunday Breakfast</b>	Casey Leslie	Taylor Sydney	Pat Jordan

Sample duty roster

The leader also finds opportunities for others to solve problems, to practice and improve their backcountry skills, and to become effective leaders themselves. Many backpacking groups use a chore chart so that everyone has an equal chance to cook, clean up after meals, manage animal-safe food storage, and take care of other camp tasks.

When you are on a backpacking trip with other Scouts, you will need to rely on one another to help minimize risk and face group challenges. Patrol members might find that a backpacking trip tests them physically and emotionally. Having their group's and patrol leader's support and encouragement will go a long way toward the success of each person and of the group as a whole.



## Tasks on the Trail

Your patrol should stay together as you move along the trail. One crew member can be designated as the **pacesetter**. This person takes the lead and hikes at a speed that is comfortable for everyone in the group.

Second in line is the crew's **navigator**, who makes regular checks of the map to be sure the group is staying on course. If the navigator has any doubt about the crew's direction, he or she should ask the pacesetter to bring the group to a halt so that everyone can discuss the location and route and decide which way to go.

In larger groups, you may designate a **sweep**. The sweep brings up the rear, carries the first-aid kit, and is responsible for making sure that all hikers are accounted for and are staying on course. The sweep calls a halt if someone needs to stop. (Anyone, however, has the right to call a halt to check a hot spot, adjust a pack, add or remove layers of clothing, or take a break.)





# Minimizing Risk

Minimizing risk is so much a part of outdoor adventures that often we hardly notice we are doing it. When you fill bottles with water from streams and lakes, you deal with the risk of parasites by treating the water to rid it of microorganisms. When you share the outdoors with wildlife, you protect them and yourself by hanging your food out of their reach, eliminating odors from sleeping areas, and keeping campsites spotless.

A truly effective approach to reducing risk comes from the willingness of every group member to take an active role in maximizing personal safety and the safety of others. The more responsibility each person takes for his or her own health and safety, the more everyone can contribute to a successful trek. To help minimize risk, follow these suggestions.

- Stay in good shape so you are ready for the physical demands of a trek.
- Know where you are going and what to expect.
- Adjust clothing layers to match changing conditions.
- Drink plenty of water.
- Take care of gear.

A critical aspect of managing risk is letting others know when you are having difficulties or are aware of a concern that might affect you or the group. Even if you feel hesitant to speak up, voicing concern about questionable route decisions or changing weather conditions, for example, can bring important matters to the group's attention.



## Dealing With Health Issues and Injuries

Getting injured while out on the trail is one of the biggest risks for which you need to be prepared. Fortunately, many trail injuries—scrapes, bruises, blisters, and sunburn—usually are not very troublesome. Soap, water, bandages, and other items in your first-aid kit will take care of the majority of medical problems you may encounter.

However, the danger of a more serious injury is magnified by your distance from emergency response. Miles up a trail, you must rely on your own resources and those of your companions. Know how to prevent, recognize, and treat the health hazards that may arise during a backpacking trip. The brief discussions that follow are intended only to alert you to the dangers. Consult a first-aid manual for complete information.

## The Boy Scouts of America Recommends ...

The BSA has some general first-aid guidelines for the treatment of minor injuries. Do not use bare hands to stop bleeding. Treat all blood as if it were contaminated with bloodborne viruses. This means always using a protective barrier, preferably nonlatex gloves, and always washing exposed skin areas with hot water and soap immediately after treating the victim. Include the following equipment in all first-aid kits, ready for use when rendering first aid:

- Nonlatex gloves, to be used when stopping bleeding or dressing wounds
- A mouth-barrier device, for rendering rescue breathing or CPR
- Plastic goggles or other eye protection, to prevent a victim's blood from getting into the rescuer's eyes in the event of serious arterial bleeding



**Blisters.** Blisters occur when skin is irritated, usually by heat or by friction. A “hot spot” on your foot signals the beginning of a blister. Stop immediately and protect the tender area by covering the hot spot with a piece of moleskin or molefoam slightly larger than the hot spot. Use several layers if necessary. Some helpful products include 2nd Skin® or Blist-O-Ban®.




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Blisters are best left unbroken. If a blister does break, treat the broken blister as you would a minor cut or abrasion. Diabetics who develop blisters should see a doctor as soon as possible after the trip.

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To prevent blisters, wear boots that fit properly and are broken in well. Keep your feet clean and dry, and change your socks frequently. Toughen your feet with short hikes before embarking on an extended trek.

**Hypothermia.** When a person's body is losing more heat than it can generate, hypothermia sets in. It is a danger for anyone who is not dressed warmly enough, although simple exposure to cold is seldom the only cause. Wind, rain, hunger, and exhaustion increase the danger. Dehydration is a common contributing factor as well. A person experiencing hypothermia might feel cold and numb, fatigued, irritable, and increasingly clumsy. Slurred speech, uncontrollable shivering, poor judgment, and loss of consciousness might also occur.



Treat a victim of hypothermia by preventing the person from getting colder. If necessary, use any or all of the following methods to help warm the body to its normal temperature.

Monitor the person closely for any change in condition. Do not rewarm a person too quickly (for instance, by immersing the person in warm water); doing so can cause irregular and dangerous heartbeat.

- Move the person into a tent or other shelter and get him or her into dry, warm clothes.
- Warm the person by zipping him or her into a dry sleeping bag or wrapping in blankets. Cover the head with a warm hat or sleeping bag hood.
- Offer small amounts of warm liquids (cocoa, soup, fruit juices, water; no caffeine or alcohol) if the person is able to drink.
- Provide water bottles filled with warm fluid (it should be comfortable to the touch) to hold in the neck, armpit, and groin areas. These areas are rich with blood vessels close to the skin, and warming them can help raise body temperature.

To help prevent hypothermia, carry spare clothing in case you get wet or if temperatures drop. Be alert for early symptoms of hypothermia in yourself and others. Take action to keep full-blown hypothermia from developing.

## The Hypothermia Challenge

If you suspect someone is suffering from hypothermia, challenge the person to walk, heel to toe, a 30-foot line scratched on the ground. If the person shows unsteadiness, loss of balance, or other signs of disorientation, take immediate action to get the victim warm and dry.

**Frostbite.** A frostbite victim may complain that his or her ears, nose, fingers, or feet feel painful and then numb, but sometimes the person won't notice any such sensation. You may see grayish-white patches on the skin—called frostnip—the first stage of frostbite.

Only frostnip can be treated out on the trail. If you suspect that frostbite is deep (extending below skin level), remove any wet clothing and wrap the injured area in a dry blanket. Do not rub the injury. Get the victim under the care of a doctor.

To treat frostnip, move the victim into a shelter, then warm the injured area. If an ear or cheek is affected, warm the injury with the palm of your bare hand. Slip a frostnipped hand under your clothing and tuck it beneath an armpit. Treat frostnipped toes by putting the victim's bare feet against the warm skin of your belly.

Help prevent frostbite by wearing layers of clothing, keeping dry, and staying hydrated.

**Dehydration.** Water is essential for nearly every bodily function, including digestion, respiration, brain activity, producing heat, and staying cool. Losing more water than one takes in puts a person at risk of becoming dehydrated. The first sign of dehydration usually is dark urine. Other signs can include weariness, headache, body aches, confusion, and dark amber-colored urine. Heat exhaustion, heatstroke, and hypothermia may all be caused in part by dehydration.

Prevent dehydration and heat reactions by drinking plenty of fluids. That is easy to do on hot summer days when you are thirsty. It is just as important in cold weather when you may not feel thirsty. Drink enough so that your urine stays clear.

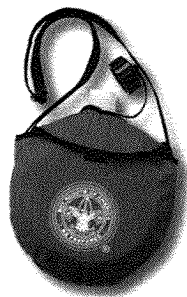
A sugary drink is not the best way to quench your thirst and prevent dehydration because each molecule of sugar in the drink requires a molecule of water to break it down. The best cure for dehydration is water. Sports drinks and other fluids designed for rehydrating the body also are a good option because they rehydrate and replace electrolytes.




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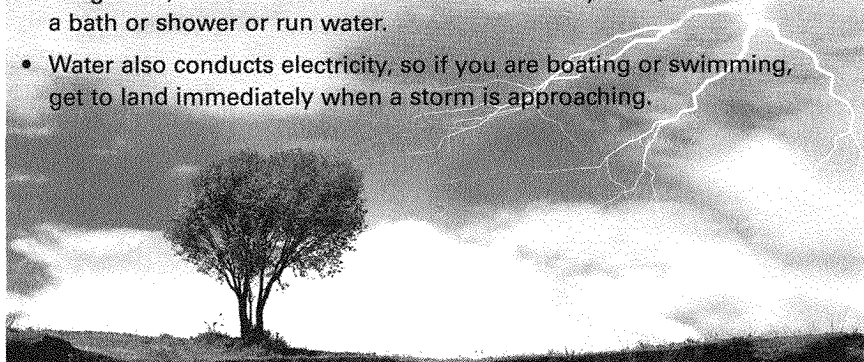
Rewarm any frostbitten area so long as there is no chance of refreezing, which would cause much more harmful damage to the affected area.

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## Staying Safe During a Thunderstorm

- If you are caught outdoors in a thunderstorm, do not stand in open areas or near lightning targets such as trees, power poles, or wire fences. Metal conducts electricity, so avoid metal poles. **Remove any metallic frame packs and do not stay near them.**
- When hiking near mountaintops, which are struck by lightning often during summer, try to get downhill before the lightning begins. If a storm catches you, find a cave or a low spot among the rocks. Avoid prominent outcroppings, overhangs, and flood zones.
- If you cannot find shelter, become the smallest target you can. Do not lie flat on the ground, because lying flat makes you a bigger target than crouching down. The less of you that is touching the ground, the better. If you feel your hair stand on end or your skin get tingly, immediately squat down on the balls of your feet, cover your ears with your hands, and get your head close to your knees. If you have a sleeping pad, use it for insulation by folding it and crouching on it.
- Take shelter in a steel-framed building or hard-topped motor vehicle (not a convertible) if you can. Such places are safe because the charge stays within the frame of the building or vehicle and is conducted safely to ground without endangering the occupants. When you are taking shelter in a car during a thunderstorm, avoid touching the metal parts.
- When taking shelter in a building during a thunderstorm, do not use the telephone or hold objects connected to electrical power (such as hair dryers). Staying near stoves, fireplaces, and plumbing is also dangerous, because metal can conduct electricity. Also, do not take a bath or shower or run water.
- Water also conducts electricity, so if you are boating or swimming, get to land immediately when a storm is approaching.







**Victims of heat exhaustion should be cooled down as quickly as possible.**

**Heat Exhaustion.** Heat and dehydration can lead to heat exhaustion. Symptoms can include pale, clammy skin; nausea and headache; dizziness and fainting; muscle cramps; and weakness and lack of energy.

If a member of your group is suffering from heat exhaustion, get the person in the shade and encourage him or her to drink small amounts of fluids. Cool water is best. Apply cool, wet cloths to the skin and then fan to hasten the cooling process. Activities can resume when the person feels better, although it can take a day or more for full recovery.

**Heatstroke.** When a person's core temperature rises to life-threatening levels (above 105 degrees), heatstroke occurs. Dehydration and overexertion in hot environments can be factors. Symptoms may include hot, sweaty, red skin; confusion; disorientation; and a rapid pulse.

This is a life-threatening condition; summon medical attention as fast as possible. To treat a heatstroke victim, lower the person's temperature quickly by moving him or her to a shady location and loosening tight clothing. Fan the person and apply wet towels. If you have ice packs, wrap them in a thin barrier (such as a thin towel) and place them under the armpits and against the neck and groin. Cooling the skin in these areas can help lower body temperature. If the person is able to drink, offer small amounts of cool water. Monitor the victim closely to guard against a relapse.



**Sunburn.** Sunburn is a common but potentially serious result of overexposure to the sun. Long-term exposure can result in an increased risk of skin cancer. Treat sunburn by getting the person in the shade. If no shade is available, have the person put on a brimmed hat, pants, and a long-sleeved shirt for protection from the sun. Treat painful sunburn by applying cool, wet cloths.

To prevent sunburn:

- Limit sun exposure between 10 a.m. and 4 p.m. Potential for skin damage is greatest around noon.
- Shade your head, neck, ears, and eyes. The thinner atmosphere at high elevations increases the intensity of UV rays. Sand and snow also can intensify the damaging effects of the sun.
- Sunscreen should provide UVA and UVB protection and have a sun protection factor (SPF) of at least 30. Skin care experts recommend applying sunscreen every two hours—even on cloudy days—and more often during water activities.
- Sunglass lenses should provide UVA and UVB protection.
- Check with your doctor to ensure that any medications you take won't make you more susceptible to increased sun damage.

**Insect Stings.** To treat bee stings, scrape away the stinger with a flat object like the edge of a credit card, but don't squeeze the sac attached to the stinger—that might force more venom into the skin. For all stings, apply an ice pack to the affected area to help reduce blood flow, pain, and swelling.



Bumblebee

Lyme disease is an illness carried by some ticks. A red ringlike rash might appear around the bite. A victim might feel tired and have flulike symptoms. Anyone experiencing these symptoms in the days and weeks following a trek should see a physician.

**Tick Bites.** Ticks are small, blood-sucking creatures that bury their heads in the skin. Protect yourself whenever you are in tick-infested woodlands and fields by wearing long pants and a long-sleeved shirt. Button your collar and tuck your pants into your boots or socks. Inspect yourself daily, especially the hairy parts of your body, and immediately remove any ticks you find.

If a tick has attached itself, remove it immediately. Grasp it with tweezers close to the skin and gently pull until it comes loose. Don't squeeze, twist, or jerk the tick, as that may leave its mouth parts buried in the skin. Wash the wound with soap and water, and apply an antiseptic. After handling a tick, thoroughly wash your hands.



Feeding tick



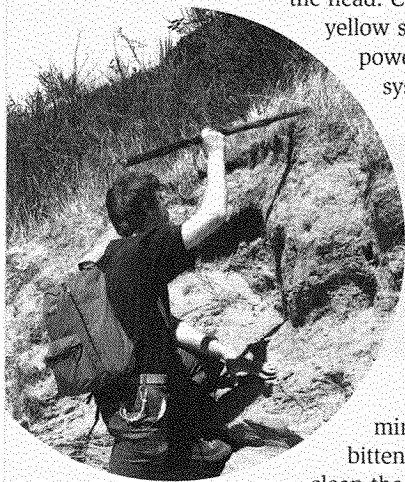
Engorged tick

Do all you can to prepare for a mishap before it occurs. Study the *First Aid* merit badge pamphlet and the chapters on first aid in the Scouts BSA handbook and *Fieldbook*. Practice rescue techniques with your patrol and troop. Enroll in emergency medical courses offered by the American Red Cross and other local groups. (Check with your BSA local council office for training opportunities in your area.)

Almost invisible, **chiggers** burrow into skin pores where they cause small welts and itching. Try not to scratch chigger bites. You might find some relief by covering chigger bites with hydrocortisone cream.

If a tick has been embedded for more than a day or poses difficulties in removal, see a physician.

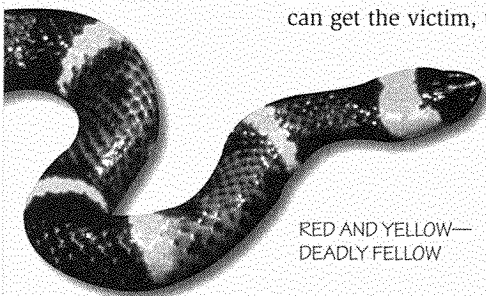
**Snakebites.** There are two types of venomous snakes in the United States. Pit vipers (rattlesnakes, copperheads, and cottonmouths) have triangular heads with pit marks on both sides of the head. Coral snakes have black snouts and bands of red and yellow separated by bands of black. Coral snakes inject powerful venom that works on the victim's nervous system; pit-viper venom affects the circulatory system.



A hiking stick does double duty when you walk through places where snakes might lurk. Walk slowly and use the stick to poke among stones and brush ahead of you. Watch where you put your hands as you collect firewood or climb over rocks and logs.

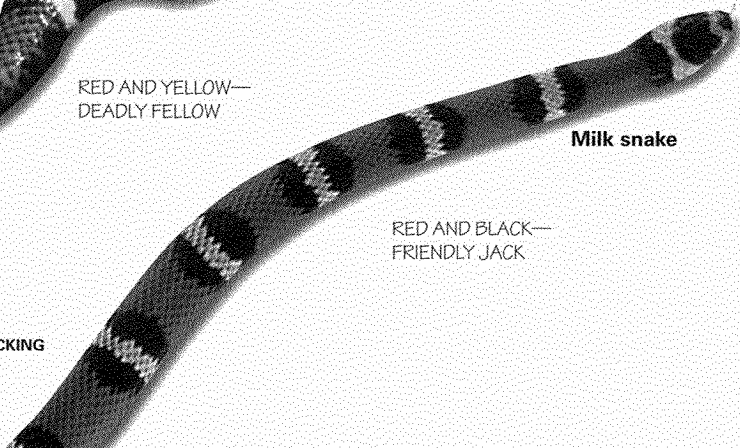
The bite of a nonvenomous snake causes only minor puncture wounds. If a crew member has been bitten by a snake that you are certain is nonvenomous, clean the wound with soap and water, then treat with an antiseptic.

The bite of a venomous snake may cause sharp, burning pain. If you are not certain whether a snake is venomous, assume that it is venomous. Get the victim under medical care as soon as possible so that physicians can neutralize the venom. The venom might not affect the victim for an hour or more. Within that time, the closer to medical attention you can get the victim, the better.



**Coral snake**

RED AND YELLOW—  
DEADLY FELLOW



**Milk snake**

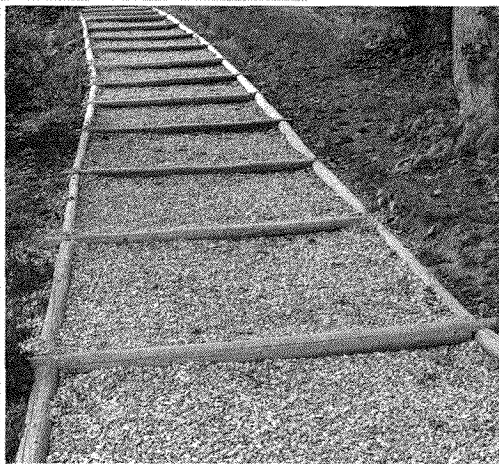
RED AND BLACK—  
FRIENDLY JACK

## Snakebite Don'ts

- **Don't** make any cuts on the bite, apply suction, apply a tourniquet, or use electric shock (such as from a car battery). All of these so-called remedies can cause more harm to the victim and are not proven to be effective.
- **Don't** apply ice to a snakebite. Ice will not help the injury but may damage the skin and tissue.
- **Don't** give the victim alcohol, sedatives, or aspirin. Doing so could hasten the absorption of venom, aggravate nausea, or fuel fear and panic in the victim.

## Don't Take a Tumble

Keeping safe from falling will make your backpacking adventures much more enjoyable from beginning to end. Trails often are bumpy and have loose rocks, gravel, and other debris, so watch where you step, every step of the way. This is especially important if you are backpacking along a steep incline. Stay within the boundaries of the trail, behind any protective railing, and obey all signage. Don't get distracted when you take photographs, talk with companions, or drop something. Paying attention will help you avoid the pitfalls of injuries such as a sprained ankle or scrapes and bruises from a tumble.









# Backpacking Clothing

Clothing keeps you warm in the winter, cool in the summer, dry in storms, and protected from insects, sun, and wind.

## Fabric Choices

**Wool** was the fabric of choice for generations of backcountry travelers. Wool is still a good choice for many cold-weather adventures. It is durable and can help you keep warm even when wet. Wool is also an excellent choice for shirts, jackets, long pants, hiking socks, hats, and mittens.

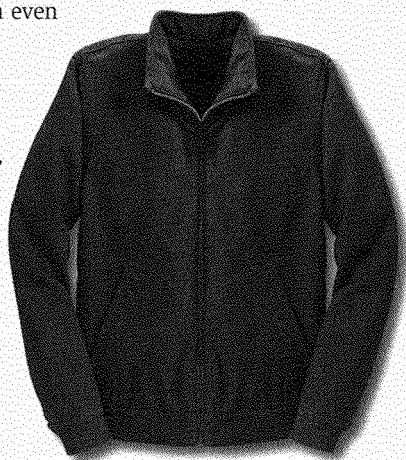
**Cotton** clothing is cool and comfortable, making it very good for hot-weather shirts and shorts worn in dry climates. If cotton becomes wet, however, it loses its ability to insulate, and it may be slow to dry. Wet clothing can be a danger on cool days, especially when mist, rain, and wind increase the threat of hypothermia, so avoid wearing cotton.

Outdoor clothing made of **synthetics**—fleece, polypropylene, and other manufactured fabrics—can be sturdy and comfortable. Synthetics will maintain warmth even when wet. Look for synthetic underwear, shirts, sweaters, jackets, pants, mittens, and hats. Lightweight garments for warmer weather and heavy ones for cooler climates have the added benefit of drying quickly when wet. Many parkas, rain jackets, and the shells of mittens and gloves are made of waterproof, breathable, synthetic fabrics. Synthetics offer the best combination of comfort and protection from the elements, and they are lightweight. Though synthetics can be more expensive than cotton, they can be superior for most conditions.

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To help decide what you need for your trek, familiarize yourself with the fabrics from which clothing is made.

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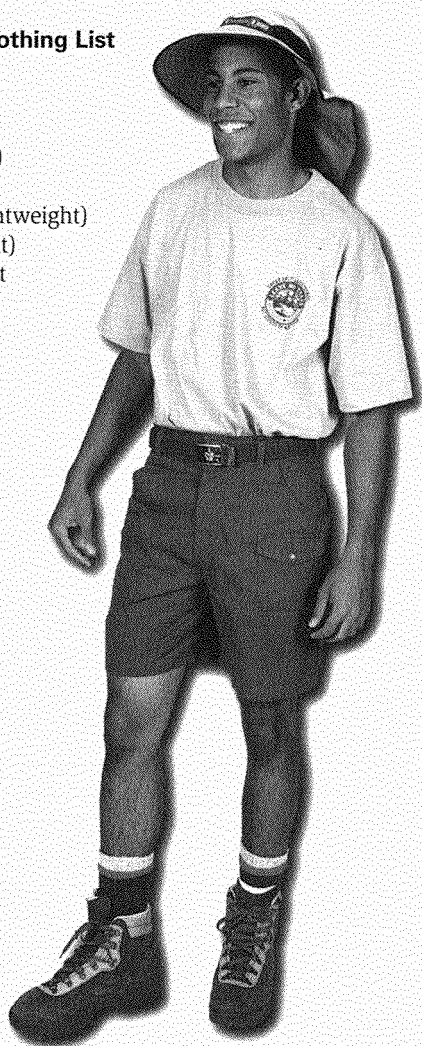
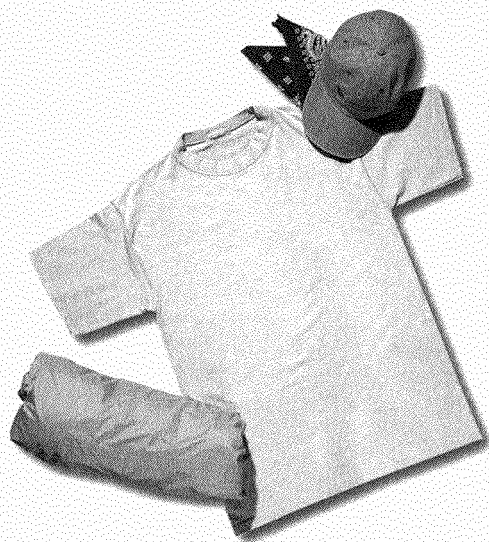


## Clothing for Warm-Weather Backpacking

Summer is a popular time with backpackers. Alpine meadows are ablaze with wildflowers, nights are comfortably chilly, and lakes and streams are warm enough for a refreshing afternoon swim. The list below offers some clothing suggestions that will help you stay comfortable in summer and in climates where it is warm year-round.

### Basic Warm-Weather Clothing List

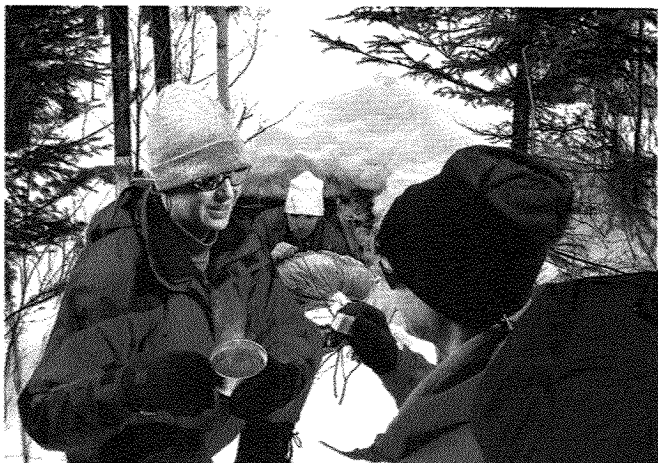
- T-shirt
- Hiking shorts
- Underwear
- Socks (synthetic blend)
- Hiking shoes or boots
- Long-sleeved shirt (lightweight)
- Long pants (lightweight)
- Sweater or warm jacket
- Brimmed hat
- Bandannas
- Rain gear



## Clothing for Cold-Weather Backpacking

As the temperature drops and snow covers the backcountry, there is no reason to stay at home. In fact, winter can be a great time to be in the wild. Trails usually are not crowded, and mountains and forests have a beauty very different from their summer appearance. Camping on a frosty January evening with moonlight glistening on the snow can be one of your most memorable backpacking experiences.

A winter trek in cold climates, however, demands special preparation. Your primary concerns are staying warm and dry. The list below provides some clothing suggestions that will help keep you warm and comfortable during a cold-weather adventure. Be sure to pack clothes made of fabrics that breathe and don't trap perspiration, which can increase your risk of hypothermia.



### Basic Cold-Weather Clothing List

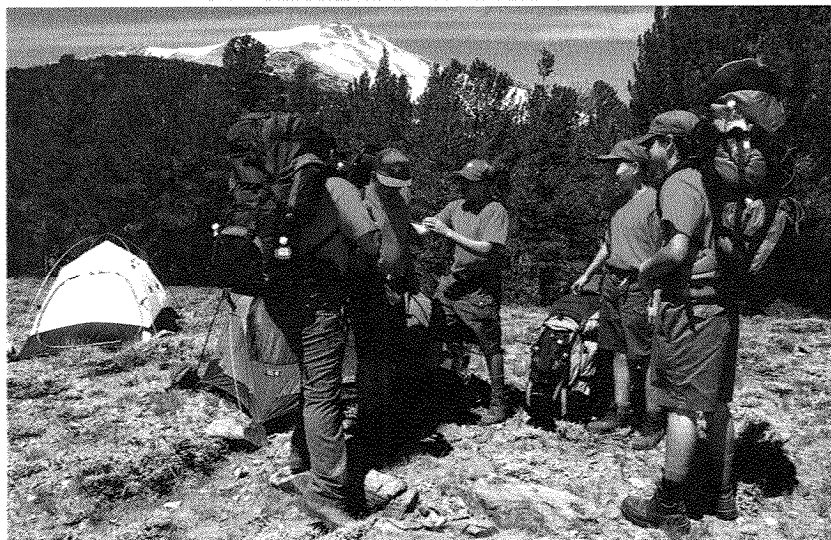
- Long-sleeved shirt (not cotton)
- Long pants (fleece or wool)
- Sweater (fleece or wool)
- Underwear
- Long underwear (synthetic blend)
- Socks (wool or synthetic blend)
- Hiking shoes or boots
- Warm hooded parka or jacket (fleece, synthetic, or down)
- Stocking hat (fleece or wool)
- Mittens or gloves (fleece or wool) with water-resistant shells



Start off feeling slightly chilled. That way, you won't soak your clothes as you warm up.

## Layering System

For the most outdoor comfort with the least weight in your pack, use layers of clothing that, when combined, will meet the worst weather you expect to encounter. On a chilly day, for example, you might start out on the trail wearing long pants, a wool shirt, a fleece pullover, mittens, and a stocking hat. As your body generates heat, you can take off the pullover. If you are still too warm, loosen a few buttons on your shirt or take off your mittens and hat.



When you reach your campsite and begin to cool down, wear enough clothing layers to stay comfortable. After the sun sets you might want to add an insulated parka and fleece pants or long underwear.

Use the layering system to keep cool in hot weather by stripping down to hiking shorts, a T-shirt, and a brimmed hat. Lightweight long pants and a long-sleeved shirt will shield you from insects, brush, and the sun.



## Rain Gear

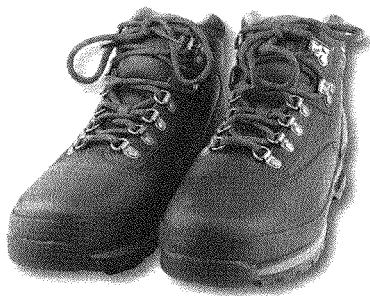
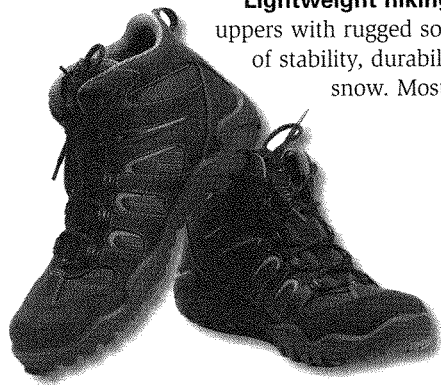
Prepare for wet weather by carrying rain pants and a hooded rain jacket. Choose rain gear that lets you move freely and allows perspiration to vent through the neck, cuffs, armpits, and waist. Your best bet is to select rain wear made of a breathable fabric that allows perspiration to escape but prevents wetness from seeping in.

## Boots

Footwear manufacturers make a wide variety of hiking shoes and boots, ranging from ultra-light trail shoes to rugged mountaineering boots. For short to moderate backpacking trips, lightweight nylon-and-leather hiking boots or leather hiking boots should provide the support you need without being too heavy.



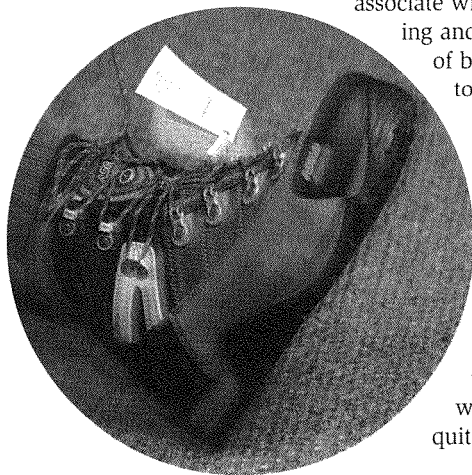
**Lightweight hiking boots** combine nylon-and-leather uppers with rugged soles. These boots offer varying degrees of stability, durability, and protection from water and snow. Most require little time to break in.



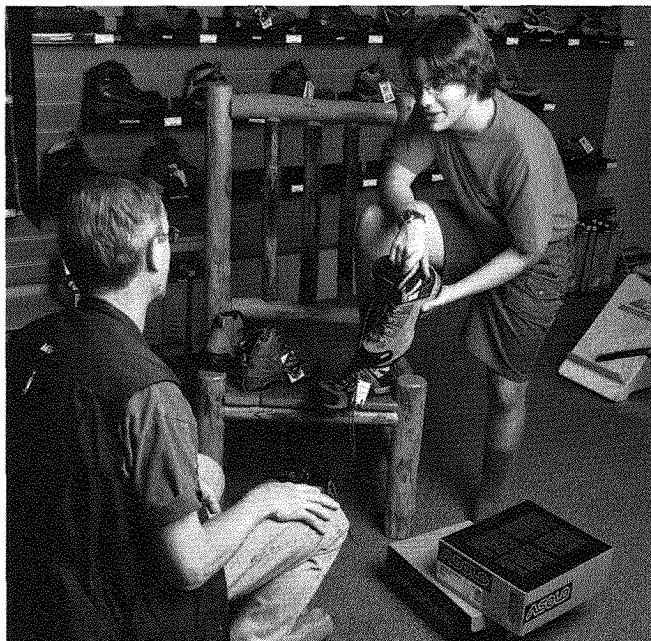
**Leather hiking boots** often have a steel shank between the upper and the sole for increased stiffness and stability. Leather boots shed water and snow and can help keep your feet warm in cold weather. Flexible leather boots may be your best choice for cross-country travel and for hiking on open trails.

Boots for backpacking must fit very well. Ill-fitting boots are an invitation to blisters. When you try on hiking boots, wear the socks you will use when backpacking. Find a sales associate who is knowledgeable about both backpacking and how to properly fit boots. Lace up a pair of boots and walk around the store. Kick your toes forward—they should not jam against the front of the boot. Kick your heel back into the heel pocket—your foot should feel secure. The widest part of your foot should not slip or feel squeezed. Try several pairs of boots for comparison, giving each the same careful tests.

Wear new boots around at home and then on short hikes to break them in before setting out on a backpacking trip. Gradually extend the length of your walks or hikes and your boots will soon feel quite comfortable.





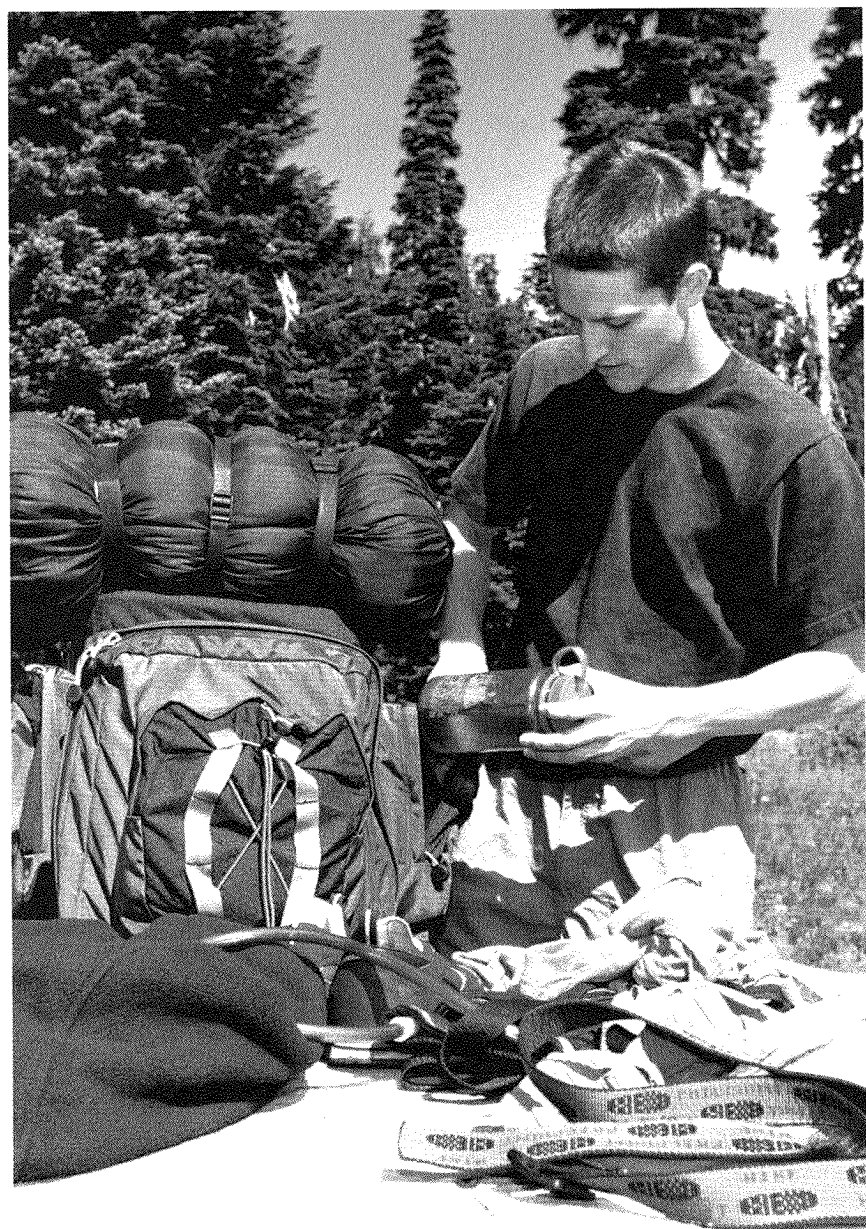


**Always try on boots in the afternoon or evening, when your feet will be slightly swollen, like they will be on the trail.**

Clean your boots after every outing. Use a stiff brush to remove mud, or wash the boots off with water and mild soap. Allow them to dry at room temperature. (Placing boots too close to a campfire or other source of heat can dry out leather and damage nylon.) Follow the manufacturer's advice for boot care. You may need to treat your boots with a waterproofing agent to keep them in top condition.

Know when to replace your boots. You can tell it's time for new boots if:

- Your boots no longer fit. The material may have stretched and no longer provides support, or your feet may have grown.
- There are cracks between the treads on the bottoms. Quality boots can be resoled by a cobbler.
- The lining of the sole is wearing out, causing blisters. Replacing the insoles may be an option.
- Seams are showing signs of failure or padding is exposed.



# Backpacking Gear

Manufacturers of outdoor travel gear are always looking for ways to make equipment lighter, tougher, and more versatile. That is good news for backpackers, but all of those choices can make gearing up a little overwhelming, not to mention expensive. However, backpacking equipment doesn't need to be expensive, new, or stylish. Secondhand gear is often just fine. Your troop might have a pack, a tent, and other items you can borrow until you are able to get equipment of your own.

## The Outdoor Essentials

The following items should go on every backpacking trek, just as they do on any Scouting adventure.

**Pocketknife.** Your pocketknife is an all-purpose tool. Use it to cut a cord, slice some cheese, whittle a tent stake, or tighten a screw. Choose a quality knife that includes a cutting blade or two, a can opener, and a screwdriver. Keep it sharp and clean.



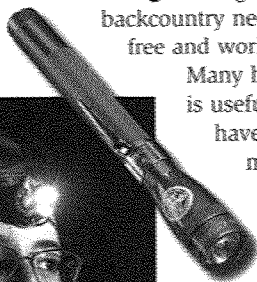
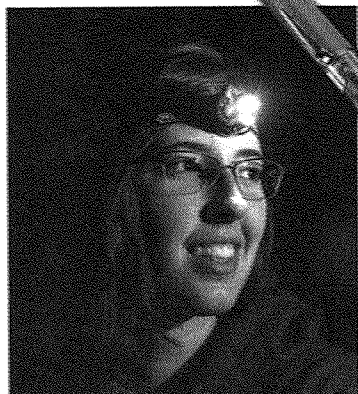
**First-Aid Kit.** Carrying a few first-aid items in a resealable plastic bag will allow you to treat a variety of minor injuries and to provide initial care should a more serious emergency arise. A first-aid kit should include blister treatments, various sizes of bandages, several gauze pads, adhesive tape, disinfecting ointment, over-the-counter pain medication, nonlatex gloves, and pen and paper. It's also a good idea to carry a compact guide to dealing with medical emergencies, such as the *First Aid* merit badge pamphlet. The length of the trip and the number of people in your group will affect the number of items in your kit.

**Extra Clothing.** Temperatures can soar during the day and plummet at night. Have the clothing you need to deal with temperature extremes. Select extra clothing appropriate for the weather that is expected. A good question to ask when choosing extra clothing is "What do I need to survive the worst conditions that could be realistically encountered on this trip?"

**Rain Gear.** Weather conditions can sometimes change with surprising quickness. Rain gear will keep you dry during a sudden downpour or a steady drizzle.

**Water.** The amount of water you need to carry depends on the activities of the day and the sources of water you will encounter. Drink plenty of fluids—at least three to four liters per day—even in cold weather. Use a lightweight, unbreakable container with a secure lid. A widemouthed water bottle is easiest to refill and clean. In cold weather, it's easier to break a layer of ice to get to the water. A one-gallon **collapsible water jug** will come in handy if you must carry water a long distance in camp. On average you will need half a liter of water for dehydrated meals. Before setting out, review with local resources (park rangers, council office, etc.) water sources along your route.

**Flashlight.** A lightweight flashlight will serve all of your backcountry needs. A **headlamp** leaves your hands free and works great for emergencies in the dark. Many headlamps have a strobe setting, which is useful in emergency situations; headlamps have the best battery conservation in strobe mode. You can even turn your headlamp into a lantern by placing an empty clear plastic water bottle, top down, on top of the light. High-output LEDs provide great light and have no filament to break, so they are ideal for rugged activities like backpacking. Even though LED lights use significantly less power than their incandescent predecessors, be sure to carry spare batteries.



**Trail Food.** Backpacking burns a lot of calories. An emergency supply of trail food will keep you going and can be especially important if a backpacking trip lasts longer than expected. Make your own trail mix with nuts, raisins, and other dried fruits. Bring along a small bag of granola. Pack a couple of energy bars.

**Matches and Fire Starters.** Store matches and butane lighters in resealable plastic bags or an empty plastic aspirin bottle with a secure lid. Plan your trip so that you won't need an open fire, but be prepared to build one in an emergency.

**Sun Protection.** Sunburn is a common injury among people who enjoy being outdoors. Use plenty of **sunscreen** with a sun protection factor (SPF) of at least 30. Protect your lips from sun and wind with a tube of SPF 30 (or higher) **lip balm**. Reapply sunscreen and lip balm often when swimming. A broad-brimmed hat, long-sleeved shirt, and long pants provide even more protection. **Sunglasses** will help keep you comfortable and safe, too.

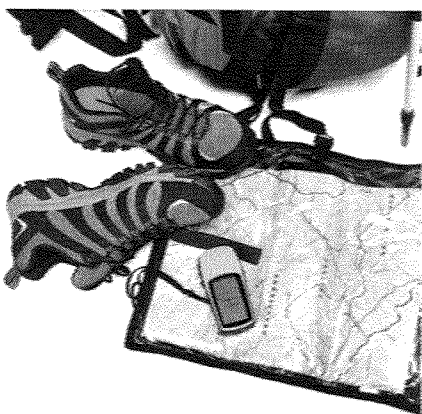
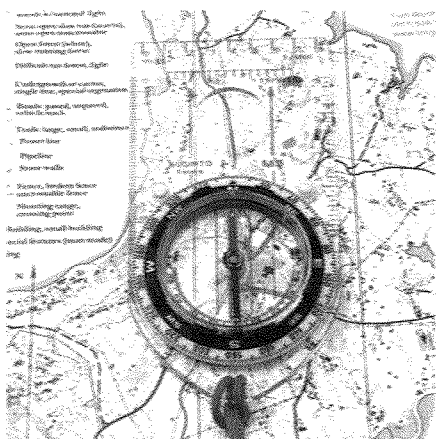
**Map and Compass.** A baseplate compass and topographic map (waterproofed or protected in a sheath) of the area where you intend to travel will help you identify landmarks and find your way. Don't forget—hone your route-finding skills *before* you go on your trip. Using a GPS unit is a great way to follow established waypoints and determine the distance you have traveled. However, a compass—which doesn't require batteries—is always ready, so brush up before your trek.




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Protect matches from moisture. Dip them one by one in melted paraffin.

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## Personal Toiletry Kit

When it comes to toiletries, a small amount will go a very long way. For instance, share a small tube of toothpaste with others in your crew, or save a nearly empty tube to carry in your pack.

- Toothbrush
- Toothpaste
- Dental floss
- Biodegradable soap
- Waterless hand cleanser
- Small towel
- Toilet paper and trowel or resealable plastic bags for packing out waste

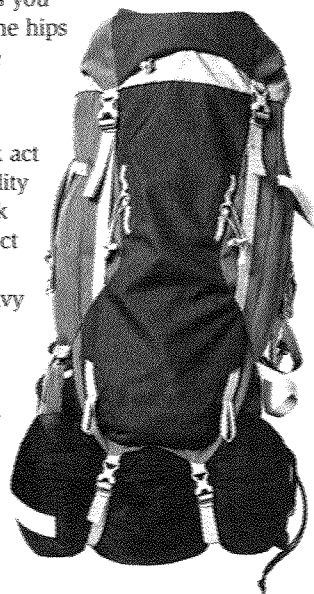


Whenever you use biodegradable camping soap, keep it at least 200 feet from rivers, lakes, streams, and springs. Use it sparingly.

## Backpacks

Out on the trail, a **backpack** will be your storeroom, attic, garage, and basement. Good packs fit well and are roomy and comfortable to carry. Most have outside storage pockets and padded shoulder straps. A hipbelt lets you support most of a pack's weight on the hips rather than the shoulders. Packs have either an internal or external frame.

**Internal-Frame Packs.** Stiff metal or plastic **stays** positioned inside a pack act as its frame, providing structural rigidity for transferring the weight of the pack load to the hipbelt. With their compact shapes and snug fit, internal-frame packs are ideal for travel through heavy brush, in steep terrain, and while snowshoeing or cross-country skiing. They also are comfortable on open trails. Some are outfitted with removable top flaps or rear compartments that can be converted into day packs for hikes from a base camp.





**External-Frame Packs.** The weight distribution principles of an external-frame pack are essentially the same as for a pack with an internal frame. Because the frame is on the outside of the bag, it can be larger and more rigid than an internal-frame pack and can efficiently transfer the weight from the shoulder straps to the hipbelt. Most external frames also provide room for lashing on a sleeping bag or tent.

Before you invest in a pack of your own, get an idea of which ones best fit your body and suit your needs. Some stores will allow you to rent a pack. Your troop might have packs you can borrow so that you can compare styles.

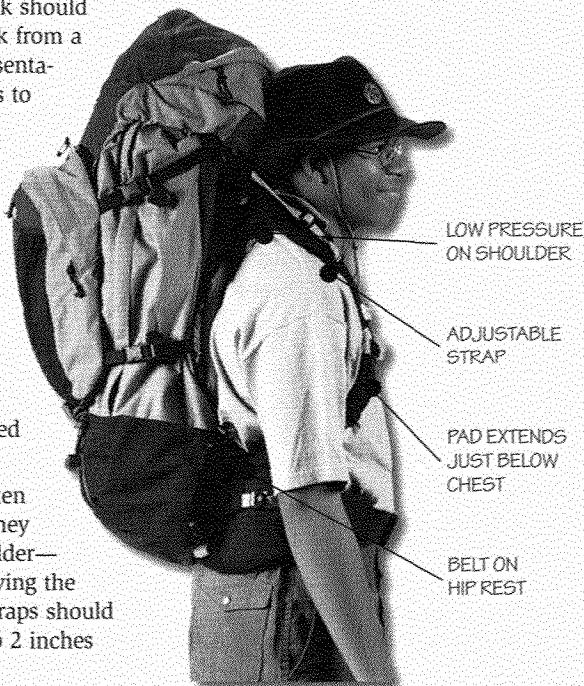
When you try on packs at a store, have the salesperson measure your torso length to get an appropriate fit. Put some weight in the packs you try, so that you can judge them based on how they will feel as you carry them on a trail.



### Fitting Your Backpack

Your goal is to have 80 to 90 percent of the weight of the pack resting on your hips. Keep in mind that as you grow, your backpack should adjust as well. Buy your backpack from a knowledgeable sales representative, and follow these steps to find a good fit.

- Make sure all the straps are loosened, and put 10 to 15 pounds of weight into the pack.
- **Hipbelt.** Put the pack on, and adjust it so the hipbelt rests on your hip bones. Check to be sure the hipbelt is padded and rests comfortably.
- **Shoulder Straps.** Tighten the shoulder straps so they wrap around your shoulder—they should not be carrying the weight. The shoulder straps should connect to the pack 1 to 2 inches below your shoulders.



- **Load Lifters.** Gently pull tight the load lifter straps (located near your collarbone). These straps help lift the weight off your shoulders and snug the pack to your back, minimizing sway.
- **Chest Strap.** Tighten the chest straps so the shoulder straps are pulled comfortably from your shoulders, allowing your arms to swing freely.
- **Stabilizer Straps.** Tighten the straps toward the back of the hipbelt—again minimizing sway.
- As you are backpacking, continue to adjust your straps throughout the day for optimal comfort.



A waterproof nylon **pack cover** weighs only a few ounces. Secure it around your pack when bad weather threatens. A large plastic garbage bag can serve as a temporary pack cover. Cut a T-shaped slit in one side of the bag, place it over the pack, and tuck the edges under the straps and frame. Tie a nylon cord around the pack and the garbage bag to help hold the bag in place.

Inspect your pack before every trek and fix any damage before you leave home. Check for cracks in the frame, stitching that needs reinforcement, frayed straps, and loose grommets. Empty the pack after a trip, shake out any debris, and store it in a clean, dry place. Take care of your pack and it will give you years of reliable service.

## Backpack Capacity

The capacity of backpacks is often noted in cubic inches.

- **2,500 to 3,000 cubic inches.** Good as a large day pack or for overnight trips in warm weather when you need only a lightweight sleeping bag and a minimum of other gear.
- **3,000 to 4,500 cubic inches.** With space for camp essentials, extra food, and extra clothing, a pack of this size works well for two- or three-day trips in the spring, summer, and fall.
- **4,500 to 6,000 cubic inches.** The majority of standard backpacks are of this size. Intended for trips of several days or more, they have the room to haul all the food and equipment you need, as well as a few extras.

## Sleeping Systems

Put together a sleeping system based on the temperatures and weather conditions you expect in the backcountry.

### Sleeping Bags

The shells of most sleeping bags are made of nylon. Fill material inside the shell may consist of down or synthetic fibers.

**Down fill** is composed of the fluffy feathers geese grow next to their skins. Goose down provides a lot of warmth without a lot of weight. However, down is expensive. In addition, if it gets wet, it loses its “loft,” which means it loses the ability to keep you warm. If you choose a down sleeping bag, be sure to shield it from the elements with a good tent or other shelter.

**Synthetic fill** is made of polyester fibers that create warmth-trapping loft even when wet. Synthetic-filled bags are often less expensive than down bags, but they are heavier and bulkier.

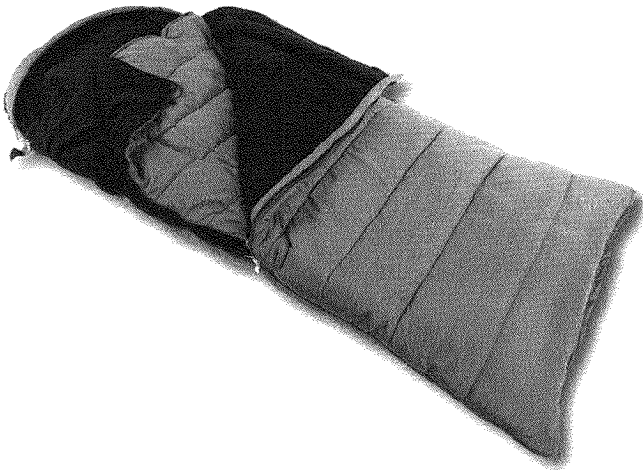
During your trip, protect your sleeping bag from moisture by stowing it in a stuff sack lined with a plastic trash bag. Air out your sleeping bag at the end of a trip, and store it in a large cotton laundry sack or pillow cover and hang it in a dry, out-of-the-way spot until your next adventure.

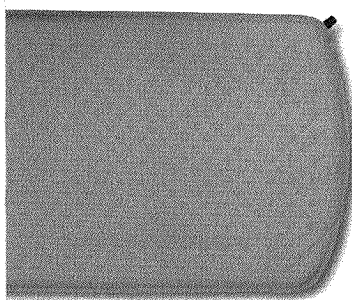
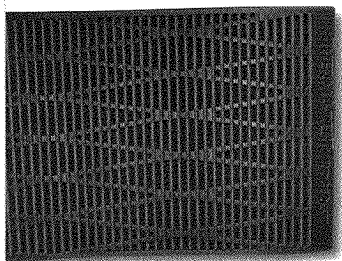



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Don't store a sleeping bag in its stuff sack. Fill that is compressed for a long time may lose some of its loft. Instead, use a large cotton pillow cover or laundry sack before hanging it in a dry storage area.

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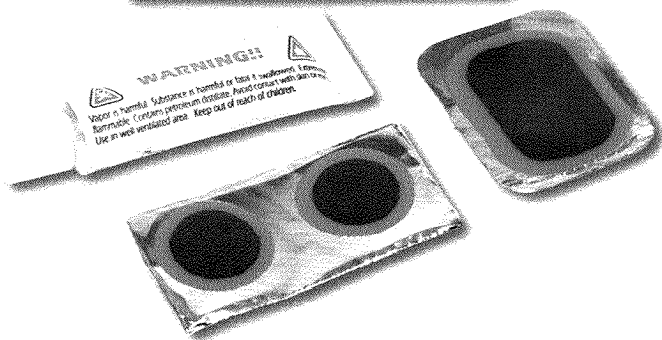
## Sleeping Pads

What you have beneath you at night is as important in keeping you warm as what is on top. A sleeping pad will prevent the cold ground from drawing away body heat and can give you a comfortable surface on which to sleep. Your best choices are foam pads and self-inflating pads.

**Foam pads** vary in the degree of insulation and comfort they provide. Closed-cell pads insulate well but at the expense of comfort. Open-cell pads are softer but may not be as warm or as durable. Though lightweight, bulky foam pads can be challenging to pack.

The choice of many backpackers, a **self-inflating pad** is an airtight nylon shell covering open-cell foam. It provides maximum insulation and warmth. Self-inflating pads are often more expensive and heavier than other kinds of pads. Store your pad unrolled, with the valve open, to let the foam retain its shape and help prevent mildew.

Make a pillow by arranging some extra clothing in a stuff sack or inside a sweater with the sleeves tied together.



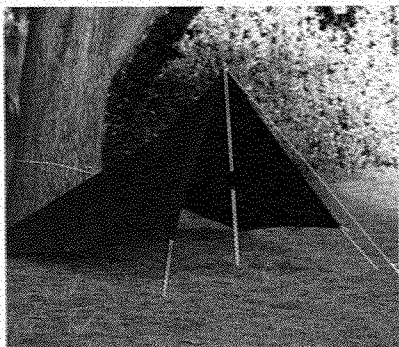
Remember to pack a small repair kit for patching punctures in your sleeping pad.

## Shelter

Having the right kind of shelter means you can always camp comfortably and in such a way that the land will not be harmed by your presence.

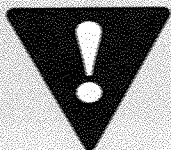
### Tarps

The simplest backpacking shelter is a tarp that weighs just a few pounds and can be set up in dozens of ways. You can use a tarp as your primary shelter or as a dining fly to protect your group's gear and cooking area from the weather. Rig it with lengths of parachute cord at the corners and as a ridgeline. A tarp has no floor, which can pose challenges in soggy terrain, nor does it have netting to keep insects away. Still, for a flexible, lightweight shelter in mild or hot climates, a tarp is hard to beat.



### Snow Shelters

If you are on a winter backpacking trek, you might dig a snow cave or build an igloo. A good snow structure can be the warmest and most secure of winter shelters, but it also can take half a day to construct. It is a good idea to have a tent with you as a backup shelter. When leaving camp, always dismantle any snow structures you built.



Before going into rugged snow country, familiarize yourself with the causes of avalanches, how to avoid them, and what to do if your party is caught in one.

Be alert for the warning signs

of hypothermia, frostbite, and dehydration in yourself and your companions. See also the chapters "Minimizing Risk" and "Expect the Unexpected."

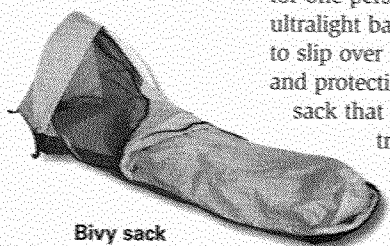


## Bivy Sacks and Shelters

The bivouac or “bivy” sack is a very small, lightweight shelter for one person. It is extremely popular with mountain climbers, ultralight backpackers, and the military. Bivy sacks are designed to slip over a sleeping bag and provide additional insulation and protection from wind and rain. Choose a high-quality bivy sack that fits your sleeping bag. Low-quality bivy sacks can trap moisture that permeates the sleeping bag.

Bivy shelters provide the same low-profile design as bivy sacks, but they use metal hoops—the kind used in tents—over the head and feet.

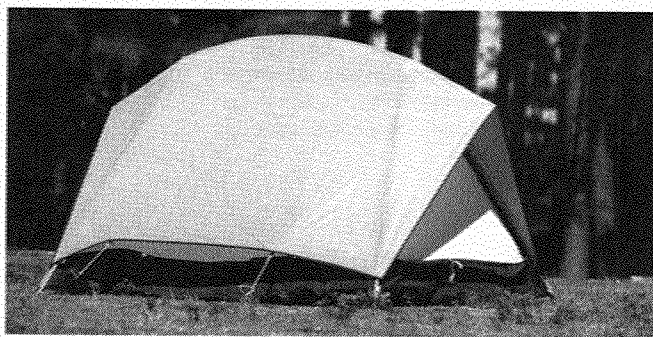
These hoops keep the shelter from constant contact with the sleeping bag so moisture doesn't form.



Bivy sack

## Tents

Most backpackers use tents for shelter. Among the factors to consider when comparing tents are season, size, and shape. Three-season tents are intended for general year-round use. Many have mosquito-netting panels to allow for bug-free ventilation in warm weather. Four-season tents are built to withstand the strong winds and snow loads of winter. Most are heavier than three-season tents. Backcountry tents come in sizes suitable for one, two, three, or four sleepers.



A-frame tent

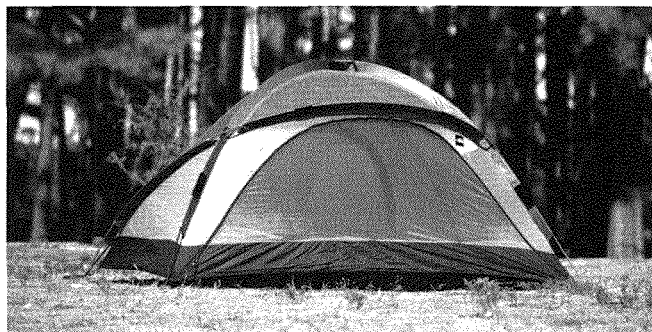
**A-Frame.** An A-frame tent is roomy and usually has a waterproof floor and mosquito netting vents and doors. Breathable fabric allows moisture to escape from inside the shelter, while a waterproof rain fly protects the tent from exterior moisture. Weighing 5 to 9 pounds, a two-person A-frame tent will keep a couple of hikers and their gear dry.



**Dome.** Flexible aluminum poles have allowed tent makers to develop dome-shaped tents. Domes stand up well in rain, wind, and snow, and the spaciousness of their interiors makes them great for two to four campers. A dome tent can be flipped upside down in the morning to shake out debris and dry the bottom of the tent floor.



Dome tent



Hybrid tent

**Hybrids.** Tent designers are constantly trying to improve their products by altering or combining basic tent shapes, adding features, and even removing basic features. Sometimes the results are an odd shape, but occasionally there are advances that make tents lighter, roomier, stronger, and more useful.

With so many tents on the market, you will want to shop around until you find the shelter that is just right for you. Ask a salesperson to help you pitch tents in the showroom, then crawl inside and check them for size, comfort, and quality of construction. Also consider how easy a tent will be to set up and take down in windy, cold, or stormy weather or after dark.

Your tent may need a ground cloth—a sheet of plastic under your tent—to protect the floor and keep moisture from seeping through. Place the cloth so that it does not extend beyond the area covered by the tent. Most quality tents today have tough, waterproof floors that make a ground cloth unnecessary.

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The first thing to fail on a tent usually is the zipper, as a result of grit getting in the teeth. To help improve your tent's longevity, after every few trips, vacuum the zipper to get rid of sand and other debris.

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Lids hold in heat, shorten cooking times, and prevent dust and insects from blowing into your food.

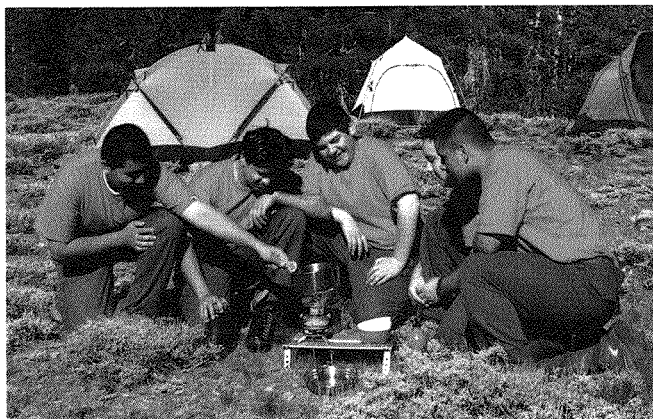
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### Cooking Gear

What you need for cooking, eating, and drinking depends upon what you intend to cook, eat, and drink. Usually, you will need a stove or two, pots and pans, and an eating kit for each individual.

One or two lightweight cooking pots will form the foundation of your kitchen. Add another pot or frying pan for more complicated meal preparations. Don't forget the lids. Match your meals to your cooking gear and carry only what you need. Be sure to have a handkerchief or pot grabber to retrieve hot pots safely.



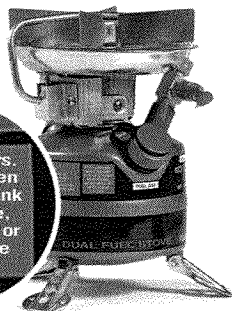
## Backpacking Stoves

Of the many backpacking stoves on the market, those burning the following fuels are most useful in the backcountry. Always read and follow the manufacturer's instructions for carrying, fueling, using, and storing stoves. Be sure to check the BSA local council and local regulations on permissible stove fuels.

**White-Gas Stoves.** White gas is a highly distilled fuel used in many North American backpacking stoves. White gas is extremely volatile and must be carried, stored, and used with the utmost caution. White-gas stoves raise the temperature of the liquid fuel that runs through the supply line so that it exits the line as a gas, allowing for high-burning temperatures. White gas is pressurized by the user, which differs from canister fuels and is a real advantage in cold weather. All fuel tanks must be packed out for proper disposal or recycling.



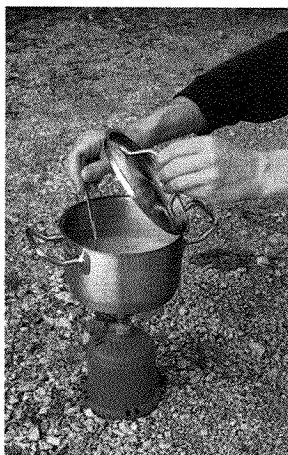
Fill outdoors. Never loosen cap or fill tank near flame, pilot lights, or white stove is hot.



Because legal restrictions often prohibit transporting camp stoves and any type of fuel on aircraft, ferries, and other means of public transportation, you may want to ship your stove ahead to be safe. Better yet, plan to buy one when you reach your destination, before setting off on your adventure.

**Canister Stoves.** Simplicity, safety, and convenience are features of canister stoves. A canister is a metal container of pressurized butane or propane gas. To use a canister stove, attach a canister, turn the control knob, and light the burner. Canister stoves operate well in warm weather and at high altitudes but can lose efficiency as the temperature drops. Empty canisters must be packed out for disposal or recycling.

**Alcohol Stoves.** Their transportability and ease of use make alcohol stoves a practical choice for a short-term trek in fair weather. These lightweight stoves are very safe and reliable. Because they do not produce the heat typical of other types of camp stoves, alcohol stoves are best for small meals. Be sure to use a windscreen with this stove.



Canister stove

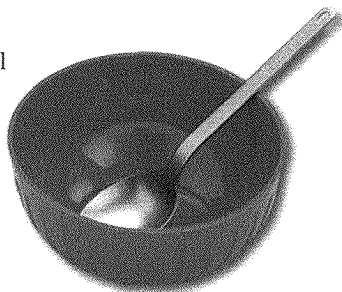
## Using Chemical-Fuel Stoves Safely

Follow these guidelines for the safe use of chemical-fuel stoves.

1. Use compressed- or liquid-gas stoves only with knowledgeable adult supervision and only where and when permitted. At home, store fuel containers in a shed, garage, or other uninhabited structure.
2. Read and understand the manufacturer's instructions before lighting any stove. Follow the instructions exactly.
3. Keep liquid fuels in well-marked, approved containers only and never in a glass container. Store fuel in a ventilated, locked box a minimum of 20 feet from buildings and tents. Keep all chemical-fuel containers away from stoves and campfires and store them below 100 degrees.
4. Let a stove cool completely before changing cylinders of compressed gases, refilling from containers of liquid gas, and storing the stove. For long-term storage (a month or more), empty the fuel tank.
5. Refill liquid-gas stoves a safe distance from any flames, including other stoves, campfires, and personal smoking substances. For safety and performance, use a commercial camp stove fuel. Pour through a filter funnel, and recap both the device and the fuel container before igniting.
6. Never fuel or use a stove inside or near a tent or cabin; always do this in the outdoors. Do not operate a stove in an unventilated structure.
7. Place the stove on a level, secure surface before operating. On snow, place insulated support under the stove to prevent melting and tipping.
8. Before lighting a compressed-gas or pressurized liquid-gas stove, check the fittings for leakage by coating them with a soap solution. If gas is leaking, the leaking gas will cause the soap solution to form bubbles, signaling a leak and its general location.
9. To avoid possible fires, locate gas tanks, stoves, etc., downhill from tents since heavy leakage of gases will flow downhill.
10. Keep your head and body to one side of the stove when lighting it. Open the stove valve quickly for two full turns and light carefully with head, fingers, and hands to the side of the burner, then adjust the valve down.
11. Never leave a burning stove unattended.
12. Do not overload a stove with heavy pots or large frying pans. Instead, set up a grill with legs to hold the pot, and place the stove under the grill.
13. Pack out empty fuel containers for proper disposal back home. Keep empty fuel bottles and canisters away from sources of heat, which can cause the empty containers to explode.

## Eating Kit

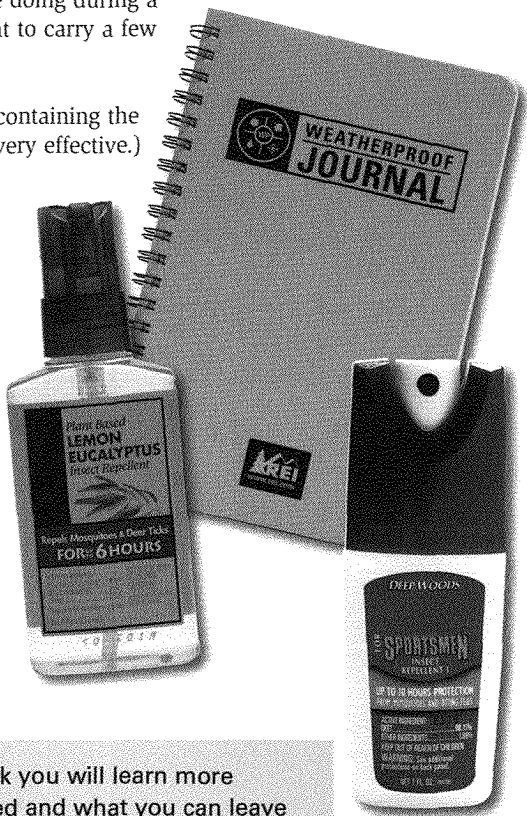
A large plastic cereal bowl or kitchen storage bowl is good for most meals, and you can dig your way through most backcountry meals with nothing more than a spoon. An insulated plastic mug that won't burn your lips is just the thing for soup and any drink.



## Other Gear

Depending on what you will be doing during a backpacking trip, you may want to carry a few of the following items:

- Nylon cord
- Insect repellent (Those containing the chemical DEET can be very effective.)
- Notebook and a pen
- Repair kit (duct tape, needle, thread)
- Hiking stick or trekking poles
- Whistle
- Camera
- Binoculars
- Fishing gear
- Field guides

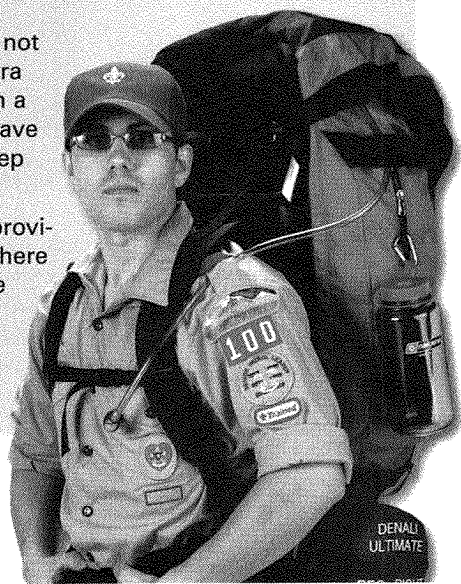


Each time you go on a trek you will learn more about what you really need and what you can leave at home next time. By eliminating ounces wherever you can, you will shave pounds off the weight on your back.

## Pack Weight

How much your pack weighs depends on the length of the adventure you have planned, the amount of food and equipment you must carry, and your personal preferences. For comfort on the trail, a pack containing everything you need for a safe trek should tip the scale at no more than 25 percent of your body's weight. If your pack weighs less, so much the better. If your pack weighs more, here are some tips for lightening your pack without compromising your health or safety.

1. Do a shakedown before every trip to "shake out" everything you won't need.
2. Divide group gear so that each person carries a fair share.
3. Gradually replace your heavy equipment and clothing with lighter items. For example, a standard flashlight with C batteries can weigh a pound or more, while a modern LED headlight weighs only ounces.
4. Choose lightweight hiking boots over stiff, heavy footwear.
5. Prepare one-pot meals featuring pasta, powdered sauce mixes, and other ingredients that are dry, easy to pack, and not very heavy.
6. Match cookware with menus. A couple of lightweight pots with lids may be all you need.
7. Get used to your hiking clothes. Wearing the same outfit three or four days in a row can save a lot of space and weight, and nobody in the backcountry is going to mind.
8. Share personal items. One small tube of toothpaste is probably enough for everybody.
9. Carefully consider anything that is not essential. Books, binoculars, camera tripods, and other items can enrich a trek, but remember that you will have their weight on your back every step of the way.
10. Review a list of all your gear and provisions when you get home. See if there is anything you can do without the next time.





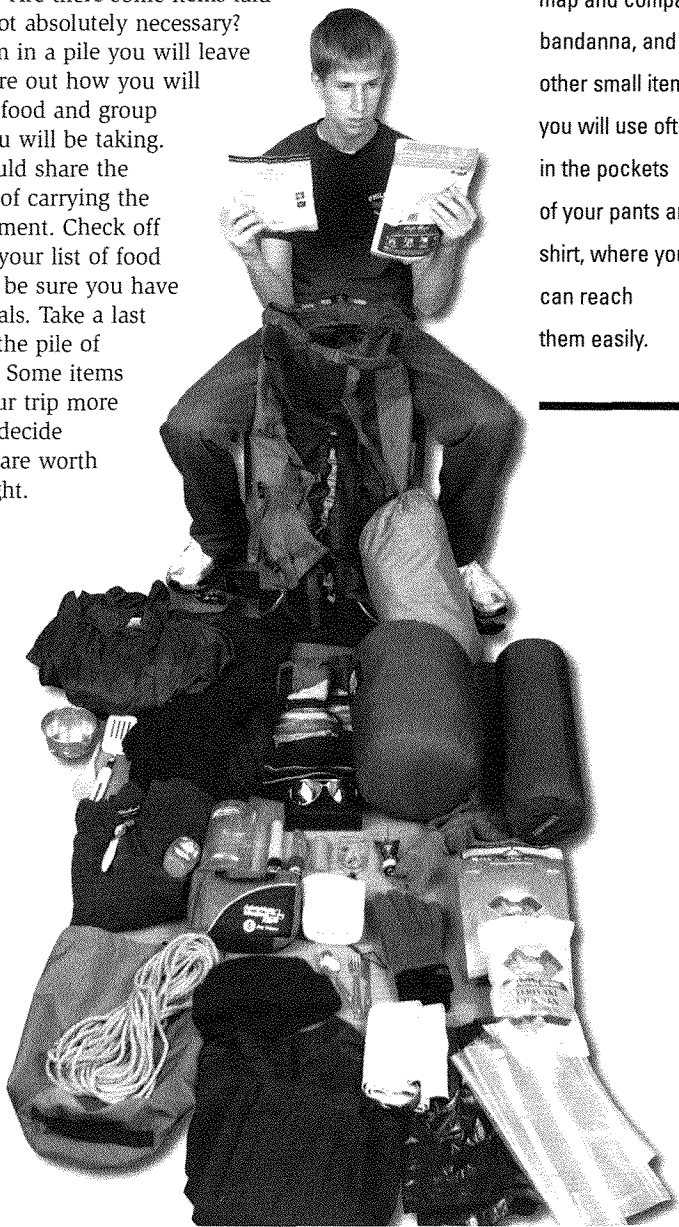
## Prehike Inspection

A day or two before you depart on a backpacking trip, spread out all the equipment, clothing, and provisions you and your group intend to take. It's the moment of truth. Consider each item carefully. Are there some items laid out that are not absolutely necessary? If so, put them in a pile you will leave at home. Figure out how you will divide up the food and group equipment you will be taking. Everyone should share the responsibility of carrying the group's equipment. Check off each item on your list of food and gear, and be sure you have all the essentials. Take a last look through the pile of nonessentials. Some items may make your trip more pleasant, but decide whether they are worth the extra weight.

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Keep your pocketknife, map and compass, bandanna, and other small items you will use often in the pockets of your pants and shirt, where you can reach them easily.

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## Loading and Hoisting Your Pack

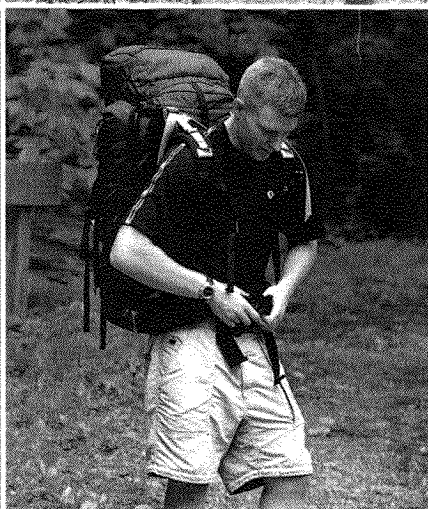
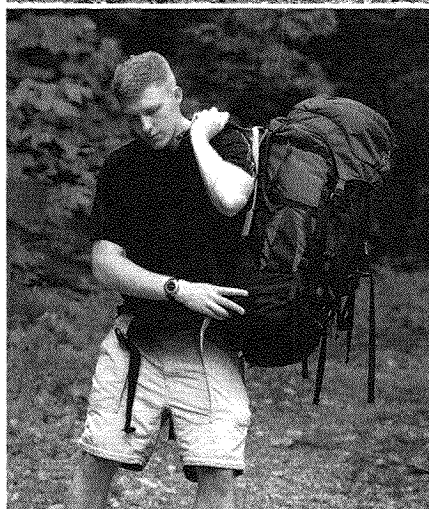
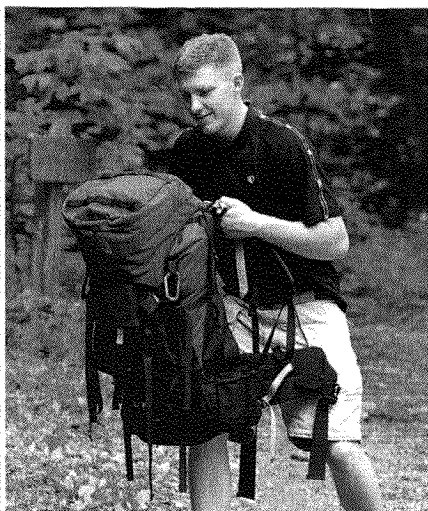
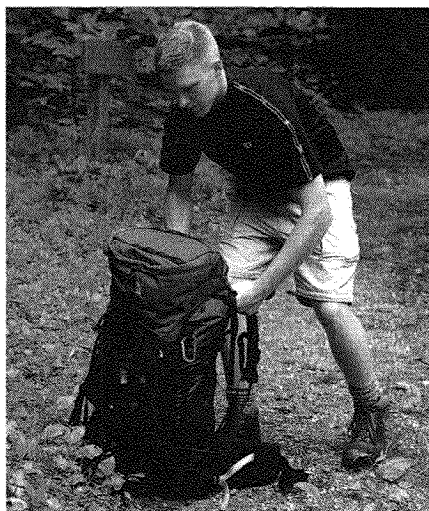
Once you have decided what to take and what to leave behind, it is time to see if it all fits in your pack. Loading a backpack is something of an art. Equipment you won't need until you make camp can go deep in your pack.

Rain gear, your first-aid kit, a sweater, dry socks, and your lunch should ride just under the main flap.

Use the outside pockets of your pack to carry your water bottle, sun and insect protection, and trail snacks. Put fuel bottles or cylinders in an outside pocket, isolated from the rest of your supplies.

Place your sleeping bag low in your pack (some packs have a special pocket for it) and away from smellable items so you don't attract animals while you sleep. Keep heavy items above your sleeping bag and close to your spine. Heavy items often include the group's food and personal water supply (hydration pack). Arrange the remaining gear and provisions so that the pack's center of gravity is high and close to your back.





To hoist your pack, grasp both shoulder straps, lift your pack waist high, and rest the bottom of the pack on your thigh. Slip an arm through a shoulder strap and smoothly swing the pack onto your back, easing your other arm through the remaining strap. Lean forward at the waist to hoist your pack into position. Buckle the waist belt and adjust the shoulder straps so that most of the weight rides on your hips.

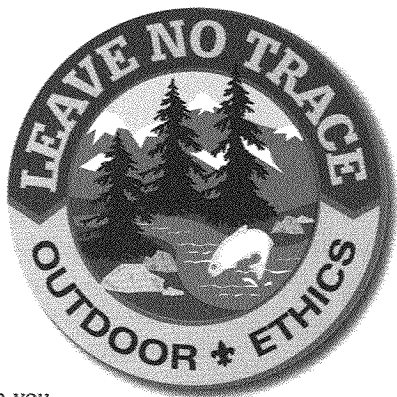


# Leave No Trace Backpacking

Caring for the environment is an important responsibility of every backpacker. The principles of Leave No Trace can help you live up to that responsibility and enjoy the outdoors fully by knowing that you are respecting the environment.

## Leave No Trace Principles

As you and your group plan your adventure, ask yourselves how you can follow each of the Leave No Trace guidelines. In addition to adhering to no-trace principles, you should also hike and backpack with sustainability in mind. The goal should be to leave minimal impact on the surroundings not only for the next group of backpackers but also for generations to come.



## Plan Ahead and Prepare

Contact the management personnel of the area you intend to visit or the Leave No Trace Center for Outdoor Ethics (see the resources section for contact information). Explain the trek you have in mind and ask how you can best implement Leave No Trace. Here are some general guidelines.

- Know the regulations and special concerns for the area you will visit.
- Prepare for extreme weather, hazards, and emergencies.
- Schedule your trip to avoid times of high use.
- Whenever possible, visit the backcountry in small groups.



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In pristine areas, disperse use to prevent the creation of new campsites and trails. Avoid places where impacts are just beginning.

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### Travel and Camp on Durable Surfaces

Stay on existing pathways and in designated campsites to help protect the surrounding landscape from being trampled, eroded, and compacted.

- In popular areas, seek durable surfaces (established trails and campsites, rock, gravel, dry grasses, snow).
- Protect shoreline vegetation; camp at least 200 feet (about 70 adult paces) from lakes and streams.
- Walk single file in the middle of the trail, even if it is wet or muddy.
- Keep campsites small and conduct activities in areas where vegetation is absent.





## Dispose of Waste Properly

Remember this solid guideline: *Pack it in, pack it out.* Make it easier on yourself by limiting the amount of potential trash you take. Refine your food lists so that most of your provisions will be consumed. Before you leave a campsite or rest area, make a thorough inspection for litter and spilled foods.



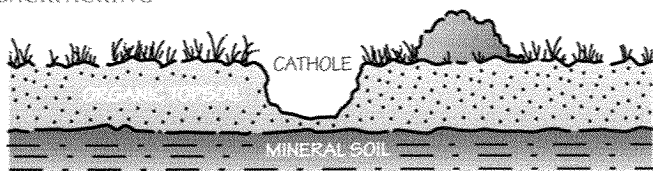

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Water used for personal washing or for laundry does not need to be strained.

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It is obvious that packing out litter helps keep the backcountry pristine, but you also need to be conscious of other sources of waste such as the water you use to wash your face, your clothes, or the dishes. Select a wash site at least 200 feet from any streams, lakes, or other sources of water. Using a strainer or sieve, strain any food particles out of dishwater and put the particles in a plastic bag along with other bits of left-over food. Pack the bag out. Dispose of the water by dispersing it over a wide area.

Especially important is the disposal of human waste. If toilet facilities are available, use them. Otherwise, urinate away from trails, camps, and other gathering places. Choose rocks or bare ground; animals may strip vegetation in their efforts to consume the salts left by concentrations of urine. Dispose of solid waste by digging a cathole or packing out the waste. Check with the land management agency for the area you will visit to find out the preferred method.



WATER SOURCE • TRAIL • CAMPSITE 200+ FEET

To dig a cathole, choose a remote spot at least 200 feet (about 70 adult paces) from camps, trails, water, and dry gullies. With a trowel, dig a hole 6 to 8 inches deep in the topsoil. Take care of business, cover the hole with soil, and disguise the site with leaves or other ground cover. Organic material in the topsoil will slowly break down the waste, making it harmless.

If you are required to pack out solid waste, bring a supply of pack-it-out bags designed for use in wilderness areas. These tear- and puncture-resistant bags contain chemicals designed to neutralize odors. Check the manufacturer's instructions for details about safe disposal of the bags. (See the resources section for product information.)

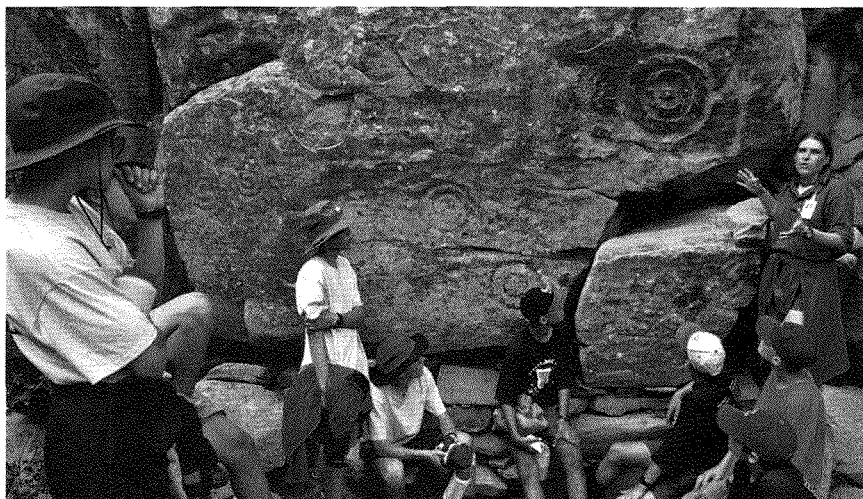
## Keep Healthy While Backpacking

Always start a trip with clean utensils, pocketknives, and kitchen gear. To help prevent the spread of germs, all members of a group should have and use their own water bottles and eating utensils.

To keep cooking and eating gear clean and sanitary, set up a dishwashing system. Fill a wash pot with hot water and add a few drops of biodegradable soap. Wash pots and utensils and rinse them in a pot of cold water that contains a few drops of bleach or a sanitizing tablet and then in a pot of clear hot water. Allow clean dishes and pots to air dry.

Set out a small plastic pump bottle of alcohol-based, waterless cleanser to use before handling food or upon returning from a latrine or cathole. A small dab rubbed on the hands will kill most harmful germs and then evaporate, leaving hands dry without the need of a towel.



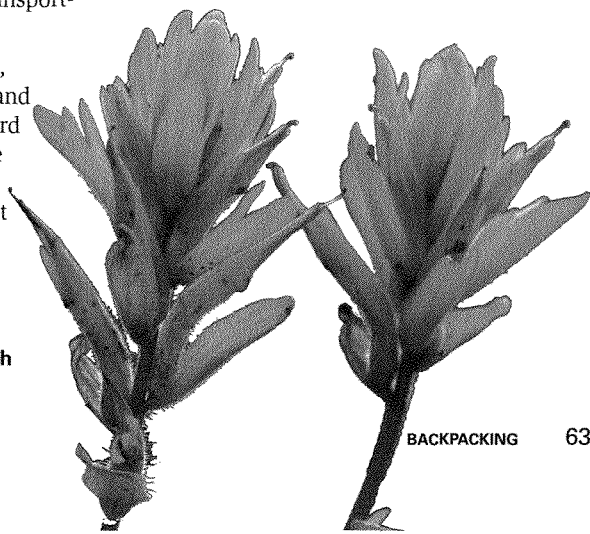


### Leave What You Find

A cluster of flowers beside an alpine trail. Bricks from a historic homestead. A bird's nest on a low bush. Every backpacking trip will bring with it a new discovery to see and enjoy. Here are some reasons why you should leave what you find.

- Future backcountry visitors will have the excitement of discovering for themselves what you have found.
- Plant and wildlife environments will not be harmed. Leave rocks and other natural objects as you find them. Avoid introducing or transporting nonnative species.
- Archaeological, cultural, and historic structures and artifacts preserve a record of America's past; some are sacred to Native Americans. Observe, but do not touch or take.

**Indian paintbrush**





### Minimize Campfire Impacts

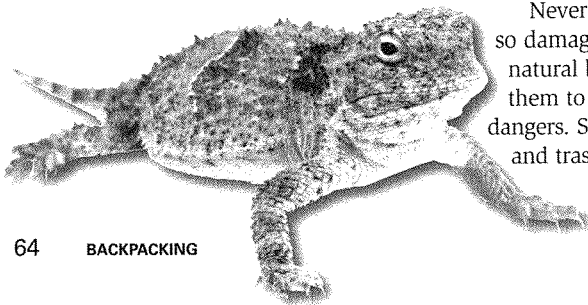
Today's backpackers have many options for cooking without an open fire and for staying warm. They also have a good understanding of when a campfire can be kindled and when a fire could scar the land. In many areas, fires are discouraged or prohibited, or are allowed by permit only. If you must make a campfire, observe these guidelines.

- Use established fire rings, fire pans, or mound fires.
- Keep fires small. Use only sticks from the ground that can be broken by hand.
- Burn all wood and coals to ash, make sure the ashes are cold out, then scatter the cool ashes.

### Respect Wildlife

Sharing the outdoors with wildlife is one of the great pleasures of backpacking. Respect wildlife by always traveling quietly (except in grizzly bear habitat) and observing animals from a distance. You are too close if an animal changes its activities because of your actions. Always avoid wildlife when they are mating, nesting, or raising young, and during other sensitive times.

Never feed animals. Doing so damages their health, alters natural behaviors, and exposes them to predators and other dangers. Store all your food and trash securely.



**Round-tailed  
horned lizard**

## Be Considerate of Other Visitors

Extending courtesy to other outdoor visitors is a natural habit of backpackers. Speak softly and avoid unnecessary noise. Leave radios and electronic devices at home. If you carry a mobile telephone for emergency communication, turn it off and stow it in your pack until you need it. Appreciate the company of those you meet on the trail and at campsites near yours, but respect their desire for quiet and solitude.

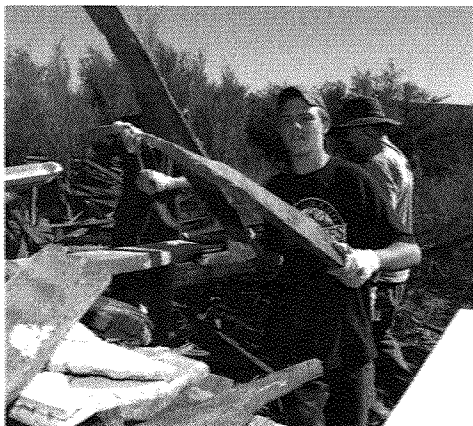
Observe proper trail etiquette. If you encounter horseback riders or pack animals, stop and ask the lead rider what you should do. The lead rider will probably ask you to step a few paces downhill from the trail and stand quietly while the animals pass. If you encounter other hikers or backpackers going uphill when you are going downhill, give them the right-of-way. Step aside on a rock or a log to minimize your impact.

## Service Project

Aside from your commitment to Leave No Trace, find out what else you can do to help preserve the wilderness. Contact land managers and conservation organizations. Your crew might help repair or maintain existing trails, build a new trail, clean water bars and other drainage structures, or clear fallen logs from backcountry routes.

When you arrange to work on a service project, find out from land managers what tools or equipment you will need. You may be able to trek to a work site where equipment is already in place. Camping near and taking part for several days in a backcountry conservation project will involve hard work, but it will be tremendously rewarding.

Including service projects as a regular part of your outdoor adventures can lead to a long-term partnership with land managers. As they become acquainted with you and learn of your commitment and skills, they are likely to put more effort into matching your group with interesting projects that will allow you to make a real difference.




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If possible, camp away from trails and other visitors. Minimize the likelihood that other people will see you and your camp by choosing earth-toned clothing, equipment, and tents.

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Control pets at all times, or leave them at home.

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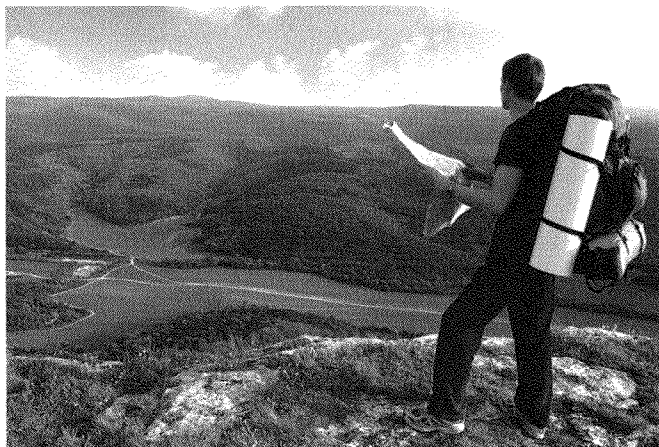


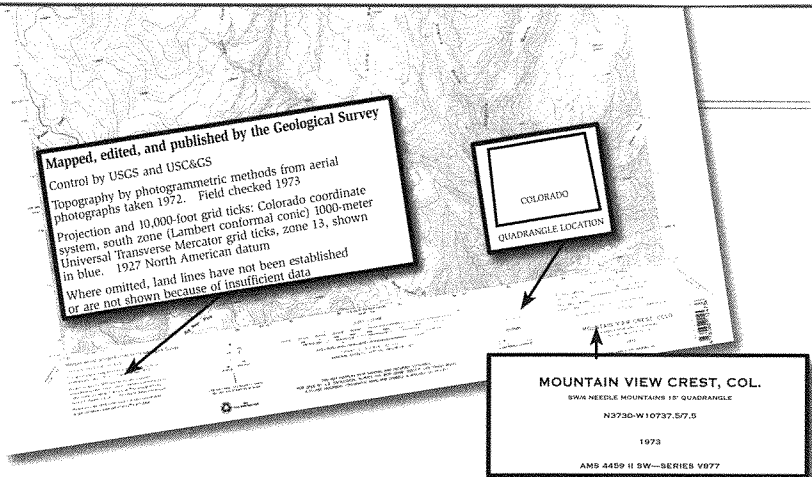
# Finding Your Way

Even if you trek along well-marked trails, you should master the use of navigational tools. In poor weather, storms can obscure familiar landmarks and destroy trail signs. A section of the path could be closed, rerouted, or washed out. No problem. With a map and compass or a map and GPS receiver and the right knowledge, you can find out where you are and the best way to reach your destination.

## Topographic Maps

Maps are written records of places. **Topographic maps** show the shape of the terrain. The most useful maps for backpackers are those based upon data prepared by the U.S. Geological Survey of the Department of the Interior. Sporting goods stores often carry topographic maps of nearby recreational areas. For a fee, maps for many parts of the country can be downloaded from internet sites (with a parent's permission) or ordered directly from the USGS. (See the resources section for ordering information.)



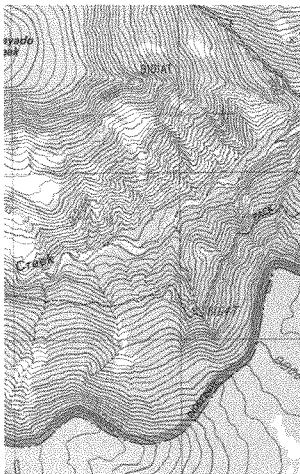


The margins of a USGS map contain a wealth of useful information. For example, the date printed in a map's margin indicates the year the map was created or most recently revised. The newer a map, the more accurately it will portray the current appearance of an area. Other useful information you will find in the margins include details on the map's scale, contour intervals, and the boundaries of the area covered on the map.

Cartographers use different colors to indicate the various landscape features of a topographic map.

- **Blue** indicates aquatic features—streams, lakes, oceans, and wetlands. Contour lines on glaciers and permanent snowfields also are blue. Aquatic landmarks such as rivers and lakes are further denoted by having their names printed in italics.
- **Green** indicates vegetation, usually forests. The darker the green, the denser the vegetation.
- **White** signifies land such as meadows and boulder fields with little or no tall vegetation.
- **Black** designates human-made structures—buildings, railroads, trails, etc. Names of geographical features are always printed in black.
- **Red** indicates certain survey lines (township and range, for instance) and highlights primary highways and other significant constructed features.
- **Purple** overlays show revisions to a map that are based on aerial photos but have not yet been fully verified in the field.
- **Brown** is reserved for contour lines and elevations.

A topographic map is a two-dimensional model of the three-dimensional world. The fundamental feature of a topographic map is the **contour line**. Drawn with brown ink, each contour line represents an elevation above sea level. The vertical difference between adjacent contour lines is indicated in the margin of a map as that map's **contour interval**—anywhere from 10 feet to 200 feet, depending on the scale of the map and the ruggedness of the terrain.



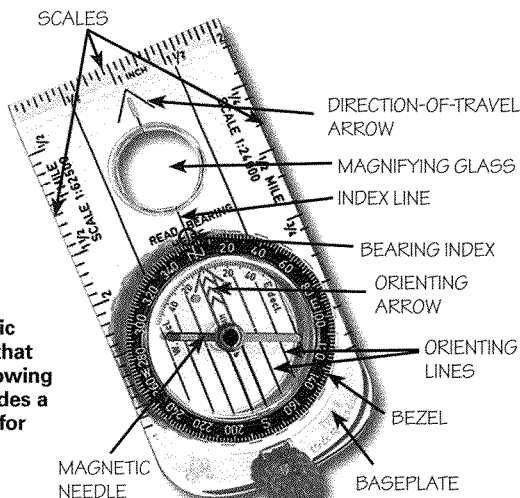
Contour lines that are close together indicate steep areas. Contour lines that are farther apart denote areas that are less steep. Maps with few contour lines signify relatively flat terrain such as a prairie or wetland.

## Compasses

A **baseplate compass** is the most useful type of compass for backcountry navigation. It consists of a magnetized needle balanced inside a circular, rotating housing mounted atop a baseplate. The plate is etched with a **direction-of-travel arrow**. The floor of the compass housing is engraved with an **orienting arrow** and, parallel to it, several north-south orienting lines.

The circumference of the housing is divided into directions—north, south, east, and west—and further divided into 360 degrees. You will see that  $0^\circ$  coincides with north,  $90^\circ$  with east,  $180^\circ$  with south,  $270^\circ$  with west, and  $360^\circ$  is again north ( $0^\circ$  and  $360^\circ$  overlap as they close the circle).

**The baseplate compass, a magnetic needle within a 360-degree bezel that rotates on a clear plastic base (allowing maps to be read beneath it), provides a convenient and accurate platform for working with bearings.**



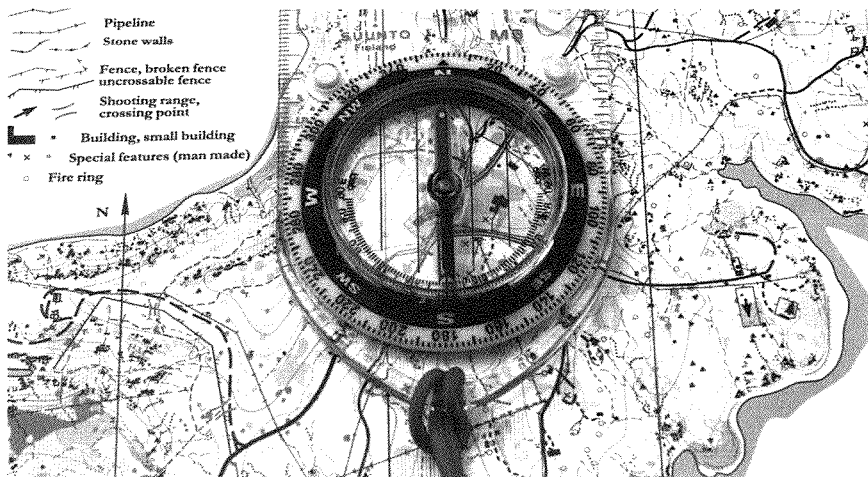
## Declination

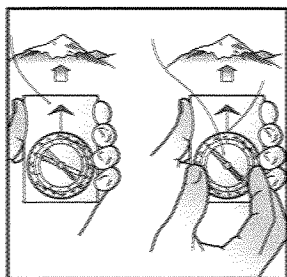
Most maps are drawn with the North Pole as the controlling reference point. A compass needle is pulled toward magnetic north, though, not the true north of the North Pole. The difference between a true north-south line and the direction that the compass needle points is called declination. Two arrows in the margin of a map, one pointing toward true north and the other pointing toward magnetic north, illustrate the declination of a particular map.

## Orienting a Map

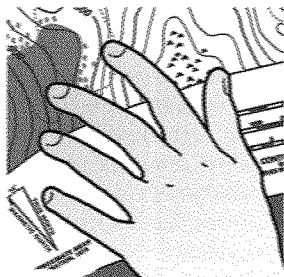
A map that is oriented is aligned with the topography it represents. Landscape features in the real world have the same directional relationships to one another as they do on the map.

To orient your map, hold the compass on the map and rotate the compass housing until *N* (360 degrees) touches the direction-of-travel arrow. Place the edge of the compass along-side the arrow in the map's margin that points toward magnetic north. (The direction-of-travel arrow on the compass will be pointing toward the top of the map.) Turn the map and compass as a unit until the compass needle lies directly over the compass-housing arrow. (The red end of the needle should always point toward the red end of the compass-housing arrow.) The map is now oriented.





Taking a bearing is simply measuring a direction from one point on the ground to another.



As you orient the map, check the terrain around you to ensure that it matches what you see on the map.



With a map and compass, you can identify a landmark that you can see from the ground if you know where you are on the map.

## Identifying Landmarks

Have you ever seen a distant ridge of mountains and wondered what each summit is called? With a compass and a sharp eye, you can identify any landmark prominent enough to appear on your map.

To identify landmarks, hold the compass in the palm of your hand, and point the direction-of-travel arrow on the baseplate at a mountaintop, lake, or other landmark feature you wish to identify. Turn the compass housing until the magnetic needle is inside the compass housing arrow. This will give you the **bearing** from your position to the landmark.

Next, place the compass on your oriented map with the long edge of the baseplate touching the spot that represents your present location. Rotate the entire compass around that point on the map until the magnetic needle is again inside the compass-housing arrow. Beginning from the map symbol for your location, draw an actual or imaginary line *away from yourself* along the edge of the baseplate. The line should intersect the point on the map representing the landmark.

## Finding Your Location

If you are not sure where you are, but you can see several landmarks that are indicated on your map, it is easy to determine your location. First, point the direction-of-travel arrow on your compass at one of the landmarks—a mountaintop, a meadow, a building, etc. Holding the baseplate steady, turn the compass housing until the magnetic needle is inside the compass-housing arrow.

Now place the compass on your oriented map with the edge of the baseplate touching the symbol representing the landmark. Rotate the entire compass around that point on the map until the magnetic needle is again inside the compass-housing arrow. Lightly pencil a line *toward* yourself from the landmark symbol along the edge of the compass baseplate.

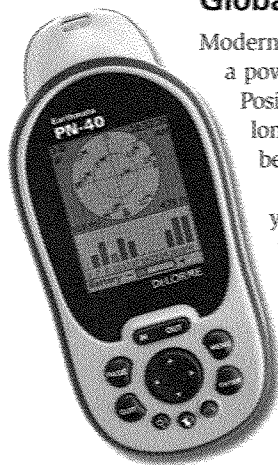
Find a second landmark and repeat the process of taking a bearing, placing the compass on the map and drawing lines toward yourself. The spot on the map at which the lines intersect indicates where you are. Taking a reading on a third landmark can increase the accuracy of your efforts.

## Global Positioning System

Modern technology has provided backcountry travelers with a powerful electronic means of navigation—the Global Positioning System. A GPS receiver accurately calculates the longitude and latitude of any spot on the globe by taking bearings on satellites orbiting 12,000 miles above Earth.

Different receivers work differently, so if you use one, you will have to study the manufacturer's instructions and then put in some time practicing. Once you learn to operate a GPS receiver, you can use it to identify precise locations, determine elevations above sea level, and plot the path of a trek. Inputting this information will create a history in the receiver that can be used if you need to retrace your steps.

Electronic navigational instruments will surely continue to improve in accuracy, versatility, and ease of use. But just as having a calculator does not eliminate the need to know how to add and subtract, a GPS receiver (especially one with dead batteries) is no substitute for being able to navigate the backcountry with traditional tools. Develop confidence in your ability to use maps and compasses and then, if you wish, add to them with a GPS receiver.





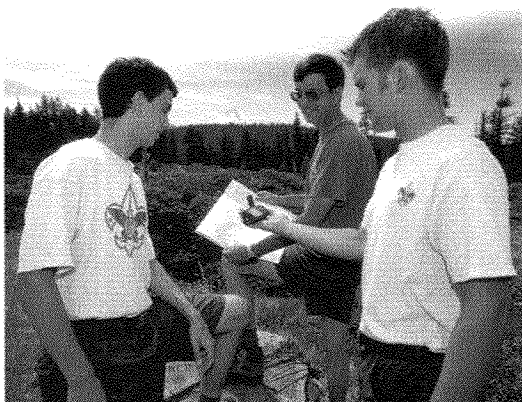
## Staying Found

Maps, compasses, and GPS receivers will be of little help if you don't remember to use them. One of the secrets of safe backcountry hiking is the use of **thumbnail navigation**. This technique calls for your constant awareness of your position. You must carry a topographic map where you can easily refer to it, that is, in your shirt or pants pocket rather than in your pack.

As you hike, you should continuously try to match up features around you with points on your map. Mark the points you identify on your map. Not only will this prevent you from getting too far off your route if you take a wrong turn, it will keep your map-reading skills sharp. With a basic knowledge of route finding and the use of thumbnail navigation, there is little chance of becoming truly lost.

If you find you can't determine your position, the best thing to do is stop walking. *Don't panic*. Sit down and relax. Pull out your thumbnail navigation map and think about the way you came. Discuss with your buddies how long it has been since you passed a feature you identified on your map. With a rough idea of your pace, you should be able to figure out how far from this point you might be. Then you may be able to determine your general position. Look around. Do you recognize any landmarks? If you are on a trail, can you determine which direction leads back to the road?

If you think you are lost, stay put. When you are late returning to your camp or your home, the people with whom you left a trip plan will initiate a search for you. In the meantime, make yourself and your companions comfortable. Erect your tent or build a small shelter. If your shelter doesn't provide enough protection to keep you warm, build a small campfire. If you have a whistle, a distress signal consisting of three short blasts at intervals of about a minute can help a search party find you. Above all, be patient.





# Backcountry Dining

Food is fuel for the body. The harder your body works, the more calories it burns and the more you need to eat. Careful food selection should allow you to eat well with about 1 to 2 pounds of ingredients a day for each person. Decide at home what to prepare for each camp meal, then bring ingredients for each dish. For convenience, premeasure meal items and carry them in plastic bags labeled with the name of the ingredient, the dish, and the preparation instructions.

## Shopping for Backpacking Food

Build your backpacking menus around simple, nutritious ingredients.

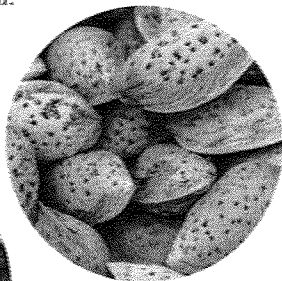
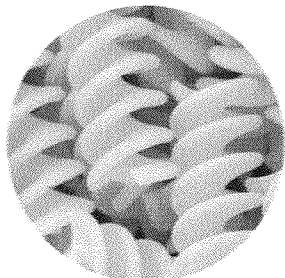
**Dry Foods.** Nuts, pasta, biscuit mix, beans, rice, seeds, powdered milk, and other dry foods form a large portion of a backcountry diet. These ingredients are usually less expensive when purchased in bulk and then repackaged for the trail.

**Fresh Foods.** If you don't mind carrying the weight, you can take fresh fruits and vegetables. They won't keep long without refrigeration, so use them for meals during the first day or two of a backpacking trip.

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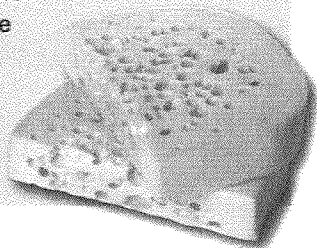
Your body stays warm by burning calories, so you probably will need more food while on a winter hike than a similar hike during the summer.

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## Say Cheese!

Eaten by itself or used as a recipe ingredient, cheese is a fresh-food favorite on the trail. Jack, cheddar, mozzarella, parmesan, and other hard varieties of cheese will stay edible for up to a week without refrigeration, especially if the weather is cool. Cheese sealed in plastic when purchased might also last longer if the airtight wrapping is left unopened. If a layer of mold appears on a piece of cheese, cut it away and use the unaffected portion underneath.



**Canned Foods.** When the weight of your pack is a concern, be very selective about which canned products, if any, you take. Instead of small cans of tuna or boned chicken, take convenient, lightweight pouches. If you must take cans, wash and flatten them, and pack them out of the backcountry.

**Convenience Foods.** Every supermarket has convenience foods that are ready to eat or quick to prepare. Those you might want to include are pancake mixes, jerky, energy bars, macaroni and cheese, or other mixes that require only the addition of hot water.

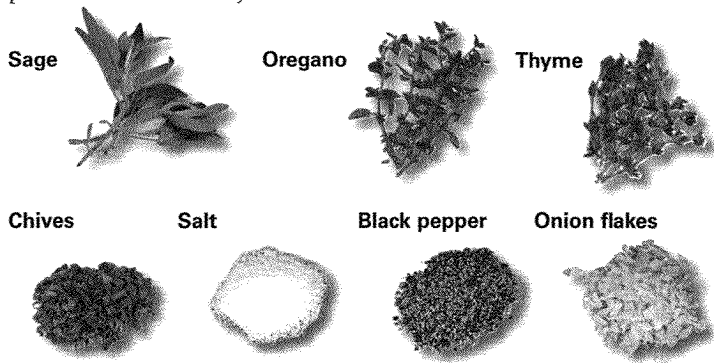


Convenience foods

**Dehydrated Foods.** Dehydrating removes most of the moisture from a food item. The result is a product that weighs ounces rather than pounds and that takes up less space in your pack. The serving sizes listed on many prepackaged foods are optimistic—a freeze-dried meal for four may, in fact, be just enough to feed two hungry backpackers.



**Seasoning Kits.** Seasonings enhance your meals by bringing variety and interest to even the most ordinary recipes. Small plastic bags are good seasoning containers, as are thoroughly cleaned plastic aspirin bottles with tight lids. Label containers with the name of the seasoning. A basic kit might contain salt, black pepper, garlic powder, onion flakes, basil, and chili powder. Add others if you wish.





## Repackaging Food

Grocery store foods often come sealed in a lot of packaging, most of which is useless in the backcountry. Here is how to eliminate excess weight and trash as you organize food for a trek.

Start a pile of food supplies for each meal you will prepare during a trek. Measure the amount of each ingredient that a recipe calls for and put it into a plastic bag. For example, suppose you want to make tuna-rice casserole as a main course. To feed yourself and three companions, you will need 2 cups of white rice, two packets of gravy mix, two cans of tuna, and 3 ounces of dehydrated vegetables.

Measure the rice into a bag and the vegetables into another, then stow them in a larger bag along with the gravy packets and cans of tuna. Write the cooking instructions on a slip of paper and include that in the bag, too. Close the bag and label it to identify the meal it contains.

Camp supply stores sell refillable squeeze tubes and plastic jars with screw-on lids for carrying peanut butter, jelly, margarine, honey, and other messy foods. Guard against leakage by carrying each jar or squeeze tube in its own plastic bag.



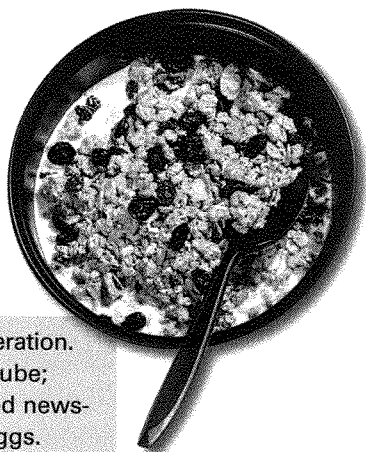
## Preparing Meals in the Backcountry

**Breakfast.** A good breakfast gives you the energy you need to last you through the morning. Include something to drink, some fruit (fresh or dried), and a main course. If you are eager to get out of camp early, a bowl of granola with nuts, fruit, and some reconstituted dry milk can hit the spot. On more leisurely mornings you might prepare hot cereal, pancakes, or scrambled eggs.

Eggs will stay fresh for a few days without refrigeration. Pack a few in an empty cardboard potato chip tube; separate and cushion them with loosely wadded newspaper. Many camping stores carry powdered eggs.

**Lunch.** Plan lunches that require little preparation. Bagels, pita bread, and tortillas are filling and won't get too squished in your pack. Round out a lunch menu with peanut butter or cheese. For dessert, have some fresh fruit or dip into a bag of trail mix.

**Dinner.** After you have set up camp at the end of the day, you have a chance to do some cooking and catch up on nutrients your other meals might have lacked. A one-pot special is a great way to make a simple, nutritious main course.



Before you leave on your trek, familiarize yourself with cooking times and preparation methods for the foods you are bringing. Take simple instructions to use when you are ready to start cooking.



Snacks are important in backcountry nutrition. Fruit, cheese, and trail mix help maintain your energy between meals. Make your own mix by combining nuts, raisins, and other dried fruit in a plastic bag.



### One-Pot Specials

To prepare a one-pot main course, combine one ingredient from each column in the chart below in proportions appropriate for the number of people in your cooking group. Feel free to use more than one item from the Extras column.

Think about the preparation times for each ingredient to determine the order in which you will add the items. Dried vegetables, for example, may require presoaking before being added to the pot, and some sauce mixes dissolve more easily in cold water than in hot. Don't limit yourself to the items listed in the chart. View them as a starting point and feel free to experiment. For more ideas, check out some of the backcountry cooking books listed in the resources section.

1

**Pastas and Grains**  
Noodles, macaroni, rice (white or instant works best), bulgur, couscous

2

**Sauces**  
Soup mixes, gravy mixes, pasta sauce mixes

3

**Proteins**  
Canned or pouch chicken or tuna (one can or pouch should feed two people), jerky (beef, turkey), dried chipped beef, textured vegetable protein (a lightweight meat substitute that is easy to pack)

4

**Extras**  
Cheese, nuts, coconut, raisins, sunflower seeds, bacon bits, dried vegetables, fresh or dehydrated fruit, fresh or dried potatoes, seasonings from your seasonings kit, margarine



## Safe Drinking Water

The safest water to use on a backpacking trip is water you have carried from home. Always start out with two or more full (one-liter) water bottles. Replenish your supply from tested public systems whenever you can. On longer adventures, streams, lakes, springs, and snowfields are potential sources of water. Treat—by boiling, chemical treatment, or filtering—all water you get in the wild before drinking it, no matter how clean it appears to be. Even a seemingly crystal-clear mountain stream may contain invisible microorganisms such as protozoa, bacteria, and viruses that can cause diarrhea, nausea, and vomiting.

**Boiling.** The surest means of making your water safer is to heat it to boiling. If water used for food preparation comes to a boil at least once, it requires no further treatment. Boiling is simple to do and completely effective in killing microorganisms. However, it requires fuel and a campfire or a stove, and it takes time for the water to boil and then cool enough for use as drinking water.

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To keep from getting dehydrated and risking a heat reaction, drink plenty of water throughout the day, even if you don't feel thirsty.

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**Chemical Treatment.** Chemical treatment is simple to use, inexpensive, lightweight, and convenient. Treatment with tablets containing iodine, chlorine, or other chemicals works against waterborne viruses and bacteria. Be sure to read the label to find out how effective the tablets are against protozoa such as *Cryptosporidium* and *Giardia*.

If you treat your water with chemical tablets, you will need to wait for some time before the water is ready to drink.

Tablets also leave a chemical taste in the water, and they lose their potency over time. If you dip your bottle into a stream to obtain water for chemical treatment, be sure to treat the lid and seams by inverting the bottle and opening it slightly so the treated water runs over those areas, minimizing the potential transfer of harmful bacteria.

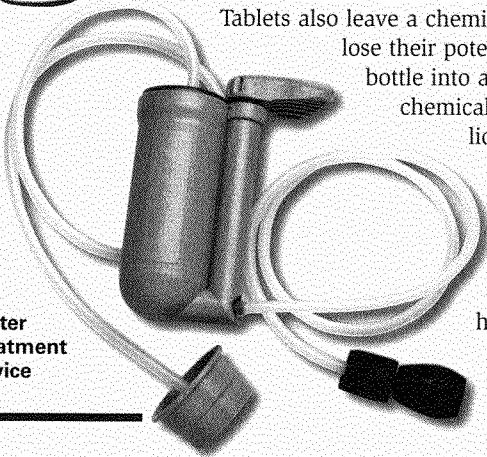
**Filtering.** Most filters are simple handheld pumps used to force water through a screen with pores so small that bacteria and protozoa cannot get through. The finer the screen, the more effective the filter. Information

provided with new filters describes how to use and maintain them and the degree of filtration they can provide.

Filters are effective against protozoa and bacteria; some filters also may be equipped to kill viruses. Filters come in a range of capacities and designs to match the needs of groups of various sizes and the duration of their journeys. Filters, while an excellent choice for longer journeys, can be expensive. In addition, filtering elements must be cleaned or replaced frequently, and the pump mechanisms of filters may malfunction.

Allow muddy water to stand in a container until the silt settles to the bottom. Dip the clear water off the top and remove any remaining organic debris by straining the water through a bandanna into a clean container. Treat the water with a filter or chemical tablets or by bringing it to a boil.

**Water treatment device**



Water used to wash dishes does not need to be treated. Allow everything to air dry before using it again. Most of the harmful microorganisms that exist in water cannot survive in a dry environment.

## Backcountry Food Handling and Storage

Proper handling and care of the food you bring on your trek is important for your health. To stay healthy during your wilderness adventure, eat perishable foods such as eggs and fresh fruits and vegetables within the first days of your trip. Plan most of your meals around ingredients that do not need refrigeration. Lastly, accurately estimate portion sizes to minimize leftovers that could spoil.

Always stow your food beyond the reach of wildlife. Get all the "smellables" out of your tent and pack whenever you will be away from camp or are bedding down for the night. Smellables include all food items, garbage, soap, shampoo, deodorant, lotions, toothbrushes and toothpaste, sunscreen, and lip balm.

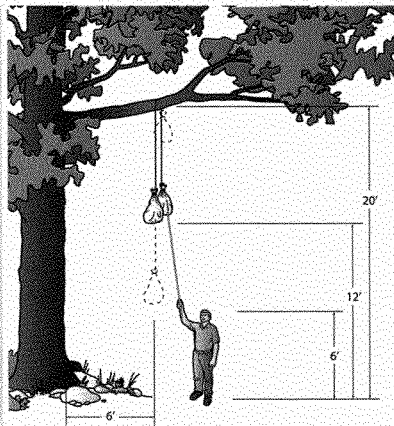
Insect repellent, first-aid kits, clothing soiled with food, and anything else that has an odor can be considered a smellable.

## Don't Feed the Bears!

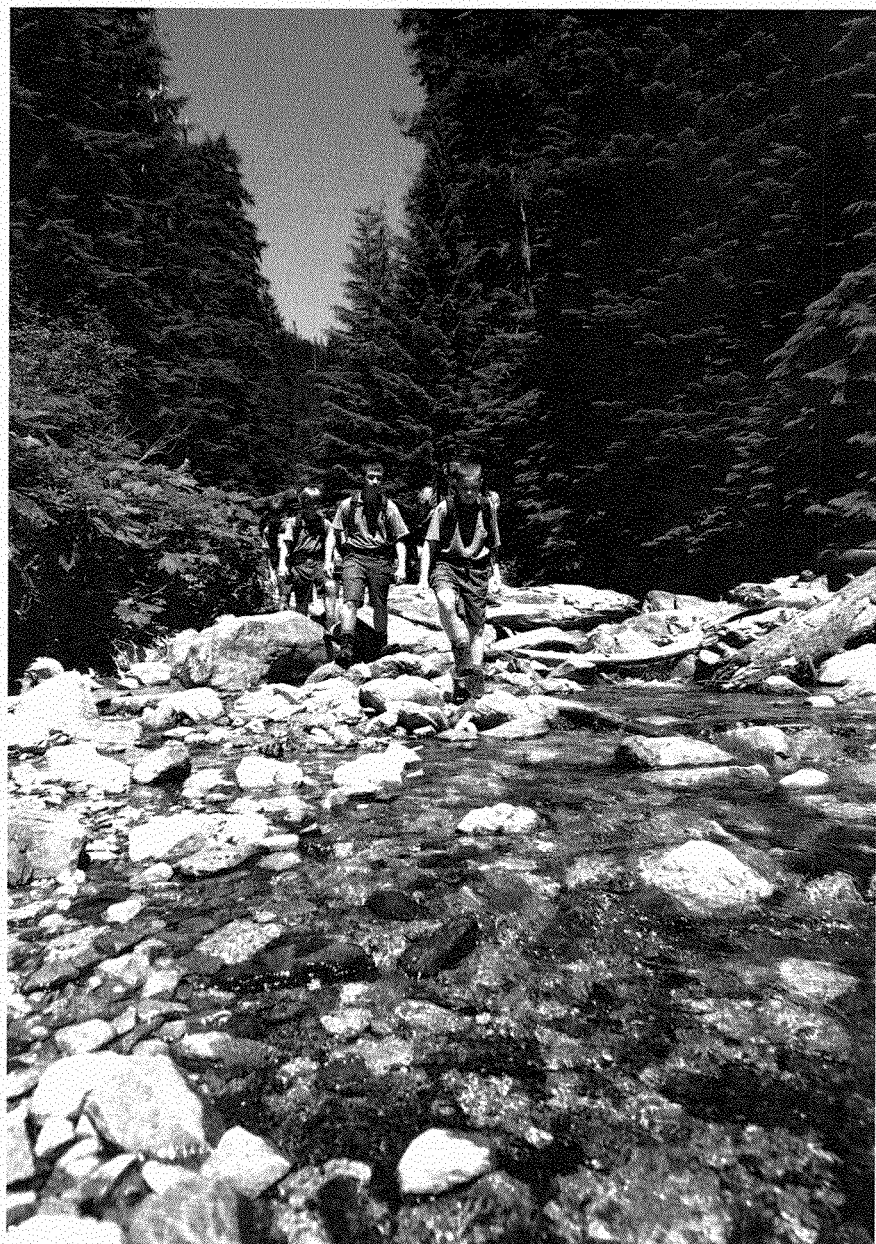
To keep your food out of reach of wildlife, the most reliable method is a hard-shell storage canister. This approach demands careful planning to ensure that provisions will fit inside.

These days, bears in many areas are wise to the bear bag method. If you must use this method, find a tree with a sturdy horizontal branch about 20 feet above the ground. Put a couple of handfuls of soil in a bandanna or plastic bag and secure it to the end of a

50-foot length of nylon parachute cord. Toss the weight over the branch. Stash provisions equally between two waterproof stuff sacks or burlap bear bags, each lined with a heavy-duty plastic trash bag. Twist both closed. Secure the first bag to one end of the cord using a clove hitch. Raise the bag up high. Tie the cord's free end to the second bag; secure the loose end so that it does not dangle, and lift the bag overhead. Use a stick or hiking staff to shove the bags at least 12 feet off the ground. The bags will counterbalance one another and keep your provisions safe. To retrieve the bags, use a stick to push one bag even higher, causing the other to come down within your reach.









# Expect the Unexpected

As you make your way up the trail, remain alert to conditions around you. By thinking about the “what ifs” of your surroundings, you can avoid or minimize risky situations. By knowing what to do in certain situations, you can keep yourself and others safe by taking the right actions at the right time. It may be impossible to anticipate every backcountry risk, but a few of the more common risks are described below.

## Beware of Wildlife

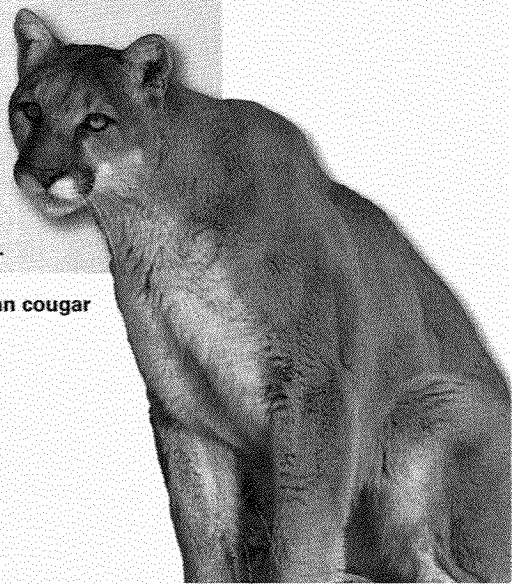
Be especially aware of the kinds of predatory animals you might meet during your adventures. Wolves, coyotes, and cougars (or panthers and pumas) are curious. If you happen upon such an animal, do not approach the animal, run, or play dead. Face the creature and slowly retreat. Make yourself as “big” as possible by waving your arms and clothing above your head. Make a lot of noise, and throw rocks and sticks. If you encounter a bear, do not run or throw anything at the bear. Stay calm, back away, and avoid eye contact with the bear. Remember, no matter what kind of wild animal, give all wildlife a wide berth—especially a mother and her offspring.

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Your trip plan and emergency response plan will serve as guidelines for minimizing risk and for getting out of difficulties when they arise.

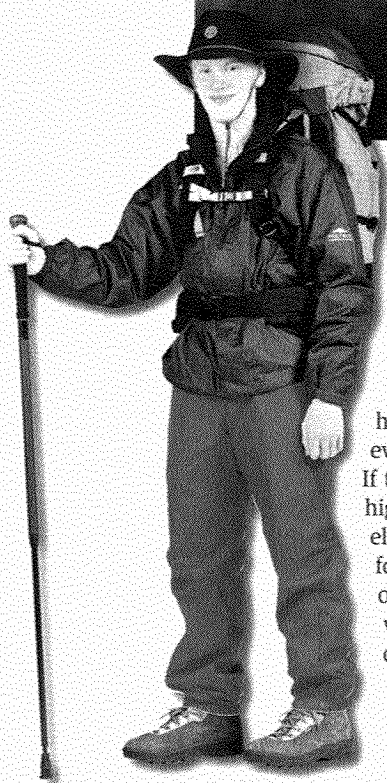
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North American cougar



See the  
"Minimizing Risk"  
chapter for more  
about staying  
safe during  
a thunderstorm.

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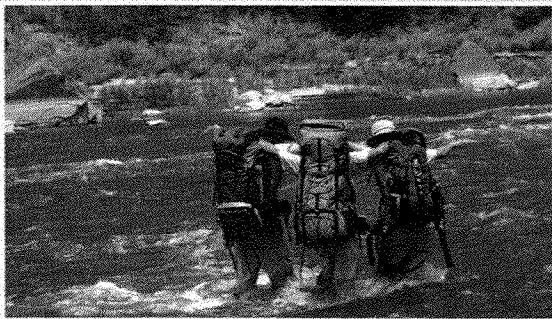
**Storms.** Changing weather conditions is a common risk encountered by backpackers. To avoid getting caught in a storm, keep your eye on the sky. Changes in the clouds, the temperature, and the direction of the wind can all signal an approaching storm.

By anticipating bad weather, you will have time to pull on your rain gear or perhaps even to reach a campsite and put up your tent. If there is lightning in the area, descend from high and open places and take cover at lower elevations and in groves of trees. Watch out for everyone in your crew. If some members of your crew are having a hard time coping with the weather, help them get sheltered, dry, and comfortable.

**Stream Crossings.** Crossing a stream where a bridge has washed out or where no bridge has ever been built is a potential danger that you should consider carefully before attempting. Take a few minutes to study the situation. Look downstream. Should you fall into the water, could you be swept into a rapids or over a falls? If so, go no farther. Be smart and turn back.

If you decide to cross, consider crossing on logs. If a log is wide, dry, and not far above the water, you might feel comfortable walking on top of it. You might also straddle it as you would a horse and scoot your way across the stream.

Before attempting any crossing, unbuckle the waist belt and loosen the shoulder straps of your pack. That way if you do fall, you can get away from your pack before it gets waterlogged and pulls you under the water.

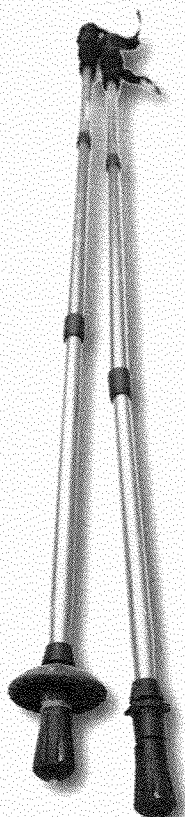


Many streams contain scattered rocks that you can use as stepping stones. However, you must still exercise caution. Plan your route before you leave shore, deciding which stones you will use. Try to step on the center of large rocks, which are more stable than small ones. Beware of loose, mossy rocks that may be slippery.

Wading also is an option, but it requires extra caution. Wade only when a stream is shallow or very calm. Protect your feet by removing your boots and socks and putting on a pair of sneakers. Dry your feet thoroughly when you reach the other side, dump water from your sneakers, and put your boots back on with dry socks.

If a stream is swift or more than knee deep, wading can become difficult. During the spring thaw when the sun is melting snow at the headwaters, a stream will be most dangerous in the afternoon but often quite low at dawn. Be patient enough to wait for safe conditions and wise enough not to challenge a stream that is simply too turbulent.

Be aware of the possible impact the tips of trekking poles may have on the trail.



Adjustable trekking poles

## Hiking Sticks and Trekking Poles

Hiking sticks or trekking poles can help you keep your balance when crossing streams. In addition, they are good for poking around in holes or between rocks to check for snakes, for maintaining a rhythm while you hike, and for absorbing impact and reducing wear and tear on your knees as you hike downhill.

**Avalanche Dangers.** If your group will be traveling in snow country, protect yourselves by knowing where, how, and when an avalanche is likely to occur. An avalanche happens when snow breaks loose on a slope or when a cornice of snow collapses and tumbles down, taking with it rocks, tree branches, and other debris. In springtime, wet avalanches can occur in consolidated snowpacks. If you are out late in the day, know that warmer temperatures increase the chance of a wet avalanche.

Keep an eye out for these signs of danger.

- Steep terrain—avalanches usually happen on slopes of 40 to 60 degrees.
- Accumulations of new snow, especially during or after a heavy winter storm.
- Variations in the quality of snow layers, especially if one or more layers are airy, granular, or in slabs.
- Sounds that suggest cracking or settling of the snowpack.

If you see an avalanche approaching and cannot escape its path, abandon your backpack. When the snow hits, move your arms and legs in a swimming motion to keep yourself upright. Try to keep your head above the surface. As the avalanche settles, push away any accumulation of snow from your face to form an air pocket that will allow you to breathe.

Should others in your party be caught in an avalanche, keep your eye on them as long as you can. Note the exact place you saw them last. Once the avalanche has settled, listen for their voices. Search quickly. Use anything you can as a shovel to free them, then treat for shock, hypothermia, and any injuries. (See the *First Aid* merit badge pamphlet for more information about first-aid techniques.)



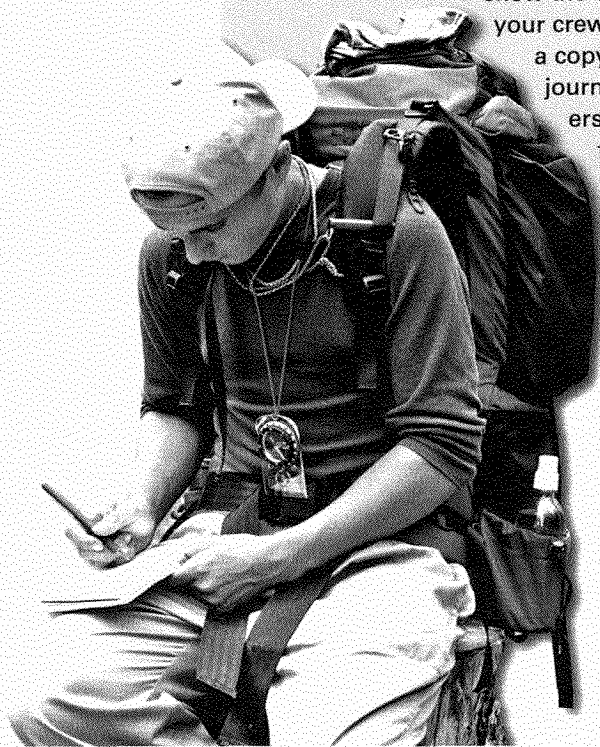


## Trek Journal

While it is important to be alert to potential dangers, don't forget to enjoy your time outdoors. Unexpected pleasures await as well. You might discover a field of ripe blackberries, a hidden waterfall, or a massive beaver dam.

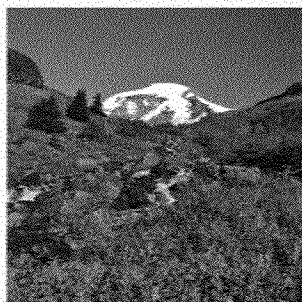
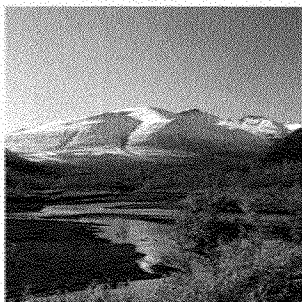
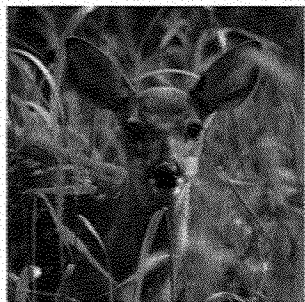
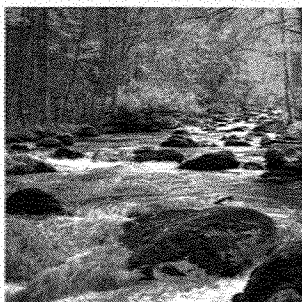
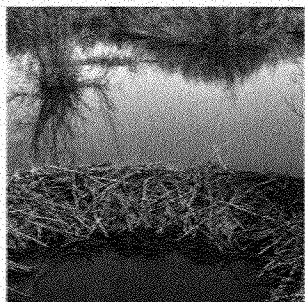
A good way to document the highlights of your backcountry trip is to keep a trek journal or logbook. Use a loose-leaf notebook, blank journal, or scrapbook. Include a description of your route and a list of your companions. Write a paragraph or two each day about the highlights of that day's adventure. Note when things went particularly well, and when things didn't go quite as planned. Include your thoughts on how you might avoid similar mishaps the next time.

A journal is especially valuable on a service project. Record each day's tasks and your progress. You can include before and after photographs that clearly show the value of the work your crew completed. Provide a copy of that portion of your journal to the land managers. As your trek journal fills over the years, you will have a valuable record of your back-packing adventures.





You can transcribe your journal onto a computer, including digital photographs and perhaps even audio and video clips. With your parent's permission, you might even create a website or use social media to share your adventure with your backpacking buddies.





# Backpacking Resources

## Scouting Literature

Scouts BSA handbooks; *Basic Illustrated Backpacking: Be Prepared Backpacking and Hiking*; *Conservation Handbook*; *Fieldbook*; *Bird Study*, *Camping*, *Canoeing*, *Climbing*, *Cooking*, *Emergency Preparedness*, *First Aid*, *Fish and Wildlife Management*, *Fishing*, *Fly-Fishing*, *Geocaching*, *Hiking*, *Kayaking*, *Mammal Study*, *Nature*, *Orienteering*, *Personal Fitness*, *Reptile and Amphibian Study*, *Search and Rescue*, *Sustainability*, *Weather*, *Whitewater*, and *Wilderness Survival* merit badge pamphlets

With your parent's permission, visit the Boy Scouts of America's official retail website, [www.scoutshop.org](http://www.scoutshop.org), for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

## Books

- Berger, Karen. *Backpacking and Hiking*. DK Adult, 2005.
- . *Hiking Light Handbook*. The Mountaineers Books, 2004.
- Birkby, Robert. *Lightly on the Land: The SCA Trail Building and Maintenance Manual*, 2nd ed. The Mountaineers Books, 2006.
- Bohmrich, Craig. *The Adventurer's Guide to Enjoyable Backpacking*. Elevation Creations, 2015.
- Conners, Christine, and Tim Conners. *Lipsmackin' Backpackin': Lightweight Trail-Tested Recipes for Backcountry Trips*, 2nd ed. Falcon, 2000.
- Drury, Jack, and Eric Holmlund. *The Camper's Guide to Outdoor Pursuits: Finding Safe, Nature-Friendly, and Comfortable Passage Through Wild Places*. Sagamore Publishing, 2006.
- Forgay, William. *Basic Illustrated: Wilderness First Aid*. Falcon Guides, 2008.
- Foster, Steven, and Roger Caras. *A Field Guide to Venomous Animals and Poisonous Plants*. Houghton Mifflin, 1998.
- Grubbs, Bruce. *Desert Sense*. The Mountaineers Books, 2005.
- Hall, Adrienne. *The Essential Backpacker: A Complete Guide for the Foot Traveler*. Ragged Mountain Press, 2000.
- Hampton, Bruce, and David Cole. *NOLS Soft Paths: Enjoying the Wilderness Without Harming It*, 4th ed. Stackpole Books, 2011.

- Logue, Victoria. *Hiking and Backpacking: Essential Skills, Equipment, and Safety*, 2nd ed. Menasha Ridge Press, 2004.
- Marsh, Laurie Ann. *Fork in the Trail: Mouthwatering Meals and Tempting Treats for the Backcountry*. Wilderness Press, 2007.
- McGivney, Annette. *Leave No Trace: A Guide to the New Wilderness Etiquette*, 2nd ed. The Mountaineers Books, 2003.
- O'Bannon, Allen. *Allen and Mike's Really Cool Backpackin' Book: Traveling and Camping Skills for a Wilderness Environment!* Falcon, 2001.
- Pearson, Claudia, ed. *NOLS Cookery*, 6th ed. Stackpole Books, 2011.
- Petzoldt, Paul. *The New Wilderness Handbook*. Norton, 1984.
- Robbins, Michael W. *The Hiking Companion*. Storey Publishing, LLC, 2003.
- Schimelpfenig, Tod, and Linda Lindsey. *NOLS Wilderness First Aid*. Stackpole Books, 2000.
- Shillington, Ben. *Winter Backpacking*. Heliconia Press, 2009.
- Skurka, Andrew. *The Ultimate Hiker's Gear Guide: Tools and Techniques to Hit the Trail*. National Geographic Society, 2012.
- Tilton, Buck. *Outdoor Safety Handbook*. Stackpole Books, 2005.
- Townsend, Chris. *The Backpacker's Handbook*, 4th ed. Ragged Mountain Press, 2011.

## Organizations and Websites

### American Hiking Society

Toll-free telephone: 800-972-8608  
 Website: <http://www.americanhiking.org>

### Bureau of Land Management

Telephone: 202-208-3801  
 Website: <http://www.blm.gov>

### Leave No Trace Center for Outdoor Ethics

Toll-free telephone: 800-332-4100  
 Website: <http://www.LNT.org>

### Local Hikes

<http://www.localhikes.com>

### National Park Service

1849 C Street NW  
 Washington, DC 20240  
 Telephone: 202-208-6843  
 Website: <http://www.nps.gov>

### Recreation.gov

Website: <http://www.recreation.gov>

### U.S. Fish and Wildlife Service

1849 C St. NW  
 Washington, DC 20240-0001  
 Toll-free telephone: 800-344-9453  
 Website: <http://www.fws.gov>

### U.S. Forest Service

1400 Independence Ave. SW  
 Washington, DC 20250-1111  
 Toll-free telephone: 800-832-1355  
 Website: <http://www.fs.fed.us>

### U.S. Geological Survey

Telephone: 703-648-5953  
 Website: <http://www.usgs.gov>  
 Website for map store:  
<http://store.usgs.gov>

## Periodicals

*Backpacker* magazine

2520 55th St., Suite 210

Boulder, CO 80301

Toll-free telephone: 800-666-3434

Website: <http://www.backpacker.com>

The use of pack-it-out kits for human waste is becoming more common at many outdoor recreational areas. In fact, some areas require packing out human waste. If the land management agency does not provide kits for visitors and you must bring your own, you may want to obtain a ready-made, commercial kit for ease and sanitation purposes.

One popular brand that is readily available is the Wag Bag®, manufactured by Cleanwaste. For more information, visit <http://www.cleanwaste.com> (with your parent's permission). Another widely used line of personal sanitation products is made by Restop®. Visit <http://www.restop.com> for more information about their products.





## Acknowledgments

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U.S. Department of Agriculture, Agricultural Resource Service/Scott Bauer, courtesy—page 27 (*feeding and engorged ticks*)

U.S. Geological Survey, courtesy—pages 68 (*map*) and 69 (*contour lines*)

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Dan Bryant—pages 40 (*water bottles, flashlight*), 43 (*backpack and Scout*), 50 (*cooking gear*), 53 (*bow and spoon*), and 62 (*trowel*)

Darrell Byers—page 90

John Fulton—page 56 (*items to pack*)

Daniel Giles—page 19

John McDearmon—all illustrations on pages 62, 71, and 83

Christian Michaels—page 26 (*ice pack*)

Mary Oakes—page 18

Brian Payne—pages 17, 21, 37, 44, 47 (*snow shelter*), 55, 56 (*Scout*), 74, 78, 87, and 89

Brian Payne, BSA File, and Julie Moore—page 33 (*photo illustration*)

Randy Piland—pages 10, 12, 30, 57 (*hoisting*), 61 (*straining water*), 64 (*campfire*), 66, 72 (*orienteeing*), 79 (*Scouts*), and 92

Scott Stenjem—page 80



## MERIT BADGE LIBRARY

Though intended as an aid to youth in Scouts BSA, and qualified Venturers and Sea Scouts in meeting merit badge requirements, these pamphlets are of general interest and are made available by many schools and public libraries. The latest revision date of each pamphlet might not correspond with the copyright date shown below, because this list is corrected only once a year, in January. Any number of merit badge pamphlets may be revised throughout the year; others are simply reprinted until a revision becomes necessary.

If a Scout has already started working on a merit badge when a new edition for that pamphlet is introduced, *they may continue to use the same merit badge pamphlet to earn the badge and fulfill the requirements therein.* In other words, the Scout need not start over again with the new pamphlet and possibly revised requirements.

Merit Badge Pamphlet	Year	Merit Badge Pamphlet	Year	Merit Badge Pamphlet	Year
American Business	2019	Family Life	2016	Plant Science	2018
American Cultures	2013	Farm Mechanics	2017	Plumbing	2012
American Heritage	2013	Fingerprinting	2014	Pottery	2008
American Labor	2018	Fire Safety	2019	Programming	2019
Animal Science	2014	First Aid	2019	Public Health	2017
Animation	2015	Fish and Wildlife		Public Speaking	2013
Archaeology	2017	Management	2014	Pulp and Paper	2019
Archery	2019	Fishing	2013	Radio	2017
Architecture and Landscape Architecture	2014	Fly-Fishing	2014	Railroading	2019
Art	2013	Forestry	2019	Reading	2013
Astronomy	2019	Game Design	2019	Reptile and Amphibian Study	2018
Athletics	2019	Gardening	2013	Rifle Shooting	2012
Automotive Maintenance	2017	Genealogy	2013	Robotics	2016
Aviation	2014	Geocaching	2019	Robotics	2019
Backpacking	2016	Geology	2016	Rowing	2019
Basketry	2017	Golf	2019	Safety	2016
Bird Study	2019	Graphic Arts	2013	Salesmanship	2013
Bugling (see Music)		Hiking	2016	Scholarship	2014
Camping	2019	Home Repairs	2012	Scouting Heritage	2019
Canoeing	2019	Horsemanship	2013	Scuba Diving	2009
Chemistry	2018	Indian Lore	2008	Sculpture	2019
Chess	2016	Insect Study	2019	Search and Rescue	2018
Citizenship in the Community	2015	Inventing	2016	Shotgun Shooting	2013
Citizenship in the Nation	2019	Journalism	2019	Signs, Signals, and Codes	2015
Citizenship in the World	2015	Kayaking	2019	Skating	2015
Climbing	2019	Landscape Architecture (see <i>Architecture</i> )		Small-Boat Sailing	2019
Coin Collecting	2017	Law	2019	Snow Sports	2019
Collections	2013	Leatherwork	2017	Soil and Water Conservation	2019
Communication	2013	Lifesaving	2019	Space Exploration	2016
Composite Materials	2012	Mammal Study	2014	Sports	2012
Cooking	2014	Medicine	2012	Stamp Collecting	2013
Crime Prevention	2012	Metalwork	2012	Surveying	2004
Cycling	2017	Mining in Society	2014	Sustainability	2013
Dentistry	2016	Model Design and Building	2010	Swimming	2019
Digital Technology	2014	Motorboating	2019	Textile	2014
Disabilities Awareness	2016	Moviemaking	2013	Theater	2019
Dog Care	2016	Music and Bugling	2013	Traffic Safety	2016
Drafting	2013	Nature	2014	Truck Transportation	2013
Electricity	2013	Nuclear Science	2019	Veterinary Medicine	2015
Electronics	2014	Oceanography	2012	Water Sports	2019
Emergency Preparedness	2019	Orienteering	2016	Weather	2019
Energy	2014	Painting	2016	Welding	2016
Engineering	2016	Personal Fitness	2019	Whitewater	2019
Entrepreneurship	2013	Personal Management	2019	Wilderness Survival	2019
Environmental Science	2015	Pets	2013	Wood Carving	2016
Exploration	2016	Photography	2016	Woodwork	2019
		Pioneering	2019		

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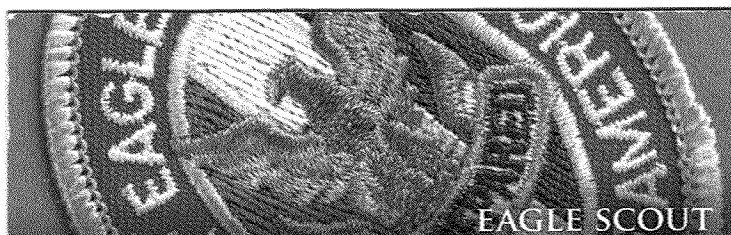
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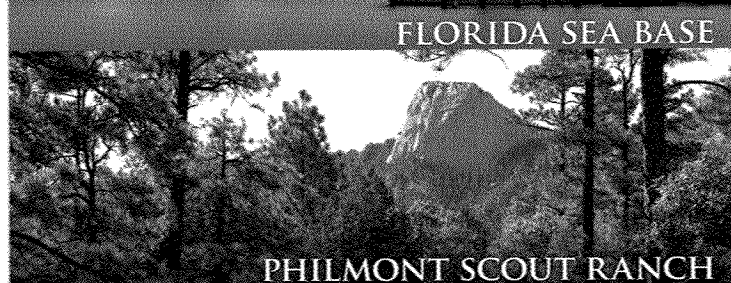
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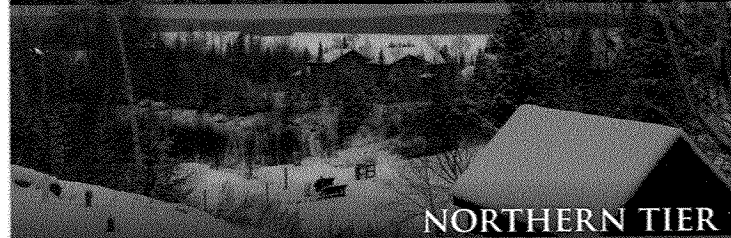
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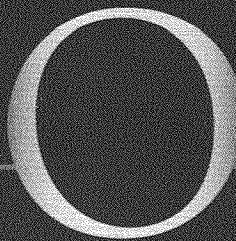
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