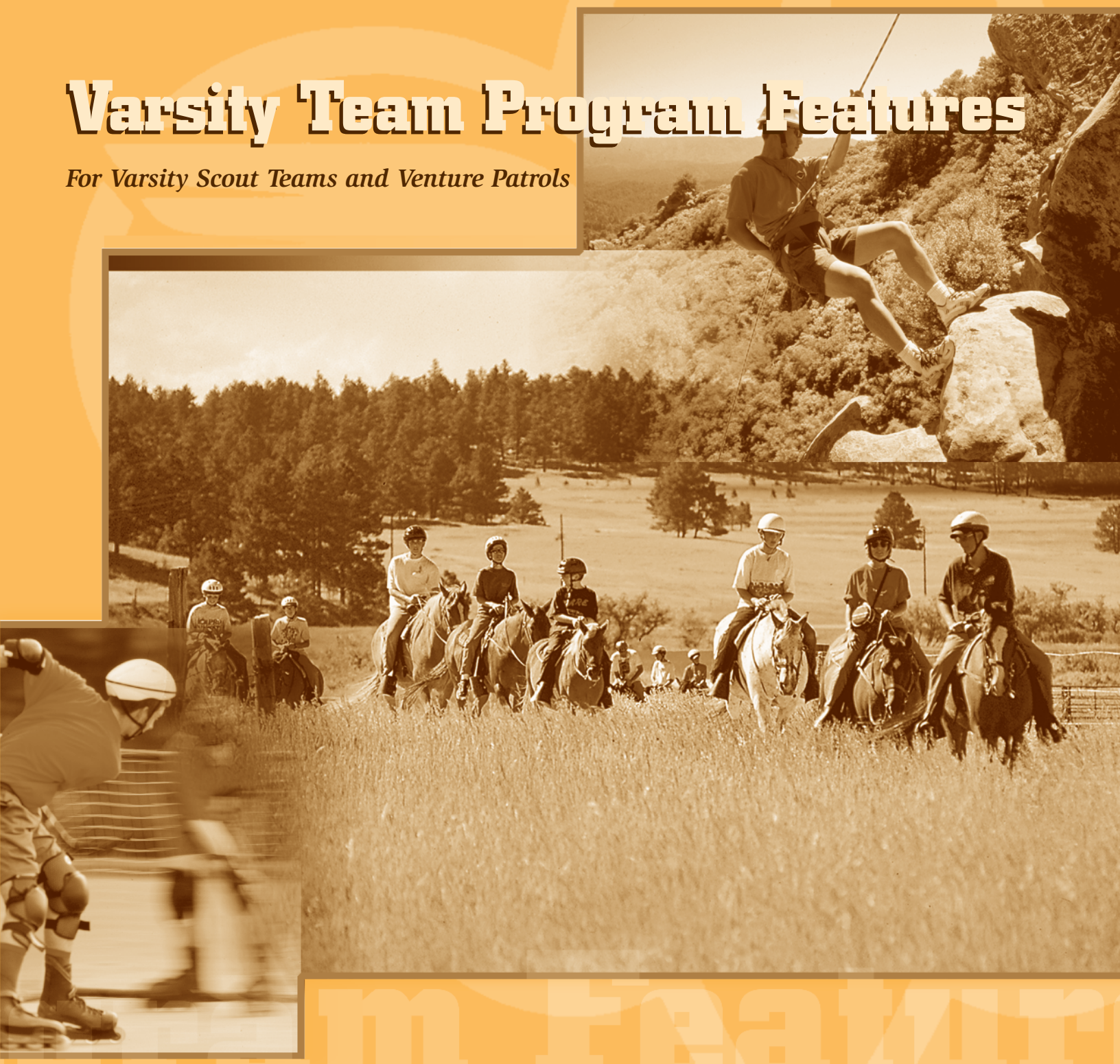
VOLUME I

# Varsity Team Program Features

*For Varsity Scout Teams and Venture Patrols*



BOY SCOUTS OF AMERICA®

# VARSITY TEAM PROGRAM FEATURES VOLUME I

*For Varsity Scout Teams and Venture Patrols*

BOY SCOUTS OF AMERICA®

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# CONTENTS



## VOLUME II COVERS THE FOLLOWING PROGRAM FEATURES:

Freestyle Biking
Frontiersman
Mechanics
Operation On-Target
Orienteering
Rock Climbing and Rappelling
Roller Hockey
Shooting Sports
Snow Camping

## VOLUME III COVERS THE FOLLOWING PROGRAM FEATURES:

Soccer
Softball
Survival
Swimming
Tennis
Triathlon
Volleyball
Waterskiing
Whitewater Canoeing

# PLANNING THE VARSITY SCOUT PROGRAM

An exciting Varsity Scout program does not just happen. It takes careful planning. The three volumes of *Varsity Team Program Features* are essential in providing program ideas and in offering basic instruction in 27 different sports and high-adventure activities. Each program feature offers conditioning, training, and basic instruction that will progress the team to a proficient skill level over a three-month period.

The following pages outline the steps in successful program planning. The three volumes of program features and copies of the *Varsity Scout Guidebook* should provide all the tools you will need to plan a successful year for your Varsity Scout team.

A crucial ingredient to program planning is the annual program planning clinic, which is outlined in chapter 15 of the *Varsity Scout Guidebook*. The six steps in this section will also be helpful in effective program planning.

Once the leadership team has selected the program features for the new year, the team must then incorporate all five fields of emphasis into each program feature. Ideas are listed at the beginning of each program feature, and you are limited only by your imagination for other ideas. It is the responsibility of each program manager to make sure his field of emphasis is planned and carried out.

Upon completion of a program feature, team members may be awarded an activity pin to acknowledge their achievement, as well as the Varsity Scout letter or bar.

### STEP 1: PREPARATION

Prior to conducting the team's annual program planning clinic, determine the resources available to the team.

- The physical facilities of your chartered organization and community that can be utilized
- The talents of the Varsity Scout parents
- The community resources available to the team such as sports leagues and outdoor facilities

If not already done, you will need to:

- Elect or appoint the team captain.
- Appoint program managers.
- Elect squad leaders.
- Gather calendars for schools, religious organizations, community holidays, and council and district Scouting activities. Do not forget personal dates and holidays.
- Conduct a Varsity Scout Team Resource Survey.
- Set the date and location for the team's annual program planning clinic.

### STEP 2: CONDUCT THE TEAM'S ANNUAL PLANNING CLINIC

Chapter 15 of the *Varsity Scout Guidebook* is devoted to the planning the team program. This should be a fun, team-building experience that will set the tone for the new year, and a high expectation of exciting things to come.

### STEP 3: SHARE THE PLAN

The team's annual program is presented to the team committee for its approval and support. The team committee chair assigns responsibilities to committee members who are program advisers to provide support to the program managers of the five fields of emphasis. If for some reason the committee cannot provide the needed support for an activity, outside resources should be considered and secured.

After receiving the team committee approval, with any modifications necessary, the team's annual program is published and provided to Scouts, families, and the chartered organization.

It is recommended that a parent's night be held to outline the team's annual program of events.

### STEP 4: QUARTERLY PROGRAM DETAILING

- On a quarterly basis, the team leaders meet to detail the upcoming quarter.
- The Coach and captain develop the agenda for this meeting.
- The captain conducts the meeting with assistance from the Coach.
- Specific assignments are given to each program manager.
- A description of activities for the next quarter is entered on an activity worksheet. Program managers note specific assignments involving them. They request specific help from team members and the program adviser.

### STEP 5: MONTHLY PROGRAM DETAILING

- The Coach, captain, program managers, and squad leaders meet on a monthly basis to finalize the coming month's meeting.
- The Coach and captain develop the agenda for this meeting.
- Activity worksheets are completed.
- Program managers verify that everything is ready for the month's activity.

### STEP 6: WEEKLY CHECKUP

Two or three days prior to the meeting, the Coach or captain should check with each program manager for last-minute assistance.

By following these planning steps, the Varsity Scout program will be well-received by the youth members. Be sure to include all five program fields of emphasis during each quarter. The team committee should devote a portion of the monthly meeting to securing committee member support for the team program and program managers.

## Varsity Scout Team Activity Planning Worksheet

Activity: _____ Program manager _____

Team committee member/consultant _____

Place: _____ Date: _____

Team captain's comments: _____

_____

Follow-up: _____

_____

_____

_____

_____

(Filled in by program manager)

**Plan the activity.** (Meet with your team committee member/consultant; make the plan.)
What needs to be accomplished? _____

_____

**Identify needs and resources**.

Equipment and facilities needed _____

_____

**Determine payment plan for team members.** _____

Number of people required _____

_____

| Task to Be Done | Assigned To |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

**Follow-up.** At additional meetings and through personal contacts, follow up on all assignments until you are sure that everything is ready. If the going gets rough, call on your Coach for help.

**Carry out the plan.** Just before the activity, double-check all arrangements. Conduct the activity to the best of your ability, using your supervisor as a resource.

**Inform others.** Give a copy of the plan to the team captain, program manager, team committee member, and Coach.

## Varsity Scout Team Meeting Plan Worksheet

Feature _____

Meeting location _____

Date _____ Time _____

| Activity | Description | Person Responsible | Time |
|---|---|---|---|
| **Warm-up (Preopening)**<br>• Early arrival activity<br>• Set up meeting room | | | |
| **Opening**<br>• Ceremony or song<br>• Welcome<br>• Announcements | | | |
| **Team Business**<br>• Reports<br>• Assignments<br>• High Adventure/Sports<br>• Service<br>• Personal Development<br>• Special Programs and Events<br>• Squad events<br>• Other reports | | | |
| **Skills Instruction**<br>• Squad meetings<br>• Advancement work<br>• Practice time<br>• Guest specialist/consultant<br>• Contest or game<br>• Special activity | | | |
| **Closing**<br>• Coach's Corner<br>• Quiet song<br>• Closing ceremony | | | |
| **Wrap-up**<br>• Evaluate meeting<br>• Cleanup | | | |

## Annual Varsity Scout Team Planning Chart

| Quarter | Program Feature | Advancement | High Adventure/ Sports | Personal Development | Service | Special Programs and Events |
|---|---|---|---|---|---|---|
| 1st<br>September<br>October<br>November | | | | | | |
| 2nd<br>December<br>January<br>February | | | | | | |
| 3rd<br>March<br>April<br>May | | | | | | |
| 4th<br>June<br>July<br>August | | | | | | |

## BACKPACKING CONTENTS

# BACKPACKING

## BACKGROUND

Backpacking has long been a part of the American tradition. Years ago, American Indians were able to carry enough food and gear to sustain themselves during long periods of travel, and many explorers, trappers, and settlers owned nothing in the world except what they could tote in bags slung over their shoulders. Through trial and error they learned what to take along, what to leave at home, and what skills were essential for living in the wilderness. They were ready for any situation that might arise, and because they were prepared, they traveled in relative safety.

Backpacking is an integral part of Scouting. In fact, you may have already earned the Backpacking merit badge. Through the Backpacking program feature, you can expand on those skills you have already learned, and prepare for your ultimate adventure. This program is designed to give you a challenging experience. There will be a series of skills and techniques to learn in preparation for the ultimate adventure, where you might spend as much as a week on a backpacking trek.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a Backpacking merit badge clinic.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida, Sea Base, etc.).

### PERSONAL DEVELOPMENT

- Arrange for worship services during the team's trek.
- Invite a representative to discuss careers in land management agencies.

### SERVICE

- Conduct an environmental awareness program for the members of the team's families.
- While on a team trek, carry out a conservation project coordinated with a land manager.

### SPECIAL PROGRAMS AND EVENTS

- Visit a meeting of a local environmental club.
- Visit an agency responsible for a wilderness area.
- Have an expert do a session on "no trace" camping.

## PLANNING A BACKPACKING ADVENTURE

### WHAT ARE THE CAPABILITIES OF YOUR TEAM?

Before planning a backpacking trek or any outdoor adventure, it is crucial to consider the capabilities of your team. Ask yourself these questions:

- What are the ages of your team members?
- How much camping experience does the team have?
- How much hiking and backpacking has the team done?
- Do the team members cooperate with one another, and does everyone pitch in to help with team tasks?
- Does the team accept the team captain's leadership?
- Does the team captain discuss options with the team before making decisions?
- How well does the team deal with tough problems?
- Does the team captain consistently use good judgment in making decisions?

The answers to these questions will make a significant difference in how ambitious a backpacking trek the team is prepared to undertake. Matching the experience to the capabilities of the team is the most important first step in planning a trek. It can make the difference between a successful enjoyable experience and a disastrous misadventure.

If a long trek is planned, the team should make some preparatory hikes and treks. Passing the requirements for the Backpacking merit badge is excellent preparation for a long backpacking trek.

Preparing for a backpacking trip in the forests of the East, the plains of the Midwest, or the rolling terrain of the South can be relatively simple. Backpacking at high elevation in the West, however, is quite different and requires additional preparation to become acclimated to areas where the air is thin. The first several days of backpacking at high elevation need to be tailored to

allow your body to adjust gradually to the change. You also need to be prepared for different climatic conditions in the region of your trek.

Even the most well-prepared team should allow some leeway in a backpacking trek, such as a layover day where you camp in the same location two nights in succession. Such leeway allows for unforeseen events, such as extremely inclement weather, and also helps boost the spirits of everyone in the team.

### WHAT ARE THE NEEDS AND DESIRES OF THE GROUP?

How many days does the group have to spend on a backpacking trek (including travel to and from the area)? To get maximum participation, the time frame for the trek should fit the schedule of a majority of the group members. Also, be sure to have at least four people in your team. If one person is injured, one can give first aid while the other two go for help.

Where does the group want to go backpacking? The possibilities are endless. National parks, national forests, nationally managed areas, state recreation areas, high-adventure bases, or privately administered lands are just a few.

To get information about these areas, visit your local library or write to any of the following agencies for information:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954

U.S. Forest Service
U.S. Department of Agriculture
P.O. Box 96090
Washington, DC 20090-6090

U.S. Fish and Wildlife Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240

Bureau of Land Management
U.S. Department of the Interior
1849 C Street NW, Room 406-65
Washington, DC 20240

Army Corps of Engineers
Pulaski Building
20 Massachusetts Avenue NW
Washington, DC 20314-1000

National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240

Boy Scouts of America
1325 West Walnut Hill Lane
P.O. Box 152079
Irving, Texas 75015-2079

### HOW FAR DO YOU WANT TO TRAVEL?

The distance you can cover depends on the terrain, your physical condition, the weight of your pack, and your reasons for taking a trek. Is the country rugged? A mile of flat trail is far different from a mile that gains 1,000 feet in elevation. Are you lean and strong, or a little out of shape? Do you walk with a fast, steady stride, or at a leisurely pace with frequent pauses to study flowers, watch wildlife, and take photographs?

As a general rule, an average hiker can walk a mile and a half every hour in level country. Add to that one hour for each 1,000-foot climb. Plan the distances of your first treks conservatively. With a group of backpackers it is important to establish a moderate pace. It is better to have too much time to reach a destination than too little, and by not rushing, you'll enjoy yourself a great deal more.

Once you have considered the capabilities of your team and considered when, where, and how long members want to spend on the trek, the next step is to make decisions. Decide where and when you will go. A majority-rules vote is a good way to arrive at a decision.

Next, consider how you will get to your trailhead to begin your trek. Refer to the section on Travel and Budget.

### WHERE WILL YOU GET HELP?

An important step and one that is frequently neglected in planning a backpacking trek is to determine:

1. The location of the nearest medical facility to the area of your trek
2. How to evacuate an injured team member who is unable to walk
3. Where to deliver an emergency message while you are on the trek if someone in your team becomes seriously injured
4. Who the home contact person is in case an emergency occurs

The nearest community of any size will probably have a medical facility, but someone should telephone the chamber of commerce or other community service agency to be sure.

If your team does not have the knowledge or experience in evacuating an injured person out of a remote backcountry area, you will probably want the administering agency, a search and rescue group, or an EMT unit to do this. They have professionally trained members with experience and who know how to manage such an operation effectively. You'll need to find out how to contact them prior to your trek.

Finally, you need to know the location of the nearest telephone or two-way radio from every location on your trek. If you have an emergency, you will know where to deliver the message. Check to be sure that communications are available 24 hours a day.

If an emergency does occur, it will probably be impossible for you to inform all parents, as well as the local council service center. An emergency contact person from your troop or team committee or one individual parent should be designated. You can send a message to that person, who can inform the others. Be sure to designate an alternate in case the first person cannot be reached.

Finally, you need to plan a day-by-day itinerary that shows where the team will be staying each night and give a phone number if a telephone is available. Distribute this itinerary to all parents. Leave the emergency contact person a highway map and backcountry map showing your intended route. Also let that person know the time of your departure and your expected time of return. If you don't return at your appointed time, the emergency contact person should activate a preplanned emergency response. If you are delayed, you need to make every effort to notify your emergency contact so that an emergency response is not activated.

### GET PERMISSION

Once you have decided where you will go, the next step is to review your plans with others and secure permission. Four steps are necessary:

1. Get parental permission for each youth participant. Copy the form included in this program feature.
2. Review your plans with your Coach and get support for drivers and vehicles, if needed.
3. Apply for a land-use permit. Most federally administered areas require some sort of permit. Permission also needs to be obtained for backpacking across privately owned land. Some states also have requirements for certain areas.
4. Apply for a BSA tour permit. Complete an application for a tour permit and submit it through your local council service center. If you will travel more than 500 miles one way, you need to complete a National Tour Permit Application. For trips and camps less than 500 miles away, complete a Local Tour Permit Application.

## GETTING IN SHAPE

A backpacking trek of any length requires physical conditioning so that it will be safe and enjoyable. Carrying a 30- to 40-pound backpack is physically demanding. Steep trails, high elevations, long distances, and inclement weather impose additional demands. The more difficult your planned trek is, the more time you will need to devote to getting in shape. Everyone on the team must also commit to a program of regular exercise.

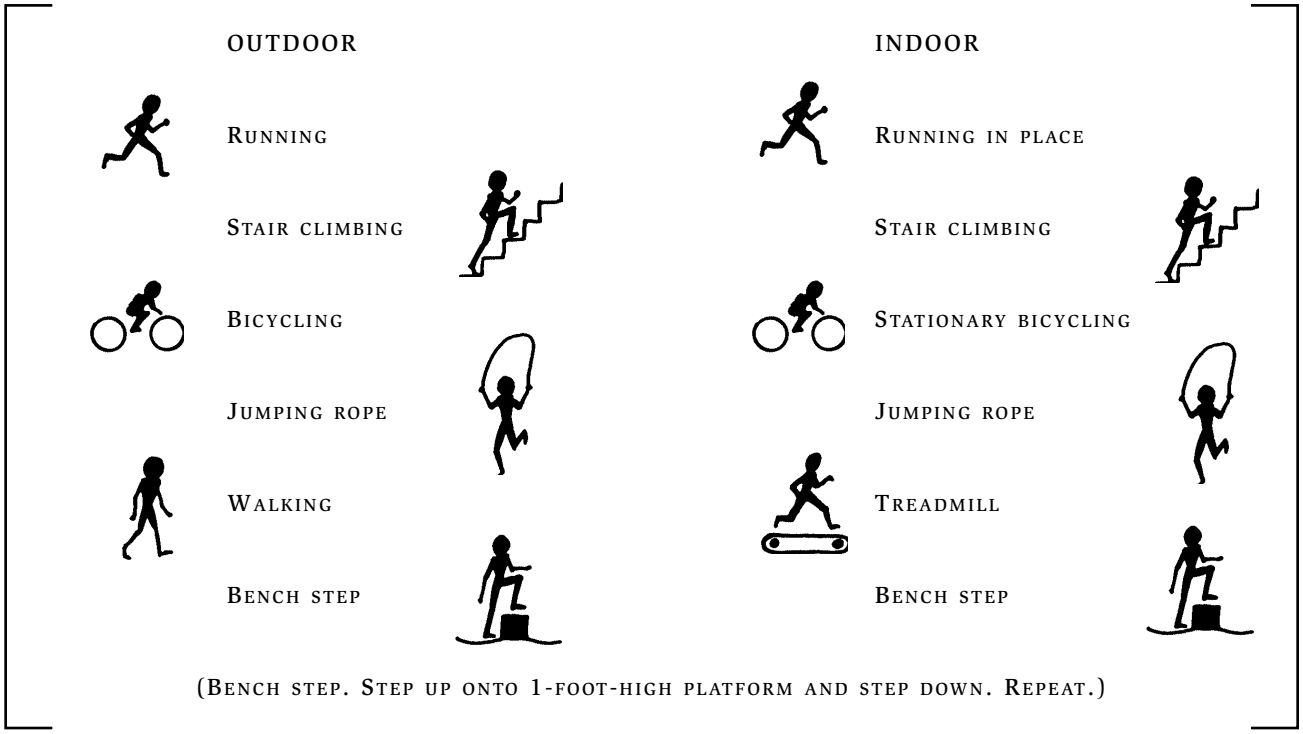
The first step in preparing for a backpacking trek is to get a physical examination from your physician. For high-adventure experiences, an exam completed within the previous 12 months is required.

### DEVELOP AN EXERCISE PLAN

A program of regular aerobic exercise will help you become physically conditioned. Begin this program three to six months before your trek. If you are overweight and/or do not exercise regularly, you may need more time to prepare.

Plan to exercise for 30 to 60 minutes, three to five times a week. Exercise at an intensity that boosts your pulse rate to about 75 percent of your maximum. An average maximum heart rate is 220 minus your age.

Do exercises that you will enjoy. Jogging, running uphill or up long flights of stairs, and hiking with a full pack are excellent preparation. After a few initial days of sore muscles, these activities become more enjoyable. Other aerobic exercises such as swimming, bicycling, skiing, stationary cycling, aerobic exercise classes, and even walking are also excellent.




(Bench step. Step up onto 1-foot-high platform and step down. Repeat.)

## STARTING OUT

Trying to do too much in the beginning can cause strained muscles and pulled ligaments. If possible, enlist the help of a school physical education teacher or coach to help you prepare an exercise program that takes into consideration the current condition of your body. Plan to work out slowly at first so your muscles can adjust to new activities. You can then get a feel for how far, how fast, and how hard you can exercise without hurting yourself. Increase the duration and intensity of your routine gradually. If you intend to do much running, wear shoes that give your feet adequate cushioning and support.

## WARMING UP

Warming up at the beginning of an exercise session stretches and loosens your muscles and prepares them for action, and gradually raises your heart rate and temperature. The more strenuous the exercise will be, the longer and more vigorous a warmup period you'll need.

Many athletes spend 15 minutes or more going through stretching routines. Others don't get much out of stretching, and instead begin a session with slow, easy exercises or a short game of catch. Runners may start by jogging very slowly for a few hundred yards, and gradually increase their speed as they feel their muscles loosening.

The best way to prepare for a backpacking trek is to backpack. Start with several day hikes carrying a full backpack, and work up to several overnight experiences. This will help you sharpen your outdoor skills as well as prepare you physically.

Exercise individually or with other members of your Varsity Scout team. Set aside regular periods of time to do it. Plan to be in top physical shape for an extended backpacking trek. You'll enjoy your experience more and be less likely to have a medical problem.

## RECORD YOUR WORKOUTS

Keep track of when and how you exercise. By writing down the routines you use and the number of repetitions of each exercise, you'll have a record of your physical progress that will give you a sense of accomplishment as it reminds you when to exercise next. Calendars or small notebooks make good record keepers. Write your entries immediately after you exercise.

## MENTAL FITNESS

Physical and mental fitness are tightly intertwined. By keeping your body well conditioned, you have done much to ensure your ability to think clearly and to concentrate for long periods of time. While we don't often think of exercising our minds in the same rigorous way we do our bodies, there are ways to increase your

ability to think clearly under pressure, to develop leadership qualities, and to enjoy the experience of being in the wild more fully. The time may come when alertness, resourcefulness, and mental toughness will get you through a tight spot, but you must prepare for that possibility now, long before the difficult situation arises.

**Be Thorough.** When you begin a task, stick with it until it's done and done right. Perseverance is just as essential in finishing a homework assignment as it is for finding shelter in a bad storm, or keeping an accident victim safe and warm until help arrives.

**Be Confident.** Confidence comes through training and experience. Learn what to expect in the outdoors by reading, asking questions, and watching others. Then practice your backcountry skills until they become instinctive.

**Be Assertive.** Wisely take advantage of new experiences. It's important to push yourself beyond what you've done before, but only in reasonable, safe ways. Be assertive around others, too, by taking the lead to get things accomplished. If you see camp tasks that need doing, take the initiative to complete them. If you aren't sure where you are, pull out your map and compass and pinpoint your location. If you believe a river is too swift to cross or a snowfield is too steep to traverse, be assertive enough to turn back and take a safer route.

**Be Willing to Learn From Successes and Failures.** Campers with many years of experience in the woods are not necessarily good campers if they've made the same mistakes over and over again. When things go well during a trek, figure out why and try to repeat them. When things go badly, determine what you did wrong in the planning or execution of the trip, and do things differently next time.

**Be Conscientious.** There aren't many people in the backcountry, and often no one to watch what you are doing. Because of that, your wilderness activities must be guided by your own standards. Camp and hike without leaving a trace, and be ready at all times to help other travelers.

## GEARING UP

Take along the right gear and provisions, and you can be comfortable walking on the trail and have a great time in camp. The essentials include food, clothing, shelter, first-aid supplies, and navigational tools.

Even though you may have never backpacked before, don't think for a minute that your equipment has to be expensive and new. As you discover what you need, rummage around in the attic and basement to see what you can find. Watch for neighborhood garage sales. Everyday household items can be converted into camping gear, and secondhand equipment is often just what you need. If you have any skill with a sewing machine, try making some gear from scratch, or from inexpensive kits. Many major-cost items can be rented or borrowed to help you determine what you really want to buy.

### CLOTHING

In the outdoors, clothing is your first line of defense. It keeps you warm in the winter, cool in the summer, dry in storms, and shielded from insects, sun, and wind.

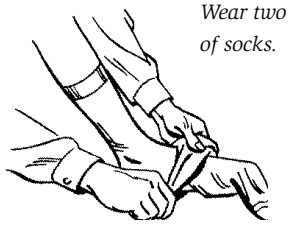
### LAYERING SYSTEM

For the most comfort in the outdoors, use the layering system. Choose loose-fitting clothing that will meet the most extreme weather you expect to encounter, and be sure you can put it on and take it off a layer at a time.

For example, on a chilly autumn day you might leave home wearing a long-sleeve Scout shirt, long pants, a wool shirt, a sweater, mittens, and a stocking hat. As you hike, exercise will cause your body to generate more heat than it needs. Peel off the sweater and stuff it into your pack. If you're still too warm, unbutton the wool shirt or slip off the mittens and hat. When you reach your campsite and are no longer exerting yourself, stay warm by reversing the procedure, pulling on just enough layers of clothing to stay comfortable. After the sun goes down, you may want to add an insulated parka and wool trousers or long underwear.

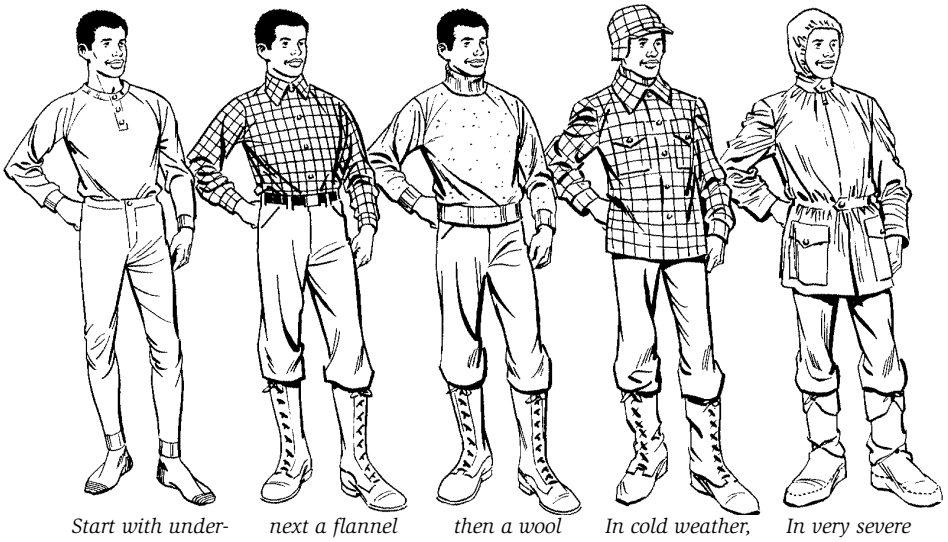
You can also use the layering system to keep cool in the summer by stripping down to hiking shorts, a T-shirt, and a brimmed cap. Despite the heat, always carry long pants and a long-sleeve shirt for protection against sunburn, bugs, and brush.

Versatility in your clothing is the key to a successful layering system. Several shirts, a sweater, and a jacket will allow you to adjust your garb in many more ways than will a single heavy coat.



*Wear two pairs of socks.*

*Wear water-repellent mitts over woolen gloves.*



*Start with underwear and two pairs of socks . . .*

*next a flannel shirt, wool trousers, and heavy boots . . .*

*then a wool turtleneck sweater.*

*In cold weather, add a light jacket, wool cap, and shoepacks.*

*In very severe cold, wear a water-repellent jacket over other clothes, and add mukluks.*

**MATERIALS**

To help decide what you need, learn about the materials from which clothing is made.

**Wool.** Wool clothing is ideal in cold weather, and a wool shirt or sweater will ward off the chill of summer evenings, too. Wool is durable and water resistant, and even when soaked, it can keep you warm. Wool makes excellent blankets, hiking socks, hats, and mittens. If wool irritates your skin, consider polypropylene or other synthetic clothing for your undergarments and wear wool over them.

**Cotton.** Cotton is cool, comfortable, and sturdy, but unlike wool it will not keep you warm when it is wet. In hot weather that may be an advantage. Underwear and liner socks often are made of cotton, as are caps, shirts, and bandannas.

**Synthetics.** Manufactured fabrics such as nylon, orlon, and polypropylene have plenty of outdoor uses. Many are waterproof, and some provide good insulation. Strong, lightweight, and easy to clean, they are used in rain gear, windbreakers, tents, packs, parkas, and sleeping bags.

**Blends.** Blended fabrics combine the advantages of several materials in a single piece of cloth. For example, a blend of synthetics and cotton makes shirts and shorts that are neat in appearance, yet tough enough for any wilderness adventure. A mixture of synthetics and wool goes into long-wearing socks, shrink-resistant shirts, and warm jackets.

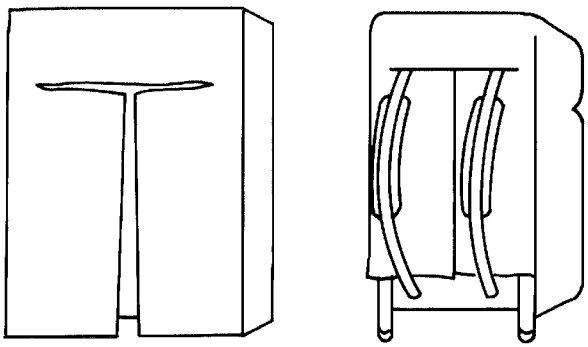
**RAIN GEAR**

No matter how clear the skies are as you pack for a trek, prepare for nasty weather. That means always taking along a poncho or raincoat, a pack cover, and perhaps rain pants and gaiters. Choose rainwear that fits loosely enough to give you freedom of movement and to allow perspiration to evaporate without condensing on the inside of the fabric.

Long a favorite of adventurers, ponchos provide wet-weather security for both hikers and their gear. In emergencies, ponchos can serve as temporary shelters. They can, however, blow around in a strong wind, and thus may not give full protection in severe storms.

Backpacker rain suits are almost invincible. Many feature hoods and large cargo pockets. Rain pants and rain chaps will protect your legs from wind, rain, and heavy dew, while gaiters will keep pebbles, water, mud, and snow out of your boots and away from your socks.

GARBAGE BAG



Make a T-cut in one side.

Tuck around bars of pack frame.

Although most packs can repel rain for a time, make sure your gear stays dry by taking along a pack cover. You can make a simple one by cutting a slit in a plastic garbage bag and tucking the loose ends around your pack frame, or you can buy or sew a cover especially contoured to fit your pack.

## FOOTWEAR

Many backcountry treks involve miles of trail hiking. No matter how you spend your time in the outdoors, you'll probably want to have a pair of good, durable hiking boots.

### LEATHER BOOTS

When you're hiking, your feet and ankles take a tremendous pounding. Quality hiking boots will give them the support and protection they need to withstand the jarring of each step. The best leather boots are made of top-grain leather, which breathes, allowing moisture from your feet to escape. A minimum number of seams keeps wetness from penetrating. Lug soles provide the most traction, although smoother soles are usually adequate, frequently lighter, and often less damaging to trails. Since a pound of weight on your feet is equal to 5 pounds on your back, stick with boots that weigh no more than 3 to 5 pounds a pair for trail wear. Mountaineering boots are heavier and more rigid, and appropriate only for the specialized needs of climbers.

### ULTRALIGHT TRAIL BOOTS

Made with the same synthetic materials and high-performance designs as running shoes, ultralight trail boots weigh just a few pounds a pair, need little breaking in, dry quickly, and are fine for walking well-maintained trails. They may not be sufficiently waterproof for wet, muddy trails, or sturdy enough for rugged backcountry use, especially if you are carrying a heavy pack.

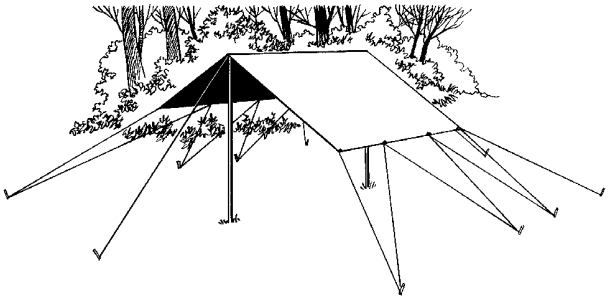
### SELECTING FOOTWEAR

When you go into a store to try on boots, wear the socks in which you plan to hike. Unlace a boot, slip in your foot, and kick your toes forward. If the boot is the right length, you should be able to slide two fingers between your heel and the back of the boot.

Next, kick your heel back into the heel pocket, and with the boot snugly laced, walk around the shop, go up and down some stairs, and do a few deep knee bends. You want to be sure your heel isn't sliding up and down inside the boot, and that the widest part of your foot isn't swimming around or being squeezed. After you've tried out one pair, run the same tests on several other models, taking plenty of time to get a real feel for the fit. Inspect each boot for quality workmanship and get the opinions of experienced hikers.

## SHELTER

Desert campers need open, airy shelters that shade them from the sun. Long-distance hikers want tents that are light in weight and yet appropriate for many variations in weather. Fortunately, there are shelters that will satisfy every outdoor traveler.



### A-FRAME TENT

Essentially a pup tent made light and strong with modern materials and engineering, the A-frame tent is roomy and usually has a waterproof floor and mosquito netting. Weighing 4 to 8 pounds, an A-frame tent will keep several hikers and their gear warm and dry.

### DOME TENT

Contemporary designs and fabrics have made possible a variety of dome-shaped tents. Their configurations help them stand up to wind, rain, 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 quickly dry the bottom of the tent floor.

### GROUND CLOTH

A sheet of plastic under your tent will protect the floor from rocks and twigs, and keep moisture from seeping through. Prevent rain from running between the tent floor and the ground cloth by placing the cloth so it does not extend beyond the area covered by the tent. Carry the ground cloth near the top of your pack and use it in sudden showers to cover your gear.

## SLEEPING BAG

Your bed is an extension of your shelter, keeping you warm while you sleep. A sleeping bag keeps you warm by trapping the heat your body generates. The bag's thickness, known as its loft, determines how much heat

the bag will retain. Usually the more loft a bag has, the warmer you will be.

The fabric shell of a sleeping bag is often made of nylon. Loft is created by filling the shell with natural or synthetic materials, and partitions sewn inside the shell hold the fill material in place. In less expensive bags, partition stitching may go through the shell, resulting in cold spots where the loft is thin. In better bags, mesh or nylon walls (called *baffles*) divide the interior of the shell into compartments that keep the fill evenly distributed without lessening its loft, thus preventing cold spots. The best bags also have tubes of fill material backing the zippers to keep warm air from escaping, and they may be equipped with insulated hoods that can be drawn about a sleeper's face.

### SLEEPING BAG CONSTRUCTION

Goose down and synthetic fibers are the most frequently used fill materials. Both also insulate parkas, vests, booties, caps, and mittens. In making your equipment choices, weigh the advantages and disadvantages of each.

### CARING FOR SLEEPING GEAR

If you expect wet weather or stream crossings, place your bedroll in a plastic garbage bag before you stow it in a stuff bag.

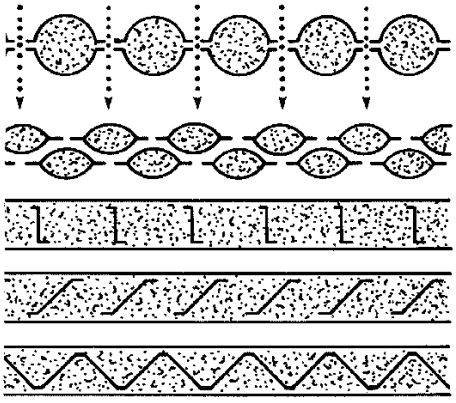
After a trek, unroll your bag, let it air thoroughly, then hang it in a closet or store it in a large cloth sack such as a laundry bag. Prolong the life of your bag by cleaning it when it becomes soiled, but only according to the manufacturer's instructions.

## FOOD

Working out the menus for a backcountry adventure may appear to be a huge effort, but it's really not difficult if you do it one step at a time. First, think through your nutritional needs, the demands of the activities you've planned, the size of your group, and the amount of time you want to spend cooking. Make some notes and you'll see that you've broken the big job of menu planning into a number of small, manageable tasks.

When you plan to be busy most of the day, you'll want meals that are fast and easy to prepare. In fact, you don't really have to cook at all, for while the warmth of main courses may enhance your eating pleasure, cold food is just as nourishing. Some backpackers occasionally even leave their stoves and cook kits at home and rely completely on foods that can be eaten as they are, and it's always a good idea to carry ready-to-eat foods in case you don't have time to light your stove or build a cook fire. For long trips, plan some quick menus, and also some that are more complex. You'll have the variety you need to make the meals interesting, and the flexibility to match your meals with your activities.

The elevation and temperature of your camp may also influence cooking times. If it takes 5 minutes to boil a quart of water at sea level, you'll need at least twice as long to boil it at timberline in the Rockies. Likewise, the colder the weather, the more time you'll spend completing every camp task, including cooking.



SIMPLE QUILTING. Loses heat where the stitching passes through the fabric.

DOUBLE QUILTING. Two quilts fastened together in an off-set way to eliminate cold spots. Material tends to be heavy.

BOX WALL. Prevents the filling from moving about.

SLANT WALL. Prevents down from moving about and gives it room to expand.

OVERLAPPING TUBE OR V-BAFFLE. Very efficient, but because it is constructed of a lot of material it tends to be heavy.

*Sections through wall of bag illustrate how filling is kept in place.*

## NUTRITION

While you'll need to eat more food for some activities and conditions than for others, your basic nutritional needs will always be met if you prepare meals that include a good mix of protein, carbohydrates, fruits and vegetables, dairy products, fats, and water.

**Protein.** Protein is one of your body's primary building blocks, essential for developing muscles and repairing injuries. Beef, poultry, fish, and eggs are all good sources of protein.

**Carbohydrates.** Whole-grain bread, cereals, rice, and pastas such as noodles, macaroni, and spaghetti provide lots of energy and help fill the empty corners of your stomach. Make biscuits, muffins, pancakes, and dumplings in camp, or bring crackers and breads from home. (To save space, you can open a bread wrapper and carefully squeeze the air out of the loaf as if it were an accordion. The slices will be thin, but the taste and food value will be unchanged.)

Sugar is also a carbohydrate, one that creates quick rather than lasting energy. Don't rely on sugar for much of your diet, especially in cold weather when your body needs plenty of slow-burning fuel.

Vegetables and fruits are complex carbohydrates. Full of vitamins and minerals, vegetables and fruits are essential menu components.

**Fats.** Fats are an important part of outdoor menus, though many people concerned with controlling their weight may think of them as taboo. Fatty foods such as butter, margarine, nuts, cheese, salami, and bacon slowly release their energy over a long period of time, keeping you warm and energized for hours. You'll want to include more fats in your winter menus than those you use in the summer. Eating a chunk of cheese before you go to bed or drinking a cup of cocoa in which you've melted a pat of butter or margarine will help keep you warm throughout the night.

**Water.** Water is as essential for good health as any of the food groups. Before you leave home, find out if there will be abundant sources of water near your camps or if you'll need to carry your water with you. Purify water collected in the backcountry by boiling it or treating it with water purification tablets.

## FORMS OF BACKCOUNTRY FOOD

**Dehydrated/Freeze-Dried.** Each of these processes accomplishes the same end: the removal of some or all the moisture from a food. The result is a product that weighs only a few ounces, won't take up much room in your pack, and won't deteriorate before you're ready to use it. Trail preparation varies from letting dehydrated ham cubes soak overnight to simply adding boiling water to freeze-dried main dishes. The disadvantages of commercially prepared dehydrated and freeze-dried foods are high cost and an occasional loss of nutritional value.

**Dry Goods.** Pastas, flour, beans, popcorn, rice, seeds, and other naturally dry foods can be a major part of your camp diet, as can dried dairy products and meats.

**Convenience Foods.** Every supermarket has dozens of convenience foods that are quick to prepare. Intended primarily for home use, many are also ideal for camp meals. Instant rice, gravy mixes, granola bars, pancake mix, and entrees in flexible metal retort pouches are just a few you may want to use. While many convenience foods are high in nutrients, others are loaded with sugar and salt or are so heavily processed that they've lost much of their nutritional value.

**Retort Foods.** Retort packages are sealed foil containers packed with delicious entrees and side dishes. Essentially a flexible metal can, a retort container will keep food fresh until you're ready to eat it, and in most cases you need only drop the whole package into boiling water to heat the contents to serving temperature. Since no water has been removed from the food, retort meals can be heavier than dry or dehydrated foods.

## PURCHASING FOODS

After you've decided what you would like to eat, studied the recipes, and listed how much of each ingredient you'll need to feed your companions and yourself, you'll be ready to buy provisions. The best place to start is your neighborhood grocery store. Food co-ops, particularly those specializing in health foods, often have extensive offerings of nuts, grains, and honey, while ethnic shops can supply the more exotic ingredients for your special recipes. Backpacking stores and sporting goods outlets usually stock dehydrated and freeze-dried meals packaged especially for hikers and campers, and while the selections can be expensive, they may sometimes be just what you need.

## GEAR AND GROUP SIZE

Most backcountry trips are best undertaken by small groups, so you'll often need only a camp stove, a few utensils, and a couple of pots to prepare meals plentiful enough to satisfy everyone. Groups with more than four or five members may want to split into small cooking teams, each with its own stove, cook kit, and provisions.

### FOOD STORAGE CONTAINERS

For food storage, you'll need several dozen clear plastic bags of various sizes. Use empty bread wrappers and fruit sacks, freezer and sandwich bags, or storage bags with self-locking closures. You'll also need a few refillable plastic squeeze tubes or a couple of plastic jars with screw-on lids.

### CANTEEN OR PLASTIC WATER BOTTLE

A 1-quart container is sufficient if water sources are abundant. For easy access, stow it in an outside pocket of your pack. Where water is scarce, and for convenience in camp, take along a collapsible water bag.

### PACKS

A pack serves as your backcountry storeroom attic, garage, and basement. A good one will ride lightly on your shoulders, protect your equipment from the elements, give you easy access to things you need along the way, and leave your hands free. To choose the pack that's right for you, you'll need to know the advantages and disadvantages of soft packs, internal frame packs, and packs with external frames.

### SOFT PACK

A soft pack will hold plenty of gear and can be stowed in tight places, making it ideal for day hikes, short portages, and light loads. However, a loaded soft pack places most of its weight on a hiker's shoulders, and that can be uncomfortable.

### INTERNAL FRAME PACK

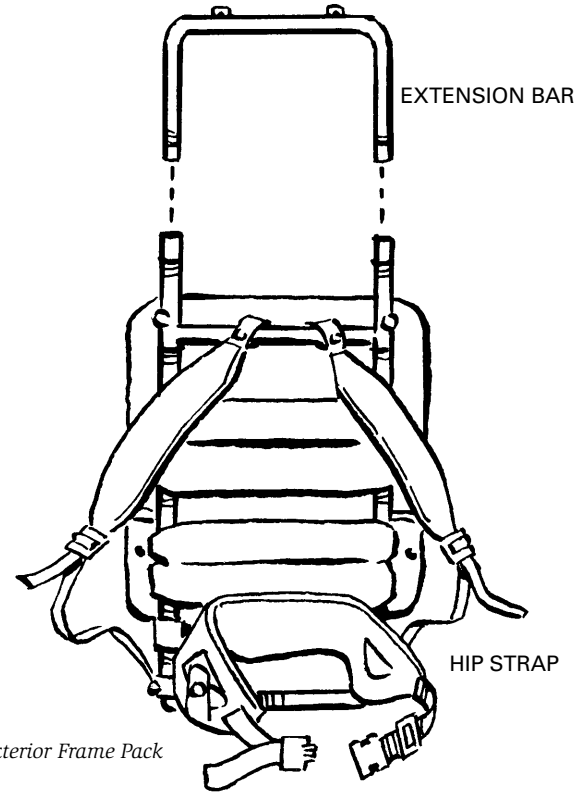
The compact shape and snug fit of internal frame packs are suitable for travel in heavy brush and on cross-country skis, as well as on open trails.

### EXTERIOR FRAME PACK

The weight distribution principles of an exterior frame pack are essentially the same as for a pack with an interior frame. However, since the frame is outside the bag, it can be larger and more rigid, and thus can more efficiently transfer the weight from the shoulder straps to the hip belt. Most frames also provide room for you to lash on a sleeping bag or tent, and with the pack bag removed, you can use the frame to haul anything from firewood to a Dutch oven.

When shopping for a new backpack, look for one that matches the kinds of adventures you'll use it for most. It may be a little large for your overnight camp-outs, but just right for two- and three-day treks. Insist on strong materials that have been securely sewn, and notice how pack bags are attached to external frames. Sturdy clevis pins secured with split rings will keep them from coming apart.

When you try on a pack, put some weight in it, then wear it around the store and see how it feels. Will it ride close to your back? Does the weight rest on your hips rather than your shoulders? Could you carry it all day on a trail?



*Exterior Frame Pack*

## PREPARING FOR A TREK

Time and effort spent in sharpening your hiking and camping skills will allow you more time to enjoy your trek. The best way to practice and develop these skills is to participate in several outings with your team.

### GATHERING YOUR EQUIPMENT

Backpacking requires proper equipment just as any other outdoor sport. Without suitable equipment, you will face unnecessary hardships. Take only what you need. After several overnight camps you should be able to conduct your own ''shakedown'' to eliminate items that you didn't need. Remember, the key to successful backpacking is to travel lightly. Check your equipment against the list of recommended equipment on page 36. This is the maximum. Some backpackers can reduce this list considerably and still be comfortable and clean.

## SHAKEDOWN

Get together with your team a day or two before you depart on a trek and conduct a shakedown. Spread all your equipment, clothing, and provisions on the floor or on a ground cloth outdoors. Consider each item carefully. Is it essential? If so, pile it beside your pack. If not, put it in a separate pile you'll leave at home.

After you've gone through everything, repeat the process. Check off each item on your lists of food and gear, and be sure you have all the basics but nothing more.

Finally, take a last look through the pile of nonessentials. Some of the items could make your trip more pleasant, and you'll have to decide whether they are worth the extra weight on your shoulders. In the case of a plant identification book, binoculars, or a camera, the answer may well be yes, but don't forget that ounces add up quickly. The more thorough your shakedown, the lighter the load on your back.

## REPACKAGING FOOD

Divide your food supplies into piles, one for each meal you'll prepare during a trek. Beginning with the first meal of the trip, read every recipe aloud, and as you do so, measure the exact amount of each ingredient that recipe calls for and put it into a plastic bag. Write the cooking instructions on a slip of paper. Put the instructions into the second bag, and seal it. On masking tape attached to the outside, write DINNER 1, etc.

Use the same technique to repackage the rest of your provisions, and soon you'll have a neat, easy-to-pack row of bags, each containing all the ingredients for a single meal.

## DIVIDE GROUP GEAR

In addition to safety, one of the greatest advantages of traveling in a group is that your pack will be lighter than if you were alone. Of course, each person must tote personal gear: clothing, eating utensils, etc. But tents, cook kits, stoves, food, stove fuel, and the like can be divided evenly among all the group members.

As you gear up, set aside those items that will be used by more than one person, and then divide them up in such a way that everyone has a pack that is light enough to be carried comfortably. To avoid confusion in camp, keep a complete list of your group's gear and note the pack in which each item is being carried.

## LOADING A PACK

Once you've determined what to carry, the next step is to pack it for the trail. Small, frequently used items go in your pockets: your knife, compass, whistle, bandanna, some matches, protection for blisters, and perhaps paper and a pencil.

Equipment you won't need until you make camp can go deep in the pack, but rain gear, the first-aid kit, a sweater, clean socks, and your lunch should ride just under the main flap. Carry your map, water bottle, sun and insect protection, and trail snacks in the pack's outside pockets. Reserve one pocket for your fuel bottle or cylinders so they'll be isolated from the rest of your supplies. Always return each small item to a specific pocket of your pack so you can locate it quickly.

For trail hiking, arrange the contents of your pack so that its center of gravity is high and close to your back. For cross-country skiing, snowshoeing, and mountaineering treks, you can trade a little comfort for a lot of stability by placing heavy gear in the bottom of the pack, thus lowering the center of gravity. In either case, pad the front of the pack's interior with a layer of clothing to provide cushioning against your back.

**Upper Left Pocket**
Water bottle or canteen
Rain gear

**Lower Left Pocket**
Sunscreen
Insect repellent
Flashlight with spare bulb and batteries

**Upper Compartment**
Cook kit and utensils
Stove
Water bag
Tent or tarp
Tent stakes
Ground cloth
Food and condiments in bags

**Flap Pocket**
Camping permit
Maps
Pencil and paper
Compass

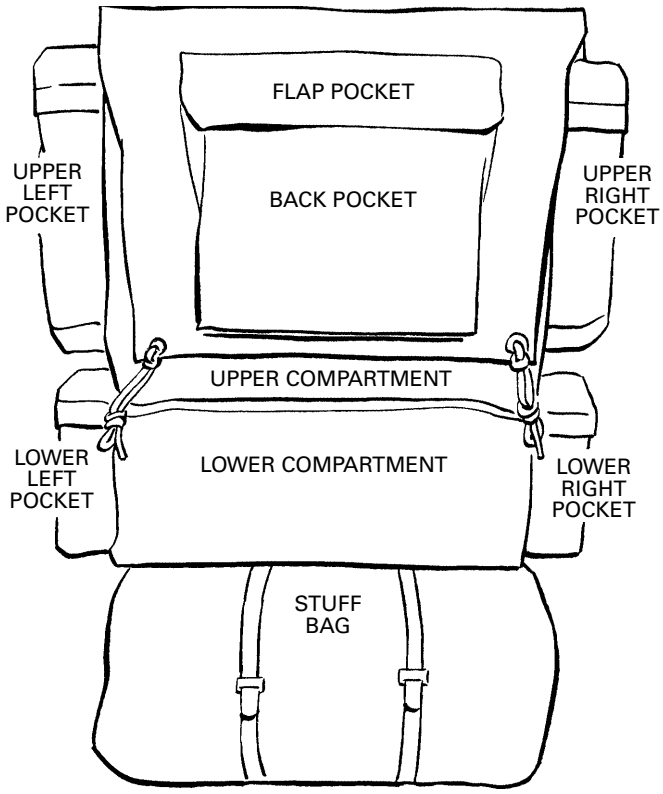
**Back Pocket**
Cup
Bowl
Matches and fire starters
Whistle
Cord
Bear bag and rope
Emergency coins
Soap
Toilet paper
Metal mirror
Comb
Toothbrush
Toothpaste
Small towel

**Upper Right Pocket**
Stove fuel
Stove wind screen

**Lower Right Pocket**
First-aid kit

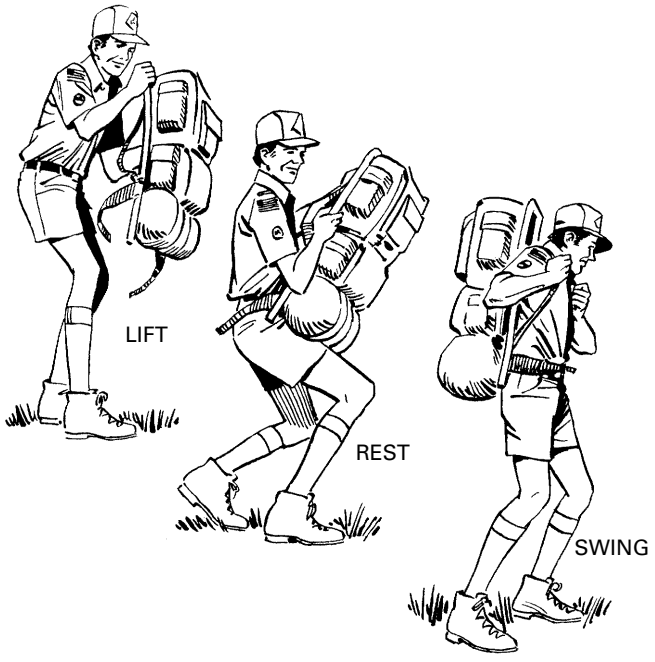
**Lower Compartment**
Hat or cap
Socks
Clothing appropriate for the season
Sweater or jacket
Parka or coat
Moccasins, running shoes, or booties
Bandanna

**Stuff Bag**
Sleeping bag
Foam pad




### WEIGHT OF THE PACK

How much your pack will weigh depends on the length of the adventure you've planned, the amount of food and equipment you must carry, and your personal preferences. Traveling with a group allows you to divide up tents, food packs, cooking gear, and other group gear. If you can keep the weight of your pack down to about a fifth of your total body weight, you'll be able to carry it fairly well.




### HOISTING THE PACK

Swinging a loaded pack onto your shoulders is easy. Grasp both shoulder straps and lift the pack waist high. Rest the bottom of the pack on your thigh and slip an arm through the proper shoulder strap. As you do so, smoothly swing the pack onto your back and slip your other arm through the remaining strap. Lean a little forward at the waist to hoist your pack into position, buckle the waist belt, and adjust the shoulder straps so that when you stand upright, most of the pack's weight rides on your hips. To remove the pack, reverse the steps.

## ORGANIZING YOUR TEAM

A well-organized team gets its chores accomplished quickly and has more time to enjoy the trek. Your team should be organized before you go on a backpacking trek.

Your adult adviser counsels and advises your team captain and team. Your adviser is responsible for ensuring the safety and well-being of each team member. Insofar as possible, the adviser lets the team captain lead the group.

Organize your cooking routine so that everything will be done neatly and efficiently. Members of small groups may pitch in and help with every aspect of meal preparation and cleanup. Larger groups can divide the responsibilities and, on long treks, rotate the duties daily so that everyone has a chance to try each task. In either case, someone must light the stove or fire, get water, do the cooking, and clean up.

### FUEL AND WATER GROUP

This group is responsible for maintaining the water supply. Also, this group is responsible for getting stoves ready for use or building a relay, gathering tinder, kindling, and firewood or charcoal. They should light the stove or fire in time for cooks to have meals ready on schedule.

### COOKING GROUP

The cooking crew assembles provisions and follows recipes exactly to serve meals on time, stores the food, puts cook pots to soak, and has cleanup water heating before sitting down to eat.

### CLEANUP GROUP

This group sets up wash and rinse water; cleans cooking pots and utensils; extinguishes stoves and fires and stores equipment; disposes of garbage and trash; and polices the kitchen and dining areas.

### LEAVE A TRIP PLAN

Once you've decided where to go and with whom, write down a full description of your intended route, where you plan to camp, and what time you will return. Give a copy to your parents or another trusted adult, and keep a copy for yourself. Be sure everyone understands your itinerary, and then stick to it.

## TRAVEL AND BUDGET

There are probably many alternatives for getting to the trailhead where you will begin your trek. You can travel by private vehicle, train, bus, airplane, rental van, or some combination of these. Before choosing one, it is important to explore the alternatives and the costs. Don't forget to consider the cost of meals and lodging in each plan. The results of this analysis may surprise you.

If you will be going during a school vacation period or over a holiday, it will be important to schedule transportation well in advance to ensure space. If you will be traveling by private vehicle, you will need to arrange for enough drivers to allow plenty of relief.

Your travel plan must include planning for meals and lodging en route. Military bases generally offer low rates and decent accommodations. You may also be able to arrange to stay overnight at a school, a camp, a state or national recreation area, a private campground,

| Item | Total Cost | Per Capita Cost |
|---|---|---|
| *Transportation*<br>This may or may not include meals. Check insurance coverage on packs and luggage if traveling by commercial carrier. | _____ | _____ |
| *Lodging*<br>Include cost of overnight stops to and from your trek, including user fees for public campgrounds. | _____ | _____ |
| *Meals*<br>Each individual can pay for his or her own meals en route or meal expenses can be pooled. Include tips and snacks. | _____ | _____ |
| *Training*<br>Cost of meals and other costs for weekend training. | _____ | _____ |
| *Use or Participation Fees*<br>Many public areas now charge a use fee. Find out how much these are and include them here. | _____ | _____ |
| *Insurance*<br>Include vehicle insurance and accident and sickness insurance if not already covered. | _____ | _____ |
| *Equipment Purchase or Rental*<br>Include purchase or rental of equipment such as tents, backpacks, stoves, and maps. | _____ | _____ |
| *Side Trips and Tours*<br>Include costs of any special side trips or activities that are planned. | _____ | _____ |
| *Promotion*<br>Costs of mailings, postage, special hats, or T-shirts. | _____ | _____ |
| *Contingency*<br>Allow for any unexpected expenditures, such as a vehicle breakdown necessitating another overnight stay. Refund at the end of trip if not used. | _____ | _____ |
| **Total** | _____ | _____ |

or even with a local Scout unit. The possibilities are endless and your troop leaders can guide you in choosing a suitable arrangement.

To plan a backpacking trek, you will need to determine costs, develop a budget, and determine what each participant will be charged. The list on page 23 is provided to assist you.

Once you have determined all possible costs including a contingency fee, add them up and divide by the total members of your group to determine each person's share. You may want to organize several fund-raising events to help reduce the cost to each participant. You will also need to develop a schedule of fee payments if the total payment is not collected at one time. Consider whether or not you will refund monies paid if someone has to drop out.

## EXPECT THE UNEXPECTED

Anything can happen in the wild outdoors and often does. You should take measures designed to prevent accidents and injuries from occurring. Ask yourself ''What would happen if _____ occurred?''

Consider all reasonably foreseeable problems and then devise a plan to minimize the risks and to manage a crisis.

Backpacking safety is a matter of foresight and good judgment. When you've planned your trek well, included responsible people in your group, and left a trip plan with someone, you can embark on an adventure confident you are prepared to handle any situation.

If any emergency does arise—a hiker is injured, for instance, or becomes ill—calmly consider all courses of action, then make sound decisions. It may be necessary to go for help, but always use your brain before you use your legs. Think first, then act.

An injury that doesn't happen needs no treatment. An emergency that doesn't occur requires no response. An illness that doesn't develop demands no remedy. Obviously, the best way to stay safe in the outdoors is not to get into trouble in the first place. That requires planning, leadership, and good judgment. As long as you keep your wits about you and clearly consider the consequences of your actions, you'll be able to enjoy even the most remote wilderness areas safely.

The preparations you make before a trek can do a lot to ensure your safety in the backcountry. Thorough

**WIND-SCALE NUMBERS**
**(Simplified Beaufort Scale)**

| | **When you see this:** | **Wind speed is: MPH** | **KM/H** |
|---|---|---|---|
| 0 | Calm. Smoke goes straight up. *No wind*. | 0–1 | 0–1.6 |
| 1 | Direction of wind shown by smoke drift, but not by wind vane. *Slight wind*. | 1–3 | 1.6–5 |
| 2 | Wind felt on face. Leaves rustle. Wind vane moves. *Light breeze*. | 4–7 | 6–11 |
| 3 | Leaves and small twigs move steadily. Small flag held straight out. *Gentle breeze*. | 8–12 | 13–19 |
| 4 | Dust and loose paper raised. Small branches move. *Moderate wind*. | 13–18 | 21–29 |
| 5 | Small trees sway. Waves form on lakes. *Fresh wind*. | 19–24 | 30–38 |
| 6 | Large branches move. Wires whistle. Umbrellas are hard to use. *Strong wind*. | 25–31 | 40–50 |
| 7 | Whole trees in motion. Hard to walk against wind. *High wind*. | 32–38 | 52–60 |
| 8 | Twigs break from trees. Very hard to walk against the wind. *Gale*. | 39–46 | 62–72 |
| 9 | Small damage to buildings. *Strong gale*. | 47–54 | 74–87 |
| 10 | Much damage to buildings. Trees uprooted. *Whole gale*. | 55–63 | 88–101 |
| 11 | Widespread damage from wind. *Violent storm*. | 64–72 | 102–116 |
| 12 | Violence and destruction from wind. *Hurricane*. | 73 + | 117 + |

**MPH—miles per hour** **KM/H—kilometers per hour**

**WIND CHILL CHART**

| Actual Thermometer Reading | Estimated Wind Speed MPH 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | Danger From Freezing of Exposed Flesh |
|---|---|---|---|---|---|---|---|---|---|
| 35° | 32° | 22° | 15° | 11° | 7° | 5° | 3° | 2° | Little danger |
| 30° | 27° | 16° | 9° | 4° | 0° | –2° | –4° | –6° | to exposed |
| 25° | 21° | 10° | 2° | –3° | –7° | –10° | –12° | –14° | flesh |
| 20° | 16° | 4° | –5° | –10° | –15° | –18° | –20° | –21° | |
| 15° | 11° | –2° | –11° | –17° | –22° | –25° | –27° | –29° | |
| 10° | 6° | –9° | –18° | –25° | –29° | –33° | –35° | –37° | |
| 5° | 0° | –15° | –27° | –32° | –36° | –40° | –42° | –45° | Increasing |
| 0° | –5° | –21° | –36° | –39° | –44° | –48° | –49° | –53° | danger to |
| –5° | –10° | –27° | –40° | –46° | –51° | –55° | –58° | –61° | exposed flesh |
| –10° | –15° | –33° | –45° | –53° | –59° | –63° | –67° | –69° | |
| –15° | –20° | –39° | –52° | –60° | –66° | –71° | –74° | –77° | Great danger |
| –20° | –26° | –46° | –58° | –67° | –74° | –79° | –82° | –85° | to exposed |
| –25° | –31° | –52° | –65° | –75° | –81° | –87° | –90° | –93° | flesh |
| –30° | –36° | –58° | –72° | –82° | –88° | –94° | –98° | –100° | |

planning means you'll have all the clothing, camping equipment, provisions, and survival gear you'll need. You will have thought through the route you intend to follow, checked weather forecasts, practiced any special skills the outing will demand, and left a complete trip plan with responsible people who will search for you if you are overdue in returning home. Since your chances of getting into difficulties are greatly reduced when you travel with others, you should have at least four people in your group. In short, you'll have done everything you can to foresee and avoid problems before they can occur.

## DANGEROUS WEATHER

### HIGH WINDS

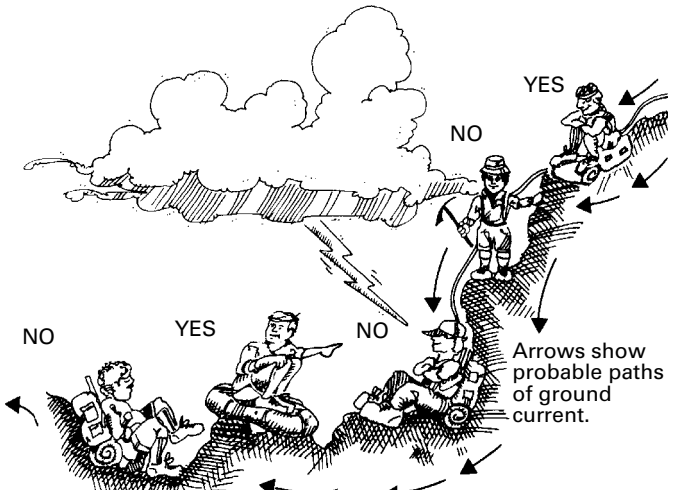
If it becomes difficult to stand up in a wind, it's probably time to stop and make camp. Exercise caution when you must hike across a large open area, along the crest of an exposed ridge, or above timberline. Fierce winds can develop quickly, so have a plan in mind if you encounter them.

In cold weather, high winds are especially dangerous. Exposed flesh can freeze quickly, resulting in frostbite, and fast-moving air rips heat from your body, creating a possibility for hypothermia. Carry a wind chill chart with you and seek shelter when anyone in your team is having difficulty.

### LIGHTNING

The summits of mountains, crests of ridges, slopes above timberline, and large meadows are extremely hazardous places to be during lightning storms. If you are caught in such an exposed place, quickly descend to a lower elevation, away from the direction of the approaching storm, and squat down or kneel down on a pad, keeping your head low. A dense forest located in a depression provides the best protection. Avoid taking shelter under isolated trees or trees much taller than adjacent trees. Stay away from water, metal fences, and other objects that will conduct electricity long distances.

By squatting or kneeling on a pad with your feet close together, you have minimal contact with the ground, thus reducing danger from ground currents. If the threat of lightning strikes is great, your team should not huddle together, but spread out at least 15 feet apart. If one member is jolted, the rest of you can give assistance. Whenever lightning is nearby, take off backpacks with either external or internal metal frames. In tents, stay at least a few inches from metal tent poles.



### FLASH FLOODS

Threadlike streams can become raging rivers in a few minutes or even seconds. It is important to be alert to the possibility of flash floods and take steps to avoid a dangerous encounter. Pitch your tents on higher ground. During and after periods of rain, stay away from natural drainage areas. Always know where you are and how to get to higher ground. Watch for indicators of flash flooding, such as an increase in the speed or volume of stream flow. Stay out of flooded areas.

## MEDICAL DANGERS

### HYPOTHERMIA

Hypothermia occurs when a hiker becomes so cold he can no longer warm himself. It's as if the body's furnace had gone out. As the core temperature drops, vital organs shut down. In extreme cases, death could result.

Hypothermia is of special concern to backpackers because it can sneak up on them gradually, even in the summer. On a chilly, windy day, a tired hiker in wet clothing is a prime target. Since hypothermia impairs the ability to think clearly, the victim might not realize his danger, and he might not be able to save himself.

Stay warm. Stay dry. Eat plenty of energy foods, and don't push yourself to exhaustion. If your clothes become wet in cold weather, stop and change them. If you become chilled, make camp and crawl into your sleeping bag to get warm.

If hypothermia occurs, get the victim warm. If possible, take him indoors and immerse him in a warm (110 degrees F) water bath. If not, set up a tent, strip off his clothing, and put him in a dry sleeping bag.

### HEAT EXHAUSTION/HEATSTROKE

While hypothermia and frostbite can occur when the body becomes too cool, heat exhaustion or heatstroke could develop if the body is unable to counter the effects of heat. In heat exhaustion, the body's cooling mechanism works so efficiently that it lowers the core temperature too much. In heatstroke, an overworked mechanism simply stops functioning, and the core temperature soars.

When the weather is hot, keep your body cool. Drink lots of liquids, even if you don't feel thirsty. Wear a hat and loose, light-colored clothing. Hike in the morning and evening, but rest in the shade during the heat of the day. Splash water on your face and body. Go for a swim in a shady brook.

Symptoms of heat exhaustion develop quickly. The victim becomes pale, and his skin begins to feel cold and clammy. Breathing is shallow, and he may feel nauseated.

Have the victim lie in the shade with his feet slightly higher than his head. Loosen his clothing and cover him with a blanket or a sleeping bag. When he can handle it, let him sip water to which a little salt has been added. Recovery is usually rapid, but make him take it easy the rest of the day.

Heatstroke is rare, but very serious. The victim does not sweat at all. His face is hot, red, and dry. He may become delirious or lose consciousness. Breathing is difficult and noisy.

Rest alone is not enough. You must cool the victim as quickly as possible. Dip him in a stream or lake if one is nearby. If not, lay him in the shade and pour water over his head and body. Drape him with damp cloths. Rub his arms and legs to increase circulation. When he is able to drink, give him as much water as he wants. Get him to a doctor as quickly as possible.

### ALTITUDE SICKNESS

Since altitude sickness is caused in part by a too-rapid rise in elevation, acclimate yourself gradually to the high country. Spend a layover day part way up to give your body time to adjust. Take antacid tablets. Get enough rest and drink plenty of liquids.

The victim may develop a headache, feel a lack of energy, lose his appetite, and sometimes become nauseated. If antacid tablets and increased liquid intake are not effective, descend to a lower elevation. The symptoms will soon disappear.

### DEHYDRATION

When backpacking you will probably sweat more than usual. Sun and wind also will remove large quantities of moisture from your skin.

To prevent dehydration, drink more water than you do normally. Four quarts a day may be needed, depending on the conditions. Avoid dehydration by hiking early in the morning (before the intense heat of midday) and late afternoon.

Symptoms of dehydration are light-headedness, dizziness, nausea, general weakness, and muscle cramps. For mild and moderate cases of dehydration, the patient should drink liquids and rest in the shade.

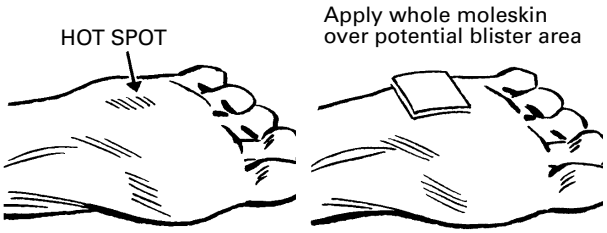
### BLISTERS

Blisters occur when skin is irritated, usually by heat or by friction. For backpackers, blisters on the feet are the most common and the most troublesome problem encountered.

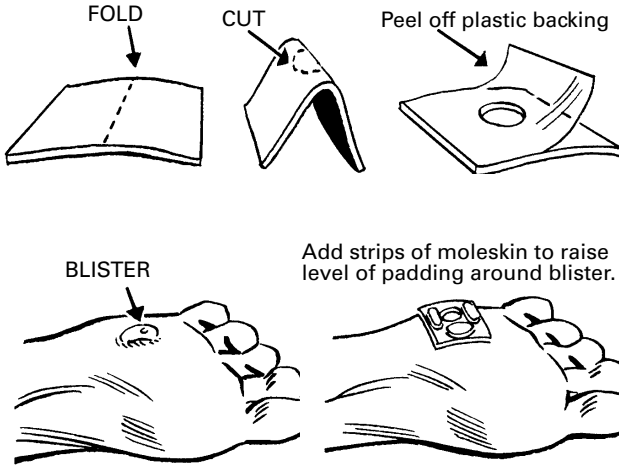
Keep your feet clean and dry. Wear boots that fit properly and are well broken-in. Change your socks

frequently. Toughen your feet with short hikes before embarking on an extended trek.

A ''hot spot'' on your foot signals the beginning of a blister. Stop immediately and reinforce the tender area with moleskin.




Put on dry socks. If a blister does form, you may need to drain it. Clean your foot with soap and water, then prick the edge of the blister with a sterilized needle. Protect the wound by cutting a hole the size of the blister in a piece of moleskin, and use it to encircle the blister. Several layers may be necessary to take the pressure of the boot off the tender skin.




**SPRAINED ANKLE**

Should your ankle twist while you are walking, muscles and ligaments can be strained, especially if you're carrying a heavy pack. A slight sprain may cause only mild discomfort, but in serious cases you could be temporarily disabled.

Wear boots with good ankle support and lace them snugly, but not so tightly as to impair circulation. Watch where you step, especially when crossing boulder fields, logs, and streams.

If a hiker suffers a sprain, don't take off his boot. It will support the injury, and if it is removed, the ankle may swell so much the boot can't be put back on.

Reinforce the ankle by wrapping it, boot and all, with your Scout neckerchief, a bandanna, or an elastic bandage. If the victim finds he still cannot put weight on his foot, suspect a bone fracture and get him to a doctor.

**WHEN TO STOP OR TURN BACK**

When lightning crackles across the sky, the rocks around you begin to buzz with electricity, and the smell of ozone is heavy in the air, you don't need to be told it's time to abandon your immediate plans to reach a mountain's peak. When you discover that the bridge your trail should have crossed was washed away by a raging torrent, or that a bear has eaten all the food you'd intended to eat for the next four days, or that 3 feet of snow has fallen on the pass over which you'd intended to hike, you probably won't have any trouble sitting down and reconsidering your itinerary.

When borderline dangers arise, however, the decision may not be so easy. Perhaps you've become exhausted. The weather may be turning bad. A companion might be feeling ill, or you may simply be having a miserable time. Should you push on despite the growing adversity? Should you devise a new plan? Should you terminate the adventure altogether and just go home? A mark of wise wilderness travelers is their willingness to stop or turn back if an adventure becomes hazardous, since they know that such a decision can spell the difference between a safe and satisfying outing and a foolhardy flirtation with disaster.

As you're planning an adventure, talk with your companions about situations that might cause you to change or terminate your trip, and don't head for the hills until you agree that you all are willing to stop anytime backcountry hazards develop, and you will not be afraid of deciding to alter your activities for the sake of everyone's safety and happiness.

Dangerous situations can develop slowly or quickly, and from just about any source. The fact that they often are unexpected is part of what makes them dangerous. Among the most common are these:

**BAD WEATHER**

Weather is the outdoor condition that can vary the most, and thus it can have great effects on your safety. Wind can shred a dining fly, make walking hazardous, or topple a tree on your tent. Lightning can drive you off meadows and ridges, and down from mountains. Rain and chilly temperatures bring with them the potential for hypothermia. If you can't keep your clothing and equipment dry, and yourself warm and safe, it's time to retreat to an area where you can.

### DIFFICULT TERRAIN

As you plan a trip, you'll find out all you can about the terrain you expect to encounter. However, what you see on a map at home and what you see when you're on the trail may differ considerably. The climbs may be steeper and longer than you had anticipated. The trail may be rocky or overgrown with brush. You may be tempted to push on, hoping the terrain will ease before long, but to do so invites exhaustion. Don't look on the bright side, look on the realistic side. If the terrain is rugged, shorten the distance you intend to cover each day, choose an alternate trail, or turn back.

### FATIGUE

Outdoor activities often require quick coordination and sharp thinking. You have neither when you are overly tired, and that increases your susceptibility to injury and illness. Stop when you become weary and refresh yourself with food, relaxation, and sleep.

### DARKNESS

Late afternoon is a time you'll want to be particularly alert to the dangers of overextending your energies. You and your companions probably will be tired from the day's exertions, and if your intended campsite is still several miles away, you may be tempted to rush to reach it before dark. Before you press on, though, determine whether you have plenty of time before sunset to complete the activity you're planning, and also to take care of tasks such as making camp and cooking supper. If not, stop now.

### INSUFFICIENT TIME

An ideal trip plan will include plenty of time for every activity, plus a few hours of leeway in case a team falls behind schedule or finds additional things to see and do along the way. However, once you've filed a trip plan and noted when you expect to come home, allow ample time to return on schedule. If that means omitting some of your planned activities, then do it. Allow time to meet your deadline without taking risks or becoming exhausted.

### INADEQUATE FOOD

A group enjoying an outdoor adventure will burn up lots of calories, and they'll need plenty of food to replenish their energies. Going without food is not only uncomfortable, it also can impair a group's ability to hike, think, and keep warm. If your provisions run low, it's time to go home.

### LOW MORALE

When trip goals are not accomplished, when poor judgment of distances and time leads to exhaustion, and when clothing and equipment do not keep a group warm and dry, morale can collapse. The outdoors is for enjoyment, not for suffering and unhappiness. Rectify the situation if you can, but if not, consider abandoning the trek and trying again after conditions improve.

## WHEN AN INJURY OR CRISIS OCCURS

In spite of your best efforts to avoid it, sometimes an injury will occur. It is important that at least one person in your group be currently trained in first aid and currently certified in CPR. When an injury does occur while you are on a trek, follow these steps in order.

1. **Approach the victim safely.** If he has fallen, study his location before trying to reach him. Is he on a ledge? If you approach from above, is there a chance of loose rocks rolling onto him? Will you be in danger of falling? Do not aggravate the situation by becoming an accident victim yourself.

2. **Treat life-threatening conditions.** First, stop any serious bleeding with pressure on the wound and on pressure points. Second, restore breathing. Third, treat symptoms of poisoning and any other serious injuries.

3. **Stabilize the victim.** See to the less serious wounds, and treat every accident victim for shock.

4. **Get help.** Calmly assess your options. Can the victim walk to the trailhead? Are you and your companions able to carry him out? (A victim with injuries to the spine or neck must not be moved without trained medical help.) If not, determine who should go for help and how it should be done. Write down all important information, including a description of the victim's injuries and details of your exact location, and send the report with the messengers. Use the reporting form; carry a copy in the map pocket of your backpack. Send at least two people to go for help. Be certain the messengers know where to go, and that they can find you when they return. If the wait will be long, set up camp and do all you can to keep the victim safe, comfortable, and calm.

## TRAIL PROCEDURES

Hiking with a pack is much different from walking without one. A pack on your shoulders alters your sense of balance. Its weight puts extra strain on your feet, ankles, and knees, especially when you're pounding downhill. Take it easy at first until you become accustomed to the sensation of carrying a pack, and rest whenever you begin to tire.

Setting a good pace will enable everyone in your group to enjoy a trek. Help ensure the comfort of the slowest members by positioning them near the front of the group where they can more easily maintain a steady stride. Backpacking is a group activity, and everyone must pitch in to do whatever is necessary for the good of all.

Begin each day's walk slowly, allowing plenty of time for your muscles to warm up and your packs to settle into place. Take brief rest breaks to refresh yourselves and adjust your clothing to meet changing weather conditions. Never hike to the point of exhaustion; you may need those reserves of energy to meet unexpected situations.

On a trek it is crucial to everyone's well-being to adopt and put into practice proper trail procedures. Every member of the group should be aware of these procedures before you depart for a trek:

- Always keep together.
- Use the buddy system.
- Anyone may call a halt.

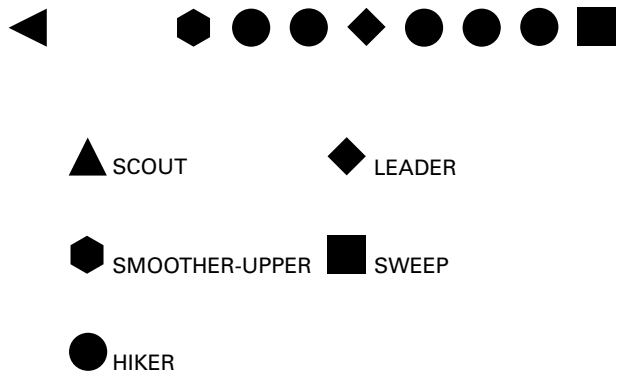
Keeping the group together is essential in preventing anyone from becoming lost, but it is frequently neglected unless the team captain insists on it and each member is committed to doing his or her part to ensure success. Every trek should be a team effort. Stronger backpackers should be expected to help those who are less able. Faster hikers should walk near the end of the line of hikers and give positive encouragement to the slower ones in front. The entire group should hike within hearing of one another.

The buddy system works well in any outdoor situation, not just aquatics. Before the trek, make sure everyone has at least one buddy; buddies can also tent together.

When hiking or backpacking on the trail, every member has a right and even a duty to call a halt to the entire group when necessary. Every member should be encouraged to call a stop to check a hot spot, adjust a pack, adjust layers of clothing, eat a snack for energy, drink some water, or any other reason. When necessary, the team captain should redistribute equipment and food to lighten the load of someone who is having a problem.

### ASSIGN DUTIES

An effective way to travel quickly and safely on a backpacking trek is to divide responsibilities among team members. There are four basic duties: those of scout, the smoother-upper, the leader, and the sweep.




**SCOUT**

With map and compass in hand, the scout strikes out a little ahead of the rest of the group in search of a route everyone can follow. Careful to maintain a course that leads toward the destination, the scout stays within earshot of the group.

**SMOOTHER-UPPER**

The smoother-upper takes a position in front of the group and ''smooths up'' the route established by the scout to ensure the other hikers the easiest walking possible. For instance, the scout might climb up and over a steep knob or plunge through a dense thicket. The smoother-upper may decide to lead the group around the obstacle and rejoin the scout on the other side. The smoother-upper also sets the pace.

**LEADER**

The leader comes along midway in line in order to monitor the progress of all the hikers. Leaving the determination of route and pace up to the scout and smoother-upper, the leader decides when to take a rest stop, where to eat lunch, when to seek shelter from inclement weather, and whether to stop or turn back. When a decision is made, a message is passed up the line to the smoother-upper and the scout.

**SWEEP**

Bringing up the rear is the sweep, who carries the first-aid kit and is responsible for seeing that all the other hikers are accounted for and are staying on course. If

someone in the group needs to stop, the sweep calls a halt by passing the message up the line.

If there are more than four hikers, those without a specific duty hike near the group leader who, at regular intervals, will rotate the responsibilities of scout, smoother-upper, and sweep so that everyone has a chance to master the skills required of each task.

To reduce their impact on the land, cross-country travelers should take care not to walk directly in one another's footsteps. Those at the rear of the group should seek alternate routes through fallen timber and rocks to avoid beating a path.

This system works especially well to keep everyone together when hiking cross-country, but it is also helpful when hiking on a trail.

### RULES OF THE TRAIL

As with any public thoroughfare, a trail has certain rules its users must obey. There aren't many of them, but they are important matters of common sense.

- If there is a registration box at the trailhead, sign in. Officials of the agency in charge of the area will know where you've gone, and they can use your registration information to better determine the needs of future hikers.
- Use switchbacks properly. Switchbacks zigzagging a trail up a mountainside help prevent erosion by easing the steepness of the grade. When hikers cut across switchbacks rather than staying on the pathway, their boots can loosen the earth, disturb vegetation, and make it easier for rain and melting snow to wash away the soil.
- Be kind to the countryside. Meadows and alpine tundra are fragile. Protect them by staying in the center of main trails, and by taking rest breaks and camping in the trees rather than on the clearings themselves.
- Treat other hikers courteously. Many people enjoy hiking, and in your travels, you will meet some of them. Be polite. Step aside to let them pass. Respect their privacy and, if you camp, find a site hidden away from other tents.
- Give livestock the right-of-way. Horses and pack animals are sometimes nervous around strangers. When you meet riders on the trail, step at least 10 feet off the path on the downhill side and stand quietly while they pass. If the trail is too narrow for that, ask the lead rider for instructions.
- Leave gates the way you found them—open or closed. Ranchers and farmers grazing animals on the lands through which you hike will appreciate your thoughtfulness.
- Pick up litter. Do the land a favor and set a good example by picking up any trash you find and by asking hikers you meet if they have litter you can carry to the trailhead for them.

### HIKING TIPS

1. How fast should the hike be paced? Not faster than the slowest member.
2. Keep some space between hikers; 6 to 10 feet is about right. Space will allow safety (no stepping on heels or catching flying limbs in the eye); it also allows for sudden stops and a good view of the surrounding environment.
3. A steady, even pace results in fewer rest stops, and less chance that members will overheat.
4. Foot problems? Speak up! Foot care is essential. Hot spots, blisters, foreign objects in the boot—all can cause misery for everybody if not taken care of early.
5. Rest stops? They're good if someone has a problem or if the scenery warrants a special gaze. Too-frequent rest stops signal a too-rapid speed of hiking.

## BE SAFE AND HEALTHY

Strict adherence to proper health and safety practices is crucial on a trek. Campers are responsible to themselves for remaining strong and healthy. Of greater importance, each camper is responsible to other members of the team. Failure to purify water or to rinse dishes thoroughly may affect everyone. Health and safety are group responsibilities as well as individual ones. Here are some wise trail practices that will help keep you and your team strong, safe, and healthy.

### PERSONAL CLEANLINESS

Backcountry cleanliness is important for your health and happiness. While you probably won't wash as frequently as you do at home, you can take a good bath with just a couple pots of water. Carry them at least 200 feet from springs, lakes, or streams before giving yourself a thorough scrubbing with a washcloth, biodegradable soap, and the water in one pot. Use water from the second pot for rinsing by dipping it out with a cup.

### CARING FOR YOUR FEET

Foot travel is your primary means of transportation on a trek. Sound, healthy feet are a must. Proper foot care will keep your feet sound and healthy. Cut your toenails short and square—don't round the corners. Clean feet

and socks will reduce the possibility of blisters. Wash your feet before and after hiking. Change your socks daily. Always keep your feet and socks dry. Treat cuts and sores on your feet with antiseptic and adhesive bandages or moleskin. Hot spots should be given immediate attention. Applications of tincture of benzoin toughen the skin and thereby help prevent blisters. Use foot powder each morning.

### WASH YOUR CLOTHES

On a long trek you should wash your clothing periodically. Use a minimum of biodegradable soap and do your washing at least 200 feet away from a spring, stream, lake, or other body of water. After washing, spread them over tree limbs or shrubs where they will dry quickly.

### PURIFY ALL DRINKING WATER

All water from all sources—including springs, streams, and wells—must be purified. This rule must be strictly enforced. Your own well-being is at stake.

The most certain treatment to purify water is to bring it to a boil or boil it for a couple of minutes at higher elevations. Water purification tablets or iodine crystals will effectively kill most water-borne bacteria and viruses that cause disease. To treat cold water, you'll need to double the contact time to destroy giardia that may be present. This means that you must let a quart of water stand for at least 30 minutes after adding a tablet or two, or 2 to 4 capfuls of iodine solution, before drinking it.

### WASH AND RINSE DISHES THOROUGHLY

Thorough washing and rinsing of dishes will protect your health. Time taken to boil water for rinsing dishes is well spent. Disinfect your dishes by submerging them in boiling water before each meal to kill any bacteria or germs that have accumulated. Air dry dishes and utensils.

### STRAIN WASTE WATER

When disposing of waste water, drain it through a strainer and dispose of the dirty water at least 200 feet away from your campsite.

### GUIDELINES FOR SAFELY USING CHEMICAL STOVES AND LANTERNS

1. Use compressed- or liquid-gas stoves or lanterns only with knowledgeable adult supervision and in Scout facilities only where and when permitted.
2. Operate and maintain according to manufacturer's instructions included with the stove or lantern.
3. Both gasoline and kerosene shall be kept in well-marked, approved containers (never in a glass container) and stored in a ventilated, locked box at a safe distance (a minimum of 20 feet) from buildings and tents. Keep all chemical fuel containers away from hot stoves and campfires, and store below 100°F.
4. Let hot stoves and lanterns cool before changing cylinders of compressed gases or refilling from containers of liquid gas.
5. Refill liquid-gas stoves and lanterns a safe distance from any flames, including other stoves, campfires, and personal smoking substances. A commercial camp stove fuel should be used for safety and performance. Pour through a filter funnel. Recap both the device and the fuel container before igniting.
6. **Never fuel a stove, heater, or lantern inside a cabin; always do this outdoors. Do not operate a stove or lantern in an unventilated structure. Provide at least two ventilation openings, one high and one low, to provide oxygen and exhaust for lethal gases. Never fuel, ignite, or operate a stove, heater, or lantern in a tent.**
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. Periodically check fittings on compressed-gas stoves and on pressurized liquid-gas stoves for leakage, using soap solution before lighting.
9. To avoid possible fires, locate gas tanks, stoves, etc., below any tents since heavy leakage of gas will flow downhill the same as water.

10. When lighting a stove, keep fuel containers and extra cannisters well away. Do not hover over the stove when lighting it. Keep your head and body to one side. 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 down.

11. Do not leave a lighted stove or lantern unattended.

12. Do not overload the stovetop with heavy pots or large frying pans. If pots over 2 quarts are necessary, set up a separate grill with legs to hold the pot, and place the stove under the grill.

13. Bring empty fuel containers home for disposal. Do not place in or near fires. Empty fuel containers will explode if heated and should never be put in fireplaces or with burnable trash.

## DISPOSAL OF TRASH AND GARBAGE

Proper disposal of trash and garbage ensures a clean camp and protects everyone's health. Do not bury garbage or dump it in latrines; bears and rodents will soon retrieve it. All burnable trash should be thoroughly burned. Put wet unburnable garbage in a plastic bag and carry it out.

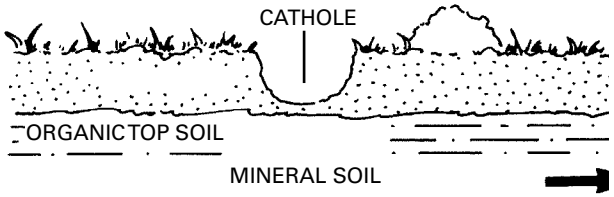
**How Long Does Litter Last?**

- Aluminum cans and tabs—80 to 100 years
- Vibram soles—50 to 80 years
- Leather—up to 50 years
- Nylon fabric—30 to 40 years
- Plastic film—20 to 30 years
- Plastic bags—10 to 20 years
- Plastic coated paper containers—5 years
- Wool socks—1 to 5 years
- Orange peel—2 weeks to 5 months

Estimate by a waste disposal expert

## LATRINES

In the backcountry you'll need to dig a cathole latrine. Make it at least 200 feet from any trail, water, or campsite. Dig the hole about 6 inches deep, but no deeper than the organic topsoil. After use, fill the hole completely, and pack and mound the earth to avoid erosion. Garbage and trash must not be put in any cathole because animals will dig it out.




Water source • Trail • Campsite 200 Feet

## WHAT TO DO WHEN "CONFUSED"

When hiking *together,* instead of spreading out over a long distance on the trail, the possibility of anyone's becoming confused is remote. By using a map and a compass with reasonable proficiency, you will always know where you are.

Never allow one member to leave camp or side hike alone. Follow the "rule of four": Always hike together in groups of four or more. If one person is injured, one tends to him and the other two go for help.

Should you become confused about where you are, don't panic. Look around for landmarks that will indicate your location. Check your maps. In your mind, retrace your steps. Discuss the situation with your companions. If you still can't make sense out of the surrounding terrain, follow a road to help or, in the wilderness, make a brief, controlled check of the immediate area. If that doesn't give you any clues, stay where you are, make yourself comfortable, and remain calm. Searchers will find you in time.

## ACCIDENTS

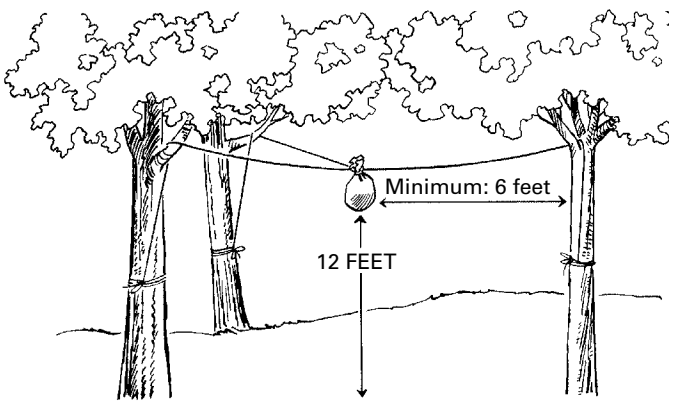
Most accidents occur late in the day in camp, not on the trail. Many of them involve horseplay. Fatigue, mild dehydration, and altitude effects may impair a member's performance and judgment. Rock throwing, improper use of equipment, foolishness in hanging the bear bags, climbing steep, rocky ridges, running through campsites, climbing trees, and carelessness around firelays frequently cause accidents. To avoid them, individual and group discipline should be maintained and safety practiced in all activities.

Avoid throwing or rolling rocks. This is particularly dangerous in steep country. There may be other hikers below you. The A-B-C of mountain climbing is **Always Be Careful.**

### BEARS

Bears are a unique and natural part of many backcountry areas. Like all wild animals, they must be treated with respect. The black bear is not an aggressive animal and most groups will not even sight one.

Anything with an odor (except the human scent) could attract bears; it does not matter if the odor is food-related. Any odor could generate a curiosity in a bear that might result in his closer examination of that odor. All items with a smell are placed in a bear bag at night. A few of these items are food, soaps and deodorants, toothbrushes and toothpaste, lip balm, sunscreen, mosquito repellent, unused film cartridges, and first-aid kits.




Good Scout camping practices are the best way to avoid contact with bears. Avoid carelessness that results in improper disposal of food. All uneaten food should be either burned or stored in a bear bag at night. Do not place uneaten food in a latrine. Cooking should occur close to the fire ring and away from the sleeping area. Cleanup must occur only at the sump. Never eat food in a tent since the odor remains after the food is gone.

The human scent does not attract bears. The superficial application of scented lotions, soaps, deodorants, shampoo, or spilled food may, however, attract the attention of bears. Avoid perfumed products with strong odors. Any clothing on which food has been spilled must be placed away from the sleeping area at night.

If a bear does visit your campsite, stay away from him and make noise. Protect your food by hanging it. Never risk injury by attempting to protect your food or equipment from a bear.

### AVOID THE PLAGUE

Rabies and bubonic plague are transmitted by rabbits, bats, ground squirrels, chipmunks, and other rodents. Do not handle or attempt to feed any animals.

### INSECT REPELLENT

Mosquitoes and other insects are often abundant in wet areas. Insect repellent is recommended for the trail. Also, watch out for bees and wasps. If you are allergic to stings, be sure you have antitoxin and that a group member is informed of your condition and what treatment you might require.

## WRAPPING UP YOUR ADVENTURE

You'll want to keep a record of your adventures. A wirebound notebook makes a fine log, as do hardbound blank journals. Within a day or two of every trip, while the memory of the outing is still fresh in your mind, write down the dates of the trek, the names of the participants, where you went, and a summary of the highlights.

**SAMPLE LOGBOOK PAGE**

Date: _____ Time: _____

Campsite: _____

Companions: _____

_____

Weather conditions: _____

_____

What we did today: _____

Personal thoughts: _____

_____

_____

_____

### WHEN YOU GET HOME

After a trek is over, there are still a few things to do. Before you get on with other activities, take time to unpack and put away your gear. Air out your sleeping bag, pad, and blankets. Wash your eating kit and store any unspoiled, leftover food. Clean your share of the group equipment, and return it to storage. If your tent and dining fly are wet, hang them in a basement, a garage, or on a clothesline in the sun until they are dry, before you roll and store them.

### EVALUATE YOUR TREK

Even the best campers can improve their skills. After each adventure, get together with your buddies and discuss what was good about the trip and what could have been better. Were the meals as easy to prepare and as tasty as you had hoped? Did everyone stay dry? Did you take the right equipment and supplies? Was the campsite a good one, and were you able to leave it unmarred? Learn from the successes of each trek as well as the mistakes, and before long you will have mastered the know-how of camping.

Here are some aspects of your trek to consider:

- What went well?
- What could be improved?
- What will I do next time?
- What skills do I need to improve or acquire?
- What gear was not used or needed?
- What gear or supplies were needed that I did not take?
- Where will I go next?

### A BACKPACKING ETHIC

The tremendous rewards of backpacking are drawing more and more people to the trails. At the same time, the vast territory suitable for treks is shrinking in size. More people and less land means hikers must be careful not to endanger the very wilderness they have come to enjoy.

A good way to protect the backcountry is to remember that while you are there, you are a visitor. When you visit a friend, you are always careful to leave his home just as you found it. You would never think of dropping litter on the carpet, chopping down trees in the yard, putting soap in the drinking water, or marking your name on the living room wall. When you visit the wilderness, let the same courtesies apply. Leave the backcountry just as you found it.

Hiking and camping without a trace is the sign of an expert woodsman, and of a Scout who cares for the environment. Travel lightly on the land.

## RESOURCES

### BSA PUBLICATIONS

*Boy Scout Handbook,* No. 33105
*Fieldbook,* No. 33104
*Backpacking* merit badge pamphlet, No. 33232A
*Guidebook to Adventure* (Obtain through Philmont Scout Ranch)
*Passport to High Adventure,* No. 4310

### OTHER PUBLICATIONS

*Backpacking: One Step at a Time,* by Harvey Manning. Vintage, 1975.
*National Outdoor Leadership School's Official Wilderness Guide,* Simon and Schuster, 1983.
*The New Wilderness Handbook,* by Paul Petzoldt. Norton, 1984.
*Wilderness Medicine,* by William W. Forgey. Indiana Camp Supply Books, 1979.

## WAIVER OF RESPONSIBILITY

(Scoutmaster/Varsity Coach carries this part, one for each Scout.)

Troop/Team _____, Boy Scouts of America

Chartered organization: _____

In consideration of the benefits to be derived, and in view of the fact that the Boy Scouts of America is an educational institution, membership in which is voluntary, and having full confidence that every precaution will be taken to ensure the safety and well being of my Scout son(s)/ward(s), namely:

_____

on the activity named below, I agree to his participation and waive all claims against the leaders of this trip, officers, agents, and representatives of the Boy Scouts of America, and the chartered organization. In the event of an emergency, the troop unit leader of the activity named below has my permission to obtain medical treatment for this Scout at the nearest hospital or doctor, at my expense, if our own doctor is not readily available.

_____ _____
(Signature of parent or guardian) (Date)

**Activity:** _____

**Emergency Information** (in addition to Emergency Data Sheet information):

During the activity listed above, I can be contacted at the following phones and will accept long-distance calls.

(_____) _____; (_____) _____

This Scout is highly allergic or sensitive to the following:

_____

What, if any, medication is this Scout taking? _____

_____

Any special instructions for this medication? _____

_____

Do you want the unit leader to carry the medication? Yes _____ No _____

Use the back of this form for additional information and for explanation of any other problems of which the activity unit leader should be aware.

Date of the latest or last tetanus shot/booster _____

**Medical Insurance Information:**

Company _____ Policy No. _____

(Control No. if group policy) _____ Other _____

| | COMPLETE BACKPACKING EQUIPMENT LIST | | |
|---|---|---|---|
| | Pack and frame | Flashlight with extra batteries and bulb | |
| | Boots | Watch | |
| | Socks | Whistle | |
| | Clothing appropriate for the season | Toothbrush | |
| | Sweater or jacket | Toothpaste | |
| | Parka or coat | Biodegradable soap (optional) | |
| | Rain gear | Small towel | |
| | Hat | Metal mirror | |
| | Tent | Comb | |
| | Groundcloth | Pencil and paper | |
| | Tent stakes | Repair kit | |
| | Sleeping bag | Cord | |
| | Foam sleeping pad | Bear bag | |
| | Stove | Bear bag rope | |
| | Fuel bottle or cylinders (filled) | Emergency coins | |
| | Cook kit | Protection from insects | |
| | Cooking utensils | Bandana | |
| | Cup | Compass | |
| | Bowl or plate | Moccasins, running shoes, or booties | |
| | Spoon | Toilet paper | |
| | Food | Camera (optional) | |
| | First-aid kit | Hiking stick | |
| | Pocketknife | Sunscreen | |
| | Matches | Insect repellent | |
| | Water bottle or canteen | | |
| | Fire starters | | |

**SAMPLE TRIP PLAN**

Trip plan of: _____

Date and time of departure: _____

Date and time of return: _____

Starting point: _____

Destination: _____

Route going: _____

_____

Route returning: _____

_____

Other participants: _____

_____

_____

Adult leaders: _____

Number of nights on the trail: _____

Location of each night's camp: _____

Alternate plan in case of adverse weather or emergency: _____

_____

_____

_____

## BASKETBALL CONTENTS

# BASKETBALL

## BACKGROUND

Basketball is a sport that was born in the United States. In 1891, Dr. James A. Naismith, a physical education teacher at the International YMCA Training School, hung two old peach baskets to the wall and tossed a soccer ball into them. The rest is history.

The Varsity basketball program should be played for fun. The game is easy to play. All that's needed are two teams, a basketball, and one or preferably two basketball goals.

The object of the game is to shoot the ball through your team's goal and to make more total points than the opposing team.

Varsity Scout teams are encouraged to participate in basketball leagues found in most communities. These leagues may be operated by church associations, park departments, the YMCA, or sports associations.

The basic rules for all are similar. The number of players, size of court, number of goals, and period of play vary slightly depending on your location. Varsity basketball teams participating in community leagues abide by the rules set up by the league.

You won't need a lot of equipment to play basketball. For players, shorts for summertime outdoor or inside play, sneakers, and a distinctive color shirt that identifies the team. Team equipment consists of basketball(s) and a stop watch to keep time of play.

Games are divided into four quarters. Each quarter has an equal number of minutes. A short time-out or break from playing is held at the end of the first and third quarters. A longer time-out or break is held at halftime, following the second quarter.

Usually two officials (referee and umpire) work each game. They are in charge and have the responsibility to enforce the rules of the game.

The game begins with a coin toss to determine each team's goal. The game begins with a throw-in or with a center court jump ball. The time clock begins when the ball is touched by a player other than the one throwing in the ball or when the ball is touched by a player jumping at center court.

The time clock continues to run and is stopped only when the referee stops the game.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a merit badge clinic for Sports.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida Sea Base, etc.).
- Conduct a Varsity basketball activity, such as league play or a tournament.

### PERSONAL DEVELOPMENT

- Fitness fun test. Using the fitness standards in the *Personal Fitness* merit badge pamphlet, have each Varsity Scout compete against standards set for his age and weight.
- Conduct a discussion on the importance of mental fitness.
- Start a physical fitness program for team members. Ask a physical education teacher or coach to assist in laying out the program.

### SERVICE

- Volunteer the team to assist in a parade or other celebration held in your community.
- Conduct a physically demanding service such as clearing rocks from a field, clearing a trail for the Forest Service, or meeting a special need of your chartered organization.

### SPECIAL PROGRAMS AND EVENTS

Attend a college or professional basketball game. Conduct a discussion on the sportsmanship of the players from both teams.

## THE BASKETBALL COURT

The basketball court may be indoors or outdoors and ranges in size depending on the league. Usually the court is 94 by 50 feet for colleges or 84 by 50 feet for high schools and has a hard surface of wood, asphalt, or packed dirt.

There should be a 3- to 10-foot unobstructed space on all sides of the court.

Backboards made of wood, glass, or metal are at either end of the court and are rectangular or fan-shaped. The basket is attached to the backboard. The rim of the basket is 10 feet from the floor. Usually a white cord net is suspended from the rim.

In the exact center of the court is the center circle, 4 feet in diameter. A 12-foot concentric circle outside the center circle is known as the restraining circle.

Centered at each end of the court is a free-throw lane, which is 12 feet wide and ends in a 12-foot circle. The center of the circle is 19 feet from the end line. Through the circle is drawn a free-throw line parallel with the end line. The free-throw line is 15 feet from the backboard.

The court is divided into two equal parts. The front court is that half containing the team's own basket that they shoot toward to score their points. The other half is called the team's backcourt.

### PLAYER POSITIONS

There are three named positions in basketball.

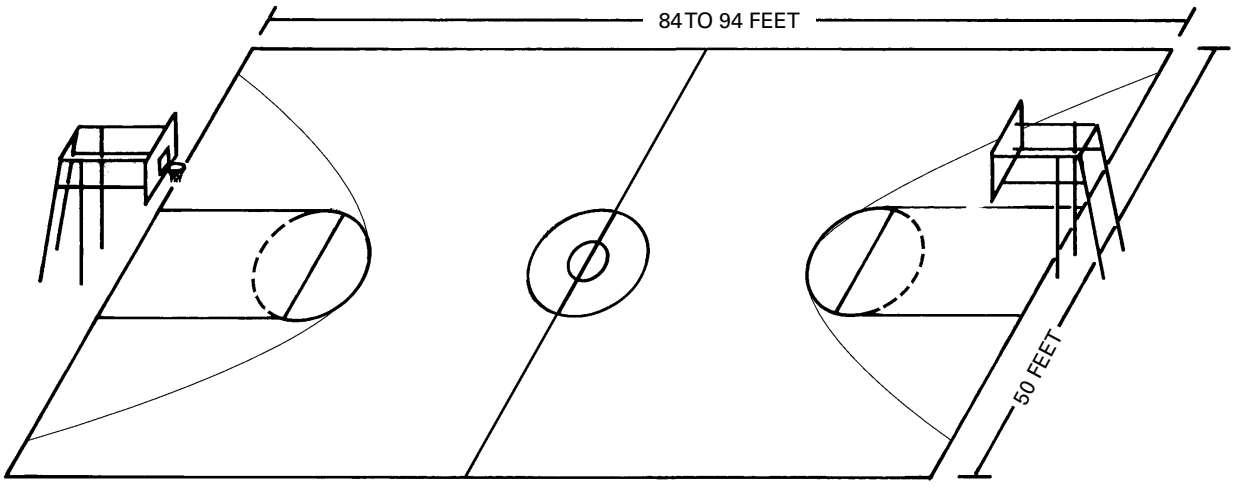
**Center—**usually the tallest member of the team with the skills in rebounding, passing, receiving, corner and outside shooting, and ball handling.

**Guard—**usually the shortest members of the team with skills in quickness, agility, ball handling (dribbling and passing), play calling, and outside shooting. The ''point'' guard runs the offense. The ''off'' guard, or number two guard, has the same skills and abilities to run the team if the point guard is being overplayed or has to leave the game.

**Forward—**usually larger than the guards. They should be skilled in rebounding, passing and receiving, outside and inside shooting, and ball handling. They are quick and agile, must be able to play defense anywhere on the floor, and lead the fast break.

### THE BALL

The basketball is round, not less than 29 inches nor more than 30 inches in circumference. It should weigh at least 20 but not more than 22 ounces. When dropped from a height of 6 feet it should bounce at least 49 but not more than 54 inches. The home team provides the ball used in the game.



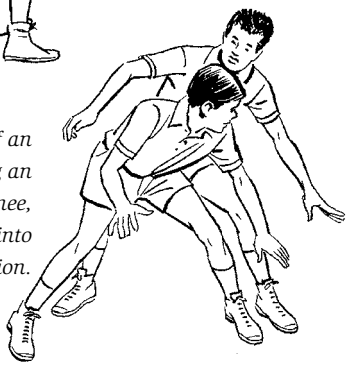

*The Court*

## CONDENSED RULES OF BASKETBALL

- **The court:** See the diagram.
- **The ball:** The ball should be from 29 to 30 inches in circumference, 20 to 22 ounces in weight, and should bounce 49 to 54 inches when dropped from 6 feet.
- **Number of players:** Equal number, usually five.
- **Play equipment:** Consists of shirt, shorts, socks, and shoes.
- **Officials:** A referee and an umpire assisted by a timer and a scorer.
- **Duration of the game:** For high school age, four 8-minute quarters with two 1-minute intermissions between quarters and a 10-minute intermission between the halves.
- **Overtime periods:** For high school age, games ending in a tie are played off in extra periods of 3 minutes each.
- **Time-outs:** Five charged time-outs are permitted for each half. A charged time-out occurs when the ball is dead (out of play) or in possession of the team calling time. Officials may call time-out for equipment repair or for injured players. Each team is granted one time-out during each overtime period.
- **Scoring:** Two points are awarded when the offensive team shoots a basket while the ball is in play. One point is awarded for foul shots. The two-point score is called a field goal.
- **Moving the ball:** The team in control of the ball has a specific amount of time to move the ball from its backcourt to its frontcourt by crossing the center line. This time is usually 10 seconds but may vary depending on league rules. If the opposing team touches the ball in the backcourt, the specific time starts over.
- **Fouls:** Many types of fouls are called in basketball games. A foul occurs when a rule of the game is violated by the players on the court or on the bench, or by the coaches. Free throws are awarded as penalty for the rule infraction. The number of free throws is determined by the game officials.
  - —**Common foul.** A personal foul that is not flagrant, intentional, or committed against a player in the act of shooting.
  - —**Flagrant foul.** Called when a violent unsportsmanlike act or noncontact vulgar display is committed by a team member or coach.
  - —**Intentional foul.** Called when the official determines that the action was premeditated or designed to occur.

TYPES OF FOULS

*Blocks the progress of an opponent not in possession of the ball.*



*Impedes the progress of an opponent by extending an arm, shoulder, hip, or knee, or by bending the body into an abnormal position.*

*Contacts an opponent as a result of guarding from the rear.*

*Intentional foul—deliberately disregards the ball and makes personal contact with a player who has control of the ball.*

  - —**Multiple foul.** Called when two or more teammates commit personal fouls on an opposing team member.
  - —**Personal foul.** Occurs when a player comes in contact with an opponent while the ball is in play.
  - —**Play control foul.** A common foul committed by a player while he or a teammate has control of the ball.
  - —**Technical foul.** Usually a noncontact foul by a player or nonplayer. Could be called when the ball is dead and a contact foul occurs.
  - —**Unsportsmanlike foul.** Called when unfair, unethical, or dishonorable conduct occurs.

## BASKETBALL PRACTICE

During the season that the Varsity Scout team is playing basketball, practice sessions are held. Practice sessions can occur as part of the troop meeting or a separate meeting. These sessions develop not only the physical side, but also the mental side of the Scout.

Many opportunities will occur to blend the sport of basketball with the game of life. Smart coaches and captains use these opportunities to strengthen the individual Scout as well as the Varsity Scout team.

Practice sessions have four parts:

1. **Warm-up and conditioning exercises.** Simple warm-up exercises, both with and without the ball, allow for loosening the muscles and help in avoiding injuries. Vary the pace and type of exercise. Questions should be asked to stimulate thinking about proper eating habits and the importance of exercise throughout life. This portion of the meeting should take about 10 minutes.

2. **Skills development drills.** Teaching fundamentals is essential at every level of basketball. Take time to teach basic skills at every practice session and plan simple drills to reinforce the points. Players should work individually and in groups so that no one gets bored or slighted. Use as many balls as possible. Drills should be brief to keep things moving and to save time for scrimmage.

3. **Team talk. Make this a regular, normal part of practice.** Use it for education and personal development. Team members should be encouraged to talk about such things as rules of the game, principles of team play, positions on the court, team tactics, and concepts of fair play.

   These rules, principles, positions, tactics, and concepts apply to everyday life as well as to the sport of basketball.

4. **Practice (scrimmage) game.** The warmups, skills development, and team talk should lead to the scrimmage. Team members enjoy this part of the meeting the most. Tie into the scrimmage what was just learned during the drills and team talk segments.

## WARM-UP AND CONDITIONING EXERCISES

Healthy young players are always ready to play the game; they rarely look forward to any preliminary ''exercises.'' It is important to avoid making the warm-up drudgery. Interpret its importance in helping get players ready for strenuous exercise.

The warm-up exercises used and the attitude about them will strongly influence each Scout's lifetime attitudes about exercise.

Select new exercises for each practice and also repeat some that have been done before.

To begin, players position themselves in a circle, in double lines, or in a semicircle facing the leader. Let players take turns choosing and leading exercises.

When a player leads, coaches can work closely with individual players or exercise with the players.

Remember: Demonstrate the exercise or game first. Tell why the exercise is important. Have players do the exercise slowly together. Then exercise at regular speed.

### STRETCHING EXERCISES

- **Deep breathing.** Ask players to take several deep breaths, expanding the chest fully by inhaling, then relaxing while exhaling.
- **Slow arm circles.** Walk in a circle. Swing arms forward and then backward.
- **Side benders.** Hands on hips, bend to one side, then the other.
- **Trunk twisters.** Hands on hips, twist to side, now the other.
- **Toe touching.** Touch opposite toe, with knees slightly bent.
- **Front thigh stretch.** Lift leg with knee bent. Grasp shin bone and pull knee close to chest.
- **Back thigh stretch.** Bend knee and bring heel up toward back side. Grasp ankle and pull toward back side.
- **Neck rotation.** Gently rotate head from side to side.
- **Ankle rotation.** Rotate the foot without moving the knee, then with knee rotating.
- **Thigh and leg stretch.** Take position of sprinter on toes. Lower the hips to the ground without moving feet. Repeat each side.
- **Forward crawl stroke.** Stretch arms forward in crawling motion.

- **Calf stretch.** Two exercises are good:

  1. Wall push. Face the wall with heels about 2 feet from the wall, with knees straight and hands on the wall at chest height. Slowly bend the elbows and bring chin close to wall, then return to upright position.

  2. Heel and toe rises. Rock closely up and down on the toes. Then rock back on the heels while lifting the toes up and down.

### JUMPING AND CIRCULATORY EXERCISES

- Jump up and down for 30 seconds, bouncing on the toes.
- Use a jump rope. Skip on both feet, on left foot, on right foot, alternate skip from left to right to both feet.
- Sit-ups (15 to 20).
- Push-ups (15 to 20).
- Windsprints (dash the length of the court).
- Round the floor (jog the outer perimeter of the floor both forward and backward).

## SKILLS DEVELOPMENT DRILLS

### PASSING

#### PASSING BASICS

Control the ball with the fingertips. Pass with force. Do not telegraph the pass. Use the right pass for the situation. Do not take foolish gambles with the ball.

#### CIRCLE DRILL

(Pass with force—receive)

Players form a circle and pass crisply to each other. Pass to any player in the circle except the players on each side of player with ball.

**Variation:** Bounce and chest passes. This is a good lead up for the Bull in the Ring drill. (See ''Scrimmage'' section.)

**Coaching hint:** Use this primarily for bounce-pass drill. Vary distance according to players' ability.

#### TWO-LINE DRILL

(Pass—catch—pivot—move)

Player in front of one line passes (chest or bounce-pass) to player in front of the other line, then goes to back of line.

**Variation for passing player:** Establish pivot foot, fake before or fake after passing, and then go to the end of either line.

**Variation for receiving player:** Receive the pass and establish pivot foot, then front pivot or rear pivot with or without dribbling. Then pass to new player at front of other line.

**Coaching hint:** Vary passing distance according to players' ability. This is an excellent way to teach how to pivot and not dribble immediately after receiving a pass.

#### LONE PLAYER DRILL

(Strength—peripheral vision—side shuffling—catch and quick pass)

This drill is for more advanced players.

Two balls are needed. Players form one line facing lone player. The lone player has one ball, and the first player in line has the other. The lone player makes a chest pass to the second player in line. At the same time, the first player in line passes to the lone player. This is repeated rapidly down and back up the line until the coach stops the drill. Then a new player rotates into the lone player spot.

**Coaching hints:** Tell players in line they must cooperate with the lone player by trying to pass exactly when he or she passes and by making crisp passes to the lone player at chest level.

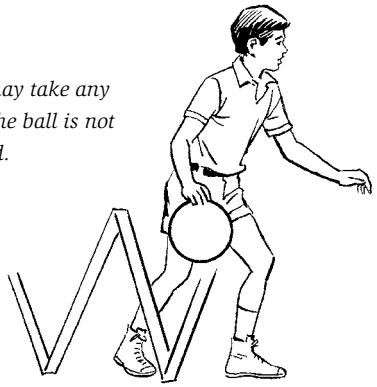
Space the line of players a foot or two apart so that balls do not meet. Tell the lone player to shuffle up and down the line in order to pass from a comfortable distance.

### DRIBBLING

#### DRIBBLING BASICS

- Control without looking at the ball.
- Use either hand.
- Dribble while moving.
- Dribble while standing still.

*Dribbling—the player may take any number of steps when the ball is not in contact with his hand.*



**FOR ALL DRIBBLING**

Spread the feet slightly and bend the knees in a relaxed position. Spread the fingers of the hand comfortably and control the ball in front and to the side with a forearm and wrist action. The tips of the fingers control the ball. Don't slap at the ball. Guide and control it with the fingertips.

**STANDING DRILLS**

**High Dribble.** The high dribble is used for speed. With each bounce of the ball, the dribbler can quickly take a maximum number of steps. The dribbler should bounce the ball to allow it to reach at least to hip or waist level.

**Low Dribble.** The low dribble should be used when protection of the ball is important because you are near a defensive player. Allow the ball to bounce to a height just above the knees. Bend the waist and lower the upper part of the body. Position the body between the ball and the defender.

- Try to continually hit a certain spot on the floor.
- Use either hand—rotate hands.
- Dribble with eyes closed.
- Dribble in circles.
- Dribble in circles keeping a pivot foot.
- Dribble between the legs (in a figure eight).

**MOVING DRILLS**

While moving, players:

- Try to bounce the ball on a line on the gym floor while running.
- Go around obstacles.
- Dribble backward and shuffle sideways.
- Dribble to a spot, then continue dribbling in a complete circle, and dribble to another spot.
- Change speed and direction while dribbling.
- Dribble while looking at a spot on the wall.

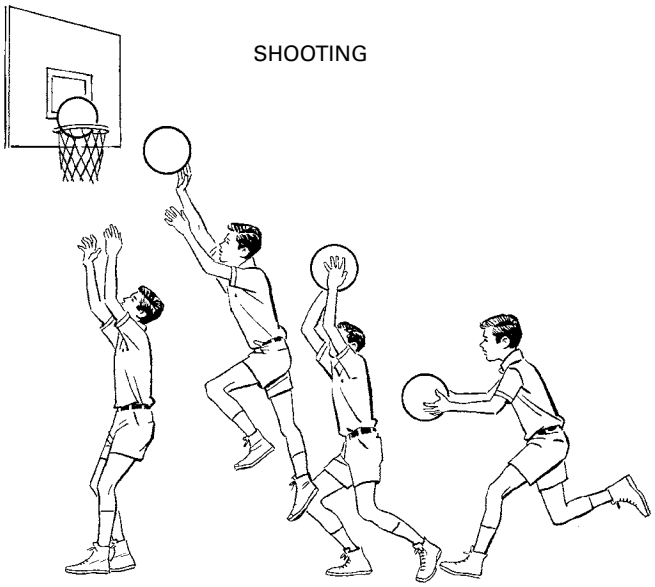
Design these drills to match the skills of your players and the equipment and facilities available.

## SHOOTING

**SHOOTING BASICS**

- Take good shots—rebound your shot.
- Have proper balance—aim at a target.
- Practices usually do not begin with every player arriving at the same time. It's a good idea to devise a system to allow early arrivals to practice shooting and sharing properly. Explain the system at the first practice.

SHOOTING



## DEFENSIVE DRILLS

**DEFENSIVE BASICS**

(One-to-one—proper positioning—rebounding—teamwork)

Successful coaches often spend the majority of their time with players on defense. Many points are scored after forcing the other team to make mistakes. The team can still win even if it had a bad offensive night if the defense is good. Good defensive play is more demanding physically and mentally than offense.

**SLIDING AND SHUFFLING**

(Footwork—quick reaction)

Refer to the section on ''Warm-up and Conditioning Exercises.''

**PLAYING THE BALL**

(Footwork—quick reaction)

Coaches pass the ball back and forth while doing such things as dribbling briefly, faking shots, and drives.

Players assume defensive stance and move when the ball is moving and react to fakes.

**Coaching hint:** Proper defense is demanding. Players alternate working the drill while taking a breather and stretching.

**PARTNER DRILL**

(Footwork—quick reaction—dribbling)

One player dribbles while a partner plays defense. Partners line up about 4 feet apart. The defensive player reacts to the dribbler's moves. The dribbler should work the defender across the gym backward and sideways by changing direction and speed.

**Variations:** The defender becomes the dribbler on the opposite side of the gym and the drill is repeated to the starting point. To teach the defender not to reach in, have him

- Hold a towel behind his back with both hands.
- Hold the back of his shorts with one or both hands.

**Coaching hint:** Keep teams of partners widely spaced. Partners must cooperate. A good dribbler can frustrate the defender. The dribbler should work on simply keeping the defender moving. If the dribbler is not very helpful to the defender because of poor dribbling, the drill is better used as a dribbling drill.

**REBOUNDING DRILL**

(Rebound—outlet pass—shooting)

Position three players around the basket as shooters. A fourth player is the rebounder. The rebounder's job is to quickly move to what he thinks will be the best rebounding position when the ball is shot. The player leaps for the rebound, pivots, and uses an outlet pass to a player on the side of the basket where the rebound came down.

**Variation:** Each rebounder gets five rebounds and rotates to become the shooter. All shooters move on each shot to a new position on the floor (clockwise or counterclockwise).

**SEMICIRCLE AND REBOUND DRILL**

(Shoot—follow the shot)

Have players form a semicircle around the basket. A player shoots, follows shot, rebounds, passes on to next designated player, then goes to a new position on the floor.

**Variations:**

- Use every available ball and basket. You may have enough balls for two or three players to share each ball.
- Upon rebounding, have players use proper pivoting before passing.
- The next player to shoot fakes, cuts, and meets pass.
- Upon rebounding, a player takes an immediate follow-up shot, especially if the first shot is missed.

**TWO-LINE FEED DRILL**

(Pass—catch, dribble, lay-up, rebound)

This most basic drill incorporates many skills and has many variations. The skills of your players will dictate the variations you use.

The first player in line dribbles ball to the basket, shoots a lay-up, and goes to the end of the other line. The first player in the other line rebounds the shot, passes to the next player in the ball line and goes to the end of the line.

**Variations:**

- Dribblers should go slowly enough to be sure they are dribbling properly and jumping off the proper foot. This may mean one dribble only or no dribble at all.
- As skills increase dribblers should fake, drive harder, approach from all sides of the basket. Two balls may be introduced.
- Rebounders should assume game situations by waiting until the last possible moment before going in for rebound. They should rebound, pivot, and pass on rebound, dribble to side, pivot and pass.

**Coaching hints:** Players must get the basic steps first. Emphasize jumping high, not far. Keep rebounders far enough away from the basket so they have to fake and run hard for a rebound.

## SCRIMMAGE AND PRACTICE GAMES

Even though warm-ups and skill training are fun for players, they most enjoy playing the game.

The following games suggest an approach to developing the team.

- The games should be progressive in nature, from a simple game to regular practice scrimmage with two full teams.
- Tie the games into the skill development drills by selecting games that reinforce learning.
- Restrict the games to small, well-defined areas on the court and limit the number of players in each game.

**ONE-ON-ONE**

(Defense—shoot—drive—rebound)

Player X (with ball) takes a position close enough to the basket to be within normal shooting range. Player O (defense) also faces away from the basket and stands one step behind player X. On the coach's command, player X pivots and drives in for a lay-up while player O pivots and attempts to catch up to X and block the shot.

**Coaching hint:** Distance from the basket depends on player's ability. Caution the defender not to foul, that it is more important to try to force the shooter to shoot and to be in position for a rebound. After shooting, players can rotate.

If the offensive player immediately establishes a pivot foot, it helps the defensive player decide on the defensive position, and the offensive player is then at a disadvantage. Urge players to follow the shot for the rebound.

**REBOUNDING**

(Boxing out)

One player takes an outside shot. The defender allows the shot with only his hand up and waving. All players attempt to rebound.

**Coaching hints:** For defense, stress not watching the ball. The defender's first task is to check the offensive player by turning in front of him and boxing the offensive player away from the basket. Stress not going immediately toward the basket. For offense, stress anticipating where the rebound will go and faking to get past the defender.

The object is to move to the other end of the court by passing. Three players line up across the base line. The middle player has the ball and passes to a player on the side, then goes behind that player. The player on the opposite side moves toward the middle to receive the next pass. This repeats itself down the court.

**Coaching hints:** Walk through this drill slowly when you introduce it. Constantly repeat, ''Go *behind* the player you pass to.'' As players improve, speed up the action and allow a lay-up at the other end. This is also a good warm-up drill.

Position a defender in a circle of five or more players. The defender's object is to intercept a pass. Players in the circle pass quickly and crisply to each other. Passes cannot be thrown to the player standing next to you over the defender's head. Any player who ''loses'' the ball or passes over the defender's head becomes the defender.

**Coaching hint:** Do not let the defender stay in the ring too long. The player will tire quickly and get frustrated. Urge bounce passes. Make sure every player in the ring gets to be a defender.

**COMPLETED PASSES**

(Passing—catching—dribbling—pivoting—faking—moving without the ball)

Divide into two even teams. Give one team the ball to bring inbounds. Use only half the court. The team with the ball must complete five passes to score a point. When a player has the ball, he can dribble no more than twice before passing. If defenders intercept a pass, they immediately go on offense and attempt to score.

**Coaching hint:** Referee this for out of bounds, traveling violations, backcourt, and fouls.

**Variation:** Vary the number of pass completions necessary to get a point. Rule that the pass receiver cannot throw the ball back to the last passer. A new receiver must be found.

**TWENTY-ONE**

(Shooting—rebounding—passing)

There are many variations to this game. Here is how you can use all nine players in a playful, competitive activity. Object: score 21 points first. Long shots count 2 points, short shots count 1 point.

Divide into three squads. Give each squad a ball. Squads are stationed an equal distance from the basket, as indicated.

On your signal, the first person in each line shoots a long shot. (They shoot any time they want to.) The shooter follows the shot and takes a short shot from anywhere. After the short shot, he or she passes to the next teammate in line and goes to the end of line.

**Variation:** Take a short shot from where you got the rebound. Use different baskets for each team. You have to finish the game with a long shot.

**Coaching hint:** The point of fun is when balls collide in midair. Urge each team to loudly yell the number of points they have after each score. Pick the teams for equal balance.

## COACHING LEAGUE GAMES

Coaching basketball games is a great opportunity to get closer to your team members. It's also an important time for the coach to model the kind of behavior expected of the team members.

### BEFORE THE GAME

Start your team in a positive frame of mind.

- Remind them of the basic skills you've been working on in practice.
- Help them remember to think and play as a team.
- Suggest that they not worry about what their opponents might do, but concentrate on what they will do themselves.
- Review the important rules.
- Caution against arguing with officials on close calls.
- Discuss proper conduct on the bench and during warm-ups.

Have the team do a few warm-up exercises before the game starts.

- Divide into groups of two or three and pass the ball.
- Shoot layups from two lines, with one line rebounding and passing to the shooting line.
- Using three or four balls, have players shoot from their normal floor positions, taking turns rebounding.
- End with free throws using two balls.

### DURING THE GAME

- Substitute as often as possible, allowing everybody to play at least half the game, regardless of the score.
- Avoid shouting at officials when you feel they have made mistakes. (You may want to talk quietly to them at halftime or after the game about specific calls or mistakes.)
- Avoid shouting at players of either team on the court.
- Correct your players in a quiet, constructive tone of voice at time-outs.
- Help keep players cool when they lose their temper by first keeping yourself cool.

### AT HALFTIME

Quietly review the improvements that players should make in the second half.

- Avoid haranguing or intimidating players.
- Be cool and helpful, and keep your directions simple.
- Avoid sarcastic or negative comments about members of your team, the other team, or officials.

### AFTER THE GAME

Encourage your players to congratulate the other team—maybe even give them a cheer from center court. Have a friendly talk with the other coach and the officials. Bring your team together. Have everybody sit down on the gym floor or in an adjacent room. Discuss the game by asking some questions such as these:

- What went well for the team today?
- Which players on both teams really tried hard?
- Did everybody get to shoot the ball several times?
- Was our passing good?
- Did we have a good attitude toward the other team?
- Did we have a good attitude toward the officials?
- What can we do better next time?
- What do we need to work on in practice?

## PREVENTION AND CARE OF INJURIES

Basketball is a relatively safe sport for players. But since it is a bodily contact game played with little protective equipment, injuries may occur.

All Varsity Scout youth sports are as safe as the environment established by adult leadership for the sport. Basketball coaches should take all necessary precautions to help prevent injury and be prepared to respond when they do occur.

| | SAFETY CHECKLIST |
|---|---|
| ☐ | Facilities are in good repair and clear of any obstructions around the court. |
| ☐ | Teams warm up properly before practice sessions and games, |
| ☐ | Rules and equipment are modified to adjust the physical demands of the sport to the development level of players. |
| ☐ | Teams are properly supervised and coached during practice sessions and games. |
| ☐ | Coaches know the proper emergency steps to take when accidents do occur. |
| ☐ | Players do not play when hurt. |
| ☐ | Players are taught how to prevent blisters by wearing footwear that fits properly, gradually breaking in new shoes, and wearing two pairs of socks if needed. |
| ☐ | Players are taught to treat bruises and sprains with ice packs to reduce swelling and pain. |
| ☐ | Practice sessions are reasonable in length and planned to include brief rest periods. |
| ☐ | Game rules are enforced by officials and excessive fouls are avoided. |
| | The emphasis should be on prevention of injury through proper warm-up, conditioning, supervision, and education. |
| | Players are conditioned properly for game play. When injuries do occur, it is necessary to be familiar with the immediate recommended treatment. First aid is the immediate handling of athletic injuries. If pain persists, refer to family physician for followup. |

| Injury | Suggested First Aid |
|---|---|
| *Muscle-pull, sprains, and bruises* | Use ice pack immediately to reduce swelling. Speed of application is essential. |
| *Small cuts* | Apply pressure to reduce bleeding. Wash with cleaning solution and apply sterile dressing if necessary. |
| *Nosebleed* | Have player pinch nostrils and hold until bleeding stops. Apply ice pack. |
| *Foreign body in eye* | Pull upper lid down, holding eyelash. Wash out with eye cleaning solution. If substance is not removed, refer to physician. |
| *Fainting or loss of wind* | Rest in cool place. Try to relax player and slow down breathing. |
| *Scrapes and floor burns* | Wash with cleansing solution. If necessary, cover with gauze. |
| *Elbow or knee injuries; jammed finger or toe* | Elevate area and apply ice pack. Refer to physician if pain persists. |
| *Shin injury* | Apply ice pack and compression. Refer to physician if pain persists. |
| *Back or neck injury* | Keep the player calm. Do not allow the player to move or sit up if pain is severe. If pain is slight, apply ice pack. |
| *Blisters* | Keep clean, wear two pairs of socks, puncture if necessary to relieve pressure. Remove dead skin for quicker healing. |

**Remember:** Never send a hurt player back into practice or a game. First aid is the immediate handling of athletic injuries. Refer a hurt player to the family physician for followup treatment if pain persists.

## GLOSSARY OF BASKETBALL TERMS

**Air ball.** A shot that does not touch the rim or backboard.

**ARC.** The trajectory of the ball in flight to the basket.

**Assist.** A pass leading directly to a basket by a teammate.

**Backboard.** The surface to which the basket is affixed (often glass) and also used to carom shots into the basket.

**Backcourt.** The half of the court away from the basket under attack.

**Backdoor.** An offensive maneuver in which a player cuts behind the defensive and to the basket.

**Ball control.** Offensive strategy which prolongs possession of the ball by not shooting until the best possible situation develops. Also referred to as *deliberate offense, disciplined offense, four corners, letting the air out of the ball.*

**Ball handler.** Player who usually brings the ball from his team's backcourt to the frontcourt and initiates the attack. Also referred to as the *playmaker*.

**Ball hawk.** Player who specializes in recovering loose balls.

**Base line.** The end boundary line.

**Basket.** The iron hoop through which goals are scored; a field goal is worth two points.

**Bench warmer.** A substitute.

**Blocking.** A foul by a defensive player who blocks the legal path of an offensive player.

**Blocking out.** Keeping your opponent away from the basket in a rebounding situation; also known as *boxing out*.

**Bonus free throw.** A second free throw awarded to a shooter who is successful on the first attempt. This bonus is in effect for each common foul (except a player control foul) committed by a player whose team has committed six or more personal fouls in a half. Also referred to as one-and-one.

**Brick.** A shot that hits the rim or backboard hard and doesn't go in the basket.

**Charging.** A foul by an offensive player who runs into a defensive player who has legal position.

**Charity stripe.** The free-throw line, thus, the term *charity shot*.

**Cheap basket.** A goal scored by poor defense rather than good offensive play; sometimes called garbage baskets.

**Control.** A player is in control when he is holding or dribbling a live ball. Team control exists when a live ball is being passed between members of a team.

**Conversion.** A successful free throw.

**Court balance.** In an offensive set, making sure there are two players back for defense when the shot is taken; also applies to fast-break situations.

**Court sense.** Being aware of everything that is happening on the court and of the game situations at all times.

**Cripple.** An easy unopposed shot at the basket. Also called a *crip shot* or *lay-up*.

**Disqualified player.** A player who is removed from further participation in a game because he has committed his fifth personal foul, or for some other reason such as a flagrant foul.

**Double dribble.** A violation that occurs when a player continues dribbling after grasping the ball with both hands.

**Double team.** Two defensive players guarding an offensive player who has the ball; the objective is to prevent a shot, pass, or dribble.

**Dribble.** A continuous bouncing of the ball, the only legal means of moving with the ball.

**Dunking.** Reaching above the rim to put the ball through the basket. Also called a *stuff shot*.

**English.** A type of spin put on the ball which can help to soften a shot while shooting.

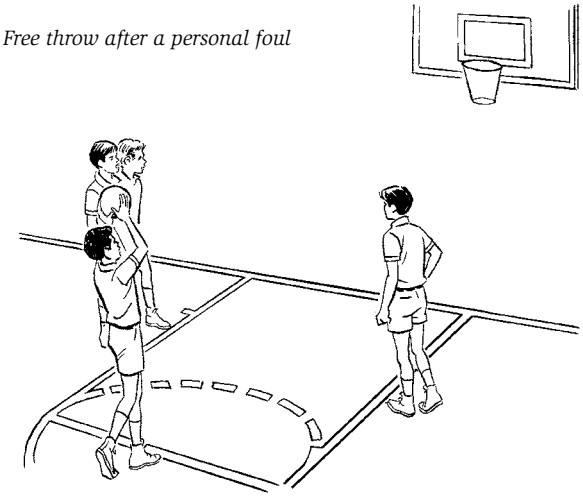
**Fast break.** A style of offense in which a team attempts to score before the defense gets a chance to set up by running downcourt as soon as the offense gains possession of the ball.

**Follow-through.** The breaking-down action of a player's wrist after he has released the ball on a jump shot or other shots; follow-through is also important in passing to help get the ball directly to the receiver.

**Foul.** A rules infraction for which the penalty is one or more free throws for the other team (except in the case of a double foul or a player control foul).

**Foul shot.** An unobstructed shot from the foul line; it is worth one point; awarded as a penalty for a foul by the opposing team.

*Free throw after a personal foul*



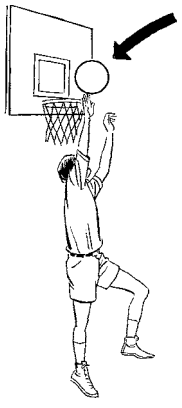
**Free throw.** Opportunity given to a player to score one point by an unimpeded shot from behind the free-throw line.

**Free-throw lane.** The area on the floor bounded by the free-throw line; the end line under the basket, and two connecting lines forming a 12-foot lane; also called the *paint*.

**Frontcourt.** The half of the court in which a basket is under attack.

**Full court press.** Defense strategy in which a team guards the opposition closely in the backcourt as well as the frontcourt. This device can employ both zone and man-to-man principles.

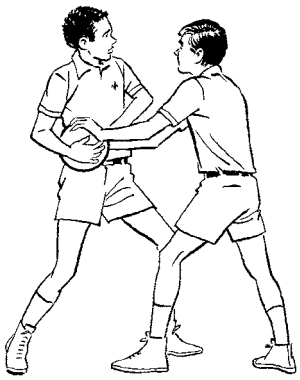
**Give and go.** Offensive strategy in which a player passes to a teammate and then cuts for the basket expecting a return pass.



*Defender interfering with the ball (goaltending)*

**Goaltending.** Illegal interference with a shot above the imaginary cylinder over the rim of the basket or when the ball is in its downward flight; it can be an offensive or a defensive infraction.

**Held ball.** Occurs when two opponents grasp the ball so firmly that control cannot be maintained without undue roughness.



*Held ball*

**High post.** An offensive pivotman who stations himself in or near the outer half of the free-throw circle.

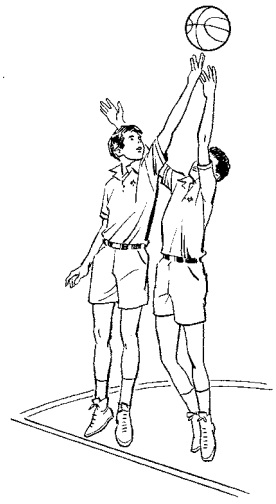
**Hitchhiker.** The member of a three-person officiating team who remains fluid near the midcourt line.

**Holding.** Personal contact with an opponent that interferes with his freedom of movement.

**Hook shot.** A sweeping, one-handed field goal attempt, with the shooter's back at least partially to the basket.

**Hoop.** The rim of the basket; synonym for basket in the sense of a score.

**Jump ball.** The means of putting the ball into play by having an official toss it upward between two players.



*Center jump*

**Jump shot.** A field goal attempt in which the ball is released at the top of a vertical jump by a player.

**Key.** The free-throw lane and circle. Also called *keyhole*.

**Kicking the ball.** A violation when done as an intentional act. Accidental contact is not a violation.

**Lay-up.** A short shot made from any of several angles alongside the basket, using the backboard as a guide.

**Low post.** An offensive maneuver in which the center stations himself just outside the free-throw lane close to the basket.

**Man-to-man defense.** A style of team defense in which each player is assigned a specific opponent to guard anywhere on the court.

**Midline.** The center line that separates the frontcourt from the backcourt; also known as the 10-second line.

**Offensive foul.** A personal foul committed by a member of the offensive team; usually not involving a free throw as a part of the penalty.

**Overtime.** One or more extra periods used to break a tie score.

**Pass.** Movement of the ball from one player to another, usually by throwing, bouncing, or rolling along the floor.

**Pick.** A legal method of providing shooting room for a teammate by taking a position that picks or blocks a defensive player.

**Pivot.** Position taken by a player with his back to the basket, at the top of the free-throw lane or alongside the free-throw lane; also known as the post position.

**Press.** A style of defense in which offensive players are closely guarded and harried. Full-court press is applied all over the court; half-court press is applied only after the ball is brought across the midcourt line.

**Rebound.** A shot that caroms off the basket or backboard and remains in play to be recovered by either team.

**Roll.** A movement by a screener after his teammate begins a drive off the screen. This is most effective if the defenders are forced to switch and can result in a basket for the man rolling.

**Scissors cut.** When two or more players crisscross each other's path.

**Screen.** A legal method of blocking a defender without causing contact. Screens can be set for moving players as well as for stationary players, and the player for whom the screen is set may or may not have the ball.

**Shuffle cut.** After the player has made a pass, he then moves away from the pass by cutting around a teammate who has set a pick for him.

**Strong side.** The side of the court where the ball is an offensive set.

**Switch.** A defensive technique in which players who have man-to-man assignments switch responsibilities with each other as their offensive men cross paths.

**Technical foul.** A foul imposed for misbehavior or for some technical rules infraction. The penalty is a free throw plus possession of the ball for the offended team.

**Ten-second rule.** The requirement that a team has to bring the ball across the midcourt line within 10 seconds after gaining possession.

**Three-pointer.** A field goal made by a that is shot from beyond the three-point line.

**Three-second rule.** The restriction against the offensive player taking a position within the free-throw lane or paint for more than 3 seconds.

**Throw-in.** A method of putting the ball in play from out-of-bounds.

**Time line.** The division line across midcourt, so called because the offensive team must advance the ball across it to the frontcourt within 10 seconds after gaining possession.

*Throw-in from out of bounds*

**Transition.** Part of a team's running game where the team goes from offense to defense or vice versa.

**Traveling.** Illegally moving the ball by violating the dribbling rules.

**Turnover.** Any loss of possession without a shot being taken.

**Two (or three) on one.** Two (or three) players converging on the basket with only one defensive player to attempt to stop them.

*Out of bounds*

**Violation.** Any infraction not classified as a foul. The penalty is loss of possession of the ball.

**Weak side.** The side of the court away from the ball in an offensive set.

**Wings.** Players who are running the outside lanes in the fast-break situation or transition game.

**Zone.** A style of team defense in which each player is assigned to guard a designated floor area, rather than a specific player or opponent.

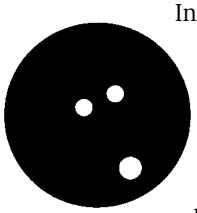
**ACKNOWLEDGEMENTS**

Much of the material in this edition of the Basketball program feature was adapted from the *Y Basketball Coaches Manual* and is used with permission of the Young Men's Christian Association of the U.S.A.

## BOWLING CONTENTS

# BOWLING

## BACKGROUND



In the excavation of ancient Egyptian tombs, there are signs that many activities enjoyed today were played many centuries ago. Evidence of bowling, for example, was found in the tomb of an Egyptian youngster buried around 5200 B.C. The crude ball and nine stone pins found indicated that the sport was played more than 7,000 years ago.

Today, bowling is a popular sport enjoyed by people of all ages. Facilities can be found in most communities throughout the United States. It is inexpensive, doesn't require much equipment, and can be played recreationally or in competition regardless of the weather. In the early days of the sport, however, it was played for different reasons.

Rolling a ball at a pin was not always for sport. For instance, religious leaders in ancient Germany used the game of Kegling to determine whether a person was leading a proper life. First, a pin (Kegel) was placed on the ground. Then, from a set distance, the person in question would attempt to knock it down. If successful, that person was known in the village as one living a correct religious life.

This religious test was later developed into a game whereby a person attempted to knock over nine pins in the least number of rolls. This nine-pin game grew in popularity, spreading throughout Europe, the Scandinavian countries, and eventually to the United States. The game added another pin, now a total of 10, and moved indoors during the mid-1800s. Since its early beginning, the sport has gained popularity throughout the world. Standards for bowling are established by the American Bowling Congress (ABC).

As with most sports, there are both amateur and professional bowlers. In some bowling centers, amateur leagues bowl 24 hours a day. All professional bowlers begin the sport by participating in these amateur leagues. To join a local bowling league, Varsity Scout team members should contact community bowling centers for information.

Bowling requires very little equipment to play. The beginning bowler need only show up at a bowling center comfortably dressed in loose-fitting clothing. The bowling center provides the ball and shoes for a reasonable rental fee. As a person's interest and skill increase, personalized equipment can be purchased.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a Sports merit badge clinic.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida Sea Base, etc.).
- Conduct a Varsity bowling activity. Join a league or organize a tournament with other Varsity Scout teams.

### PERSONAL DEVELOPMENT

- Attend a meeting of community-elected officials, such as the city council or county commissioners. After the meeting, discuss the issues covered and how they affect team members.
- Encourage team members to earn the religious emblem of their faith.
- Visit a clothing store. Have the owner or sales person explain how color choice and style selection differ among individuals.

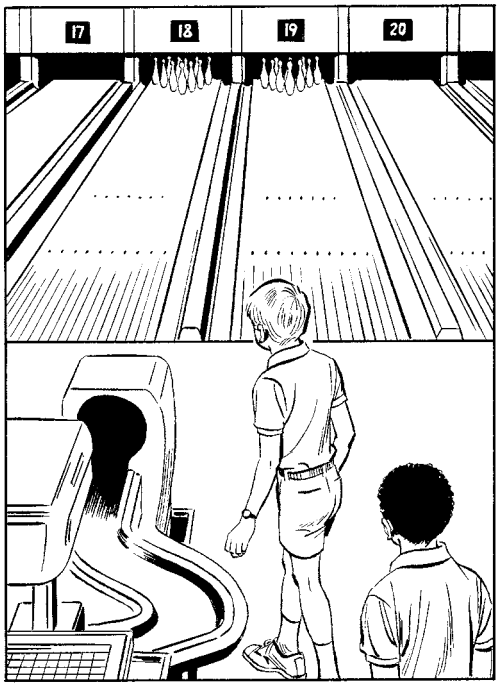
### SERVICE

- Conduct a bowling party for a Webelos Scout den.
- Assist with a community festival.
- Offer the assistance of the team members to a Scout (not a team member) in carrying out his Eagle Scout service project.

### SPECIAL PROGRAMS AND EVENTS

- Plan and carry out a bowling tournament for the team.
- Visit a museum. Concentrate on the period of time when bowling was first played.
- Visit a bowling facility. Learn how computers are used to keep score for bowling tournaments.
- Plan a coed bowling party.

## EQUIPMENT AND PLAYING AREA




### THE BOWLING AREA

The bowling area has four parts—the approach area, lane bed, pin deck, and pit area.

#### APPROACH AREA

The *approach area* is 41 to 42 inches wide. It has a runway of at least 15 feet from the foul line. This is the area where the player picks up his ball, takes his steps, and delivers the ball. There are five starting markers at the end of the approach area. These markers help the player find the correct starting position.

The *foul line* divides the approach area from the lane bed. There are seven delivery spots in front of the foul line. These spots help the player check the accuracy of the ball.

#### LANE BED

The *lane bed* extends from the foul line 60 feet to the center of the head pin, then an additional 3 feet from the head pin to the pit area (pin deck). The lane bed is 41 to 42 inches wide.

Lane markings include 10 angle spots found 7 feet beyond the foul line. These angle spots help the player establish the correct angle for the path of the ball. Additionally, there are seven line darts some 13 feet 10 inches beyond the foul line that the player also uses to establish the correct angle for the path of the ball.

#### PIN DECK

The *pin deck* is the area where the pins are set. There are side partitions called *kickbacks* on either side of the pin deck that extend to the rear cushion in the pit area. The kickbacks absorb the impact of the flying pins and assist pin action on the pin deck.

#### PIT AREA

The *pit area* is directly behind the last row of pins. This area is recessed about 4 inches to catch the pins and keep them from bouncing back onto the lane. Most pit areas today are automated. Belts carry the ball back to the ball return and pins into the automatic pinsetter.

### EQUIPMENT

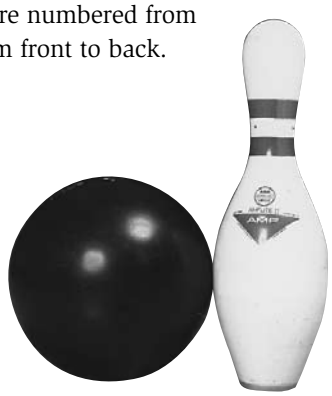
#### BOWLING BALLS

Generally, the bowling ball has a diameter of 8.5 to 8.595 inches. After drilling finger holes, the ball may not weigh more than 16 pounds. The weight of the ball chosen is a matter of individual preference. Young people or those small in stature will find balls weighing 8.9 to 10 pounds are more easily handled and controlled. As body size increases, balls of heavier weight can be used.

Several factors determine which ball is best. The player should be able to grip and swing the ball without straining. The finger- and thumbhole sizes, as well as the span, are important. Players should try several hole sizes and spans until they find a ball that feel comfortable.

#### BOWLING PINS

Pins approved by the ABC are 15 inches tall. The diameter at the bottom of the pin is 2 inches and is approximately 4.75 inches at the widest point (4.5 inches above the bottom or base). Pins are made of wood or synthetic materials and have a plastic base and covering. Pins made of wood weigh 3 lbs. 2 oz. to 3 lbs. 10 oz., while those made of synthetic materials weigh 3 lbs. 4 oz. to 3 lbs. 6 oz. Pins are set in four rows with the pins 12 inches apart. Pins are numbered from left to right and from front to back.



## CONDENSED RULES OF BOWLING

As with every sport, bowling has a code of etiquette and rules that cover the game. When all players practice good sportsmanship, conduct themselves properly, and follow the rules of play, the game will be more enjoyable for everyone.

### ETIQUETTE

Etiquette is nothing more than using good manners and following the established procedure for the sport. For example, when it is the your turn to bowl, be ready. The lane to the player's right usually bowls first; this is referred to as the *right of way.* The player should not begin his approach until the person on the right has finished. Don't wait, however, if someone is two or more lanes over.

Also, players should take their time, but not so excessively as to delay the game. After delivering the first ball, the player steps back on the approach. When the ball has returned for the second delivery (if a strike was not made), the ball is recovered and the player again checks for the right of way.

### EQUIPMENT

Bowling is like any other sport in that players should tread their equipment properly. The first rule of etiquette is to never use another player's equipment without permission. The second rule is to use the bowling equipment with respect. For example, lofting or throwing the ball damages the lanes and will affect the score. Also, remember that bowling shoes are designed especially for bowling, and they should always be used. Not only do the shoes help a player's approach, they also protect the approach area.

### PLAYING THE GAME

When in league play, two lanes are paired. The team begins bowling on the assigned lane. The team then alternates to the other lane for each following frame. For the second game, the team starts the first frame on the paired lane.

As a player begins his approach or after delivery of the ball, no part of the player may touch or pass the foul line. If a player fouls on the first ball, none of pins knocked down is counted. The pins are reset fully for the second delivery. If the player fouls on the second ball, only the pin count from the first ball is recorded.

A player may occasionally deliver a *gutter ball.* This type of ball may come out of the channel and knock over pins. If this occurs, none of the pins knocked over count. If this occurs on the first ball of the frame the pins are reset fully for the second delivery.

Pins will sometimes bounce off to the side or lane and return to the lane, standing up. When this occurs, the pin is considered as standing. Also, if the pinsetter knocks over a pin, the pin must be reset prior to the next ball.

The ball may rebound off of the rear cushion. Any pins knocked down when this occurs do not count. If this happens on the first ball, the pins must be reset prior to delivery of the second ball. All pins that have been knocked down must be removed from the lane prior to delivery of the next ball.

In the following situations, a ball is declared *dead.*

1. A player encounters interference before this delivery is completed, provided that the player quickly calls attention to the interference.
2. Interference with the ball prior to reaching the pins (gutter ball, lane jump).
3. Interference with a pin before the ball reaches it (for example, the pinsetter knocks it over).
4. One or more pins is missing from the set-up.
5. The player is on the wrong lane.
6. The player bowls out of turn.

## BOWLING PRACTICE

Practice sessions are held during the Varsity Scout team participation in the bowling activity. Practice sessions can occur as part of the troop meeting or be held at a separate meeting. These sessions develop the Scout both physically and mentally.

Many opportunities will occur to blend the sport of bowling with the game of life. Smart coaches and captains use these opportunities to strengthen the individual Scout as well as the Varsity Scout team. Practice sessions have four parts:

1. **Warm-up and conditioning exercises.** Simple warm-up exercises allow for loosening the muscles and help in avoiding injuries. Vary the pace and type of exercise. Questions should be asked to stimulate thinking about proper eating habits and the importance of exercise throughout life. This portion of the meeting should take about 10 minutes.
2. **Skills development drills.** Teaching fundamentals is essential in the sport of bowling. Take time to teach basic skills at every practice session and plan simple drills to reinforce the points.

3. **Team talk.** Make this a regular, normal part of practice. Use it for education and personal development. Team members should be encouraged to talk about such things as rules of the game, principles of team play, team tactics, and concepts of fair play.

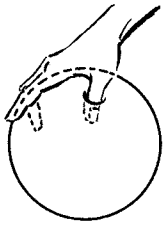
   These rules, principles, tactics, and concepts apply to everyday life as well as to the sport of bowling. These discussions should be a regular segment of practice as well as taking place at any appropriate time.

4. **Practice games.** When the practice session is held at a bowling facility, several games should be going on at the same time. Depending on lane availability, divide team members into groups of two or four. These practice games should relate to the skills instruction portion of the meeting.

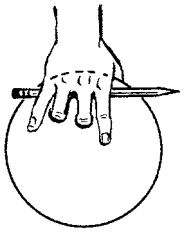
## PLAYING THE GAME

### BALL SELECTION

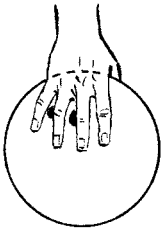
Learning to bowl starts with choosing the proper ball. In making your selection, begin with the weight of the ball. First, divide the player's body weight by 10. For example, if the body weight is 140 lbs., divide it by 10. The result is 14. That player should begin with a ball weighing 14 pounds.



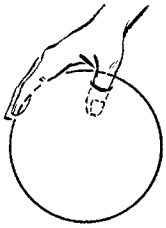
*Your thumb should slip in and out of the thumbhole rather easily.*



*There ought to be just enough space under your palm for a pencil to fit snugly.*



*For proper span, the knuckles of your middle fingers should be over the edges of the finger holes with your thumb in the thumbhole.*



*Only by actually using the ball can you determine whether the fit is correct.*

Two other factors to consider are the size of the finger holes and the span from the thumb to the fingers. The thumb should fit in the hole snugly. When removed, there should be some resistance, but not a "pop." The finger holes are sized the same way.

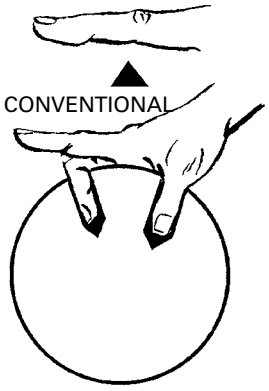
The span will depend on the style of grip that the player uses. A short span is used with the conventional grip. A large span is used with the fingertip grip. The semifingertip grip is wider than the conventional grip but shorter than the fingertip method.

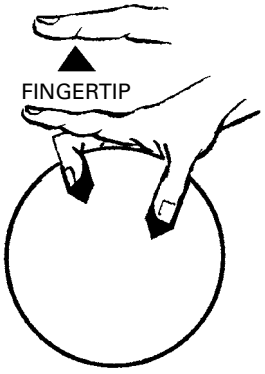
Players new to bowling should use the conventional grip. To determine the correct span, insert the thumb fully into the thumbhole. Next, lay the fingers over the finger holes. The second or middle crease in each finger should extend about ¼ of an inch beyond the nearest edge of each hole.

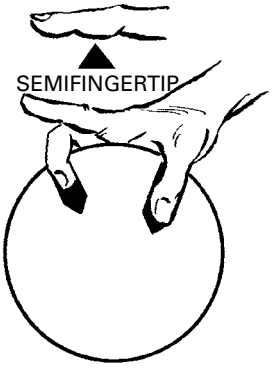
For the fingertip grip, again insert the thumb fully and extend the fingers over the holes. The first joint crease should extend about ¼ inch beyond each hole.

A semifingertip grip follows the same procedure. Insert the thumb in the hole fully, with fingers extended. This time, the holes should be anywhere between the first and second joint of each finger, rather than using the crease as a guide.

Start with the conventional grip. Try the other grips later, as your skills develop.



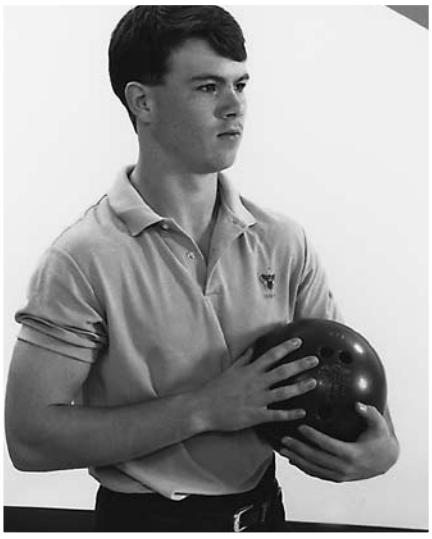



## LIFTING THE BALL

Balls are picked up from the ball return. A player should use both hands to pick up the bowling ball, placing the hands on the opposite sides of the ball, away from the other balls. This prevents any finger-smashing.

Lift the ball and hold it in your arms as you would a basketball. Never insert your fingers until you are ready to begin your approach and delivery. This is called *cradling the ball.*

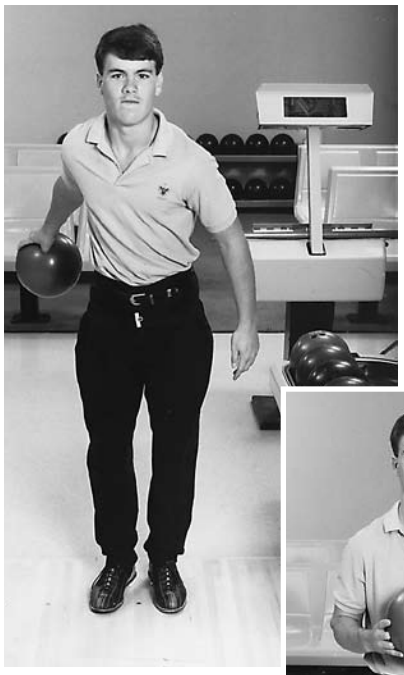
*Lifting the ball*

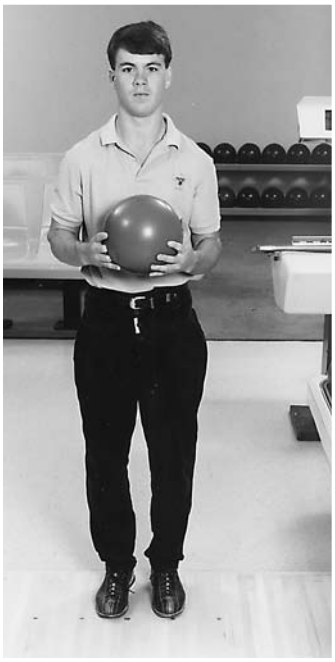


*Cradling the ball*

## STANCE

While cradling the ball, stand at the rear or approach area. Insert your fingers into the ball, using the conventional grip. With both feet closely together, bring the ball upward until it's about waist high. Your fingers will be in one side of the ball, while the other hand helps support the ball on the side opposite them. Keep your elbows close to your sides, and look down the lane toward the pins.





## TRIAL SWING

While in the stance, take a practice swing without moving the feet. The arm movements are much like a pendulum found on clocks. Push the ball out and forward. Let the arm swing downward, back, and forward, and return to the stance position. The weight of the ball should carry it down, letting its momentum carry it into the back swing. This is somewhat difficult to let happen. Players will want to force the ball down and back. Just remember to let the ball swing freely. Players need to practice the trial swing several times until the pendulum of the arm is straight and smooth and moves without hesitation.

## APPROACH

The *approach* is the way that the player moves toward the foul line and delivers or rolls the ball. This is done using one or more steps. The player should try using both the three- and the four-step approaches and use the number of steps that feels most comfortable.

### FOUR-STEP APPROACH

The four-step approach lets the player's body move in a natural rhythmic movement during delivery. Coordination of the foot and arm movement or motion are the most important parts of good bowling technique. (**Note:** The following procedures are for a right-handed bowler. Left-handed bowlers should follow the same instructions, starting the first step with the left foot.)

Begin by shifting your weight to your left foot. It will then feel more natural to step off with your right foot.

1. **Push away.** On the first step (right foot), while using both hands, the ball is pushed forward and away from the body. Push the ball as far forward as the right foot moves forward.

2. **Downward swing.** On the second step (left foot), release the left hand from the ball and allow the weight of the ball to cause it to drop. The right arm and wrist are kept straight and move downward in a swinging motion. As the ball reaches the side of the leg, begin the next step.

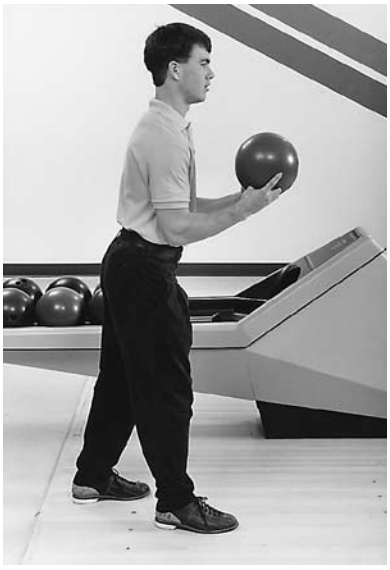
3. **Back swing.** On the third step (right foot), the ball swings backward to the height of the player's hips. The body should lean forward with both knees slightly bent.

4. **Forward swing.** On the fourth step (left foot), the weight of the ball causes it to swing down and forward in a straight line toward the foul line. As this step is taken, the left foot will slide.

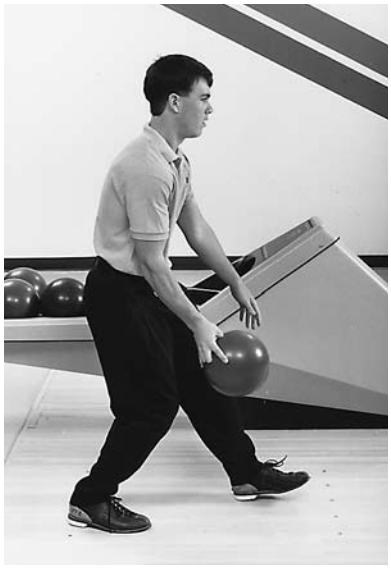
   The ball and the left foot must reach the foul line at the same time. The player's shoulders should be straight and parallel to the foul line. The left toe should point forward in a straight line, with the body leaning forward and the eyes focused on the spot over which the ball is to travel. Upon reaching the foul line, the ball is released.

The player can practice this four-step approach without releasing the ball. This is called a *dry run*.

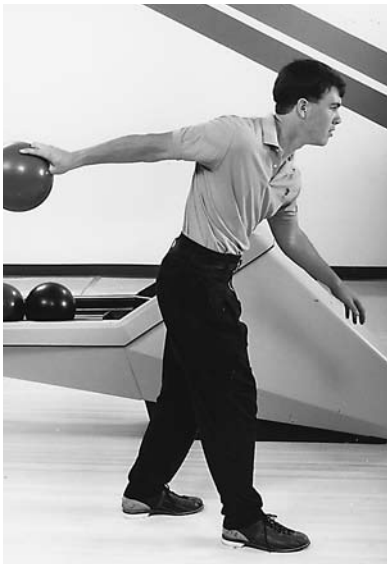
THE FOUR-STEP APPROACH



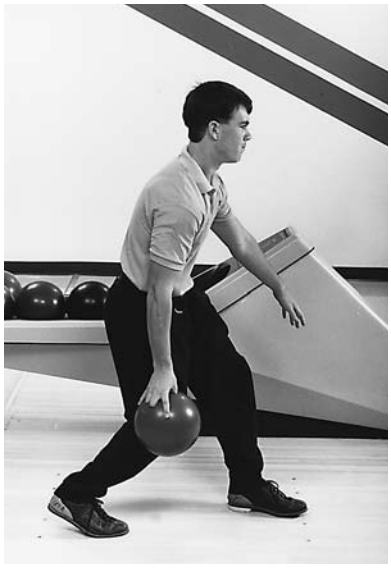
*Push away*



*Downward swing*



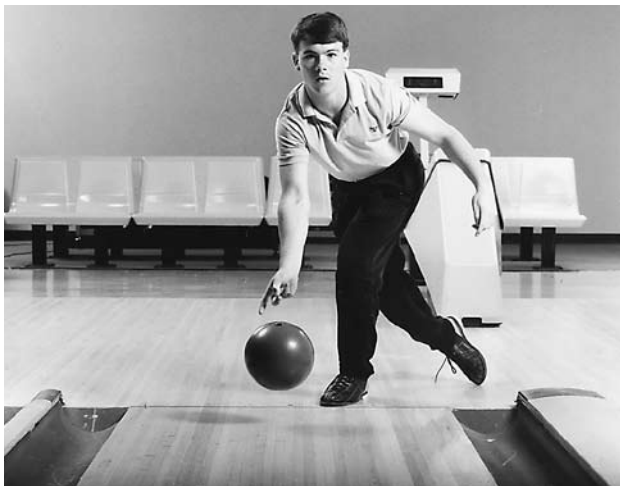
*Back swing*



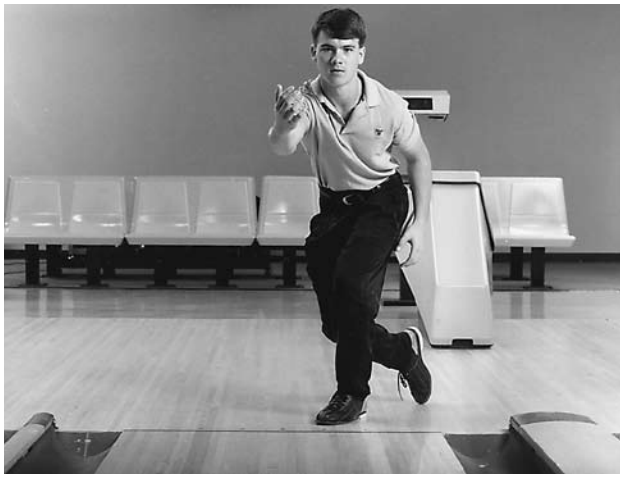
*Forward swing*

## FOLLOW-THROUGH

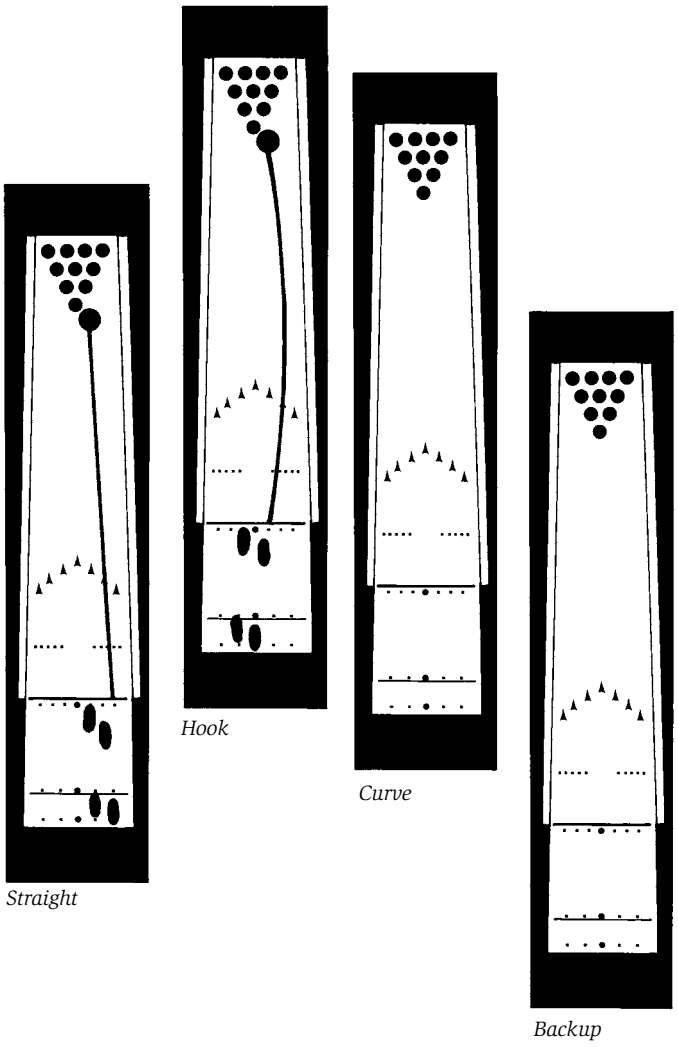
After releasing the ball, the player follows through with the swing. There should be a continuation of the upward movement of the right arm to a level of at least the player's waist high or higher.



*Ball release*



*Follow-through*



*Straight* *Hook* *Curve* *Backup*

## DELIVERY

There are four styles of ball delivery: straight, hook, curve, and backup. The style used will determine the action and path of the ball.

### STRAIGHT BALL

The straight ball is delivered with the thumb in the 12 o'clock (thumb on top of ball at release) position. Players with weak wrists find that they can better support the ball using this style. The ball travels in a straight line with little action.

### HOOK BALL

This delivery gives the ball the most action. The player holds the ball as if shaking hands with someone or have the thumb at the 10 o'clock position. The hook action results by pulling the fingers from beneath the ball on release.

### CURVE BALL

The curve ball is held the same way as the hook ball. On the release, the hand is brought upward harder or with more lift.

### BACKUP BALL

The backup ball is held the same way as the hook and curve ball. Backup balls are usually released from the left side of the lane, in a clockwise rotation. On release, the fingers are given a clockwise lift, causing the ball to also rotate clockwise and move to the right.

## STYLES USED IN AIMING

As delivery begins, bowlers aim at a target. There are several methods of aiming. For example, should the player look and aim at a spot on the lane as a target or should the player aim directly at the pins? Most players use spot bowling rather than pin bowling. The player will determine which method works better for him.

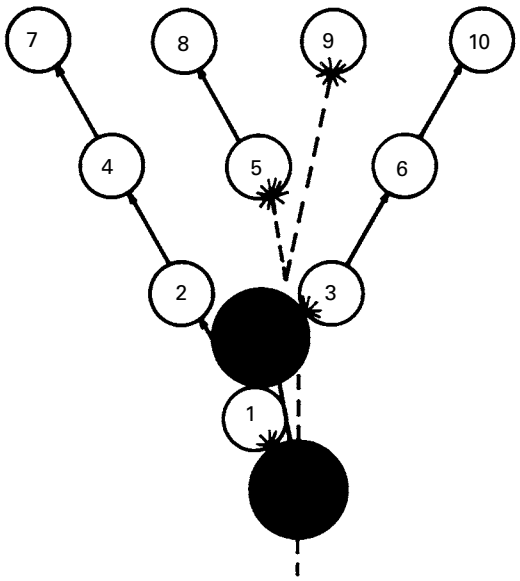
### SPOT BOWLING

A spot bowler uses a target arrow found on the lane. Target arrows indicate in which pocket the ball should strike the pins. The player can use the spots at the foul line, the arrows, or the spots between the two.

### PIN BOWLING

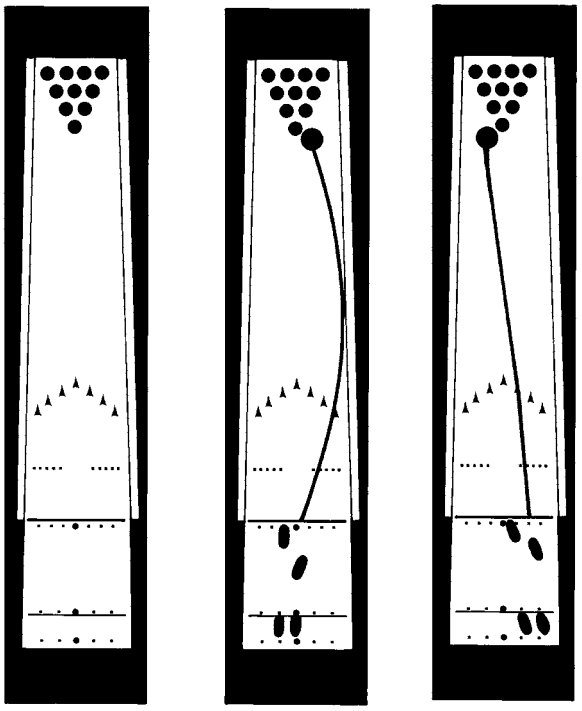
The player who pin bowls looks directly at the pins from the start of his approach to the follow-through. Players will find that pin bowling will cause more loft of the ball.

PIN BOWLING




*Contacting these points on pins 1, 3, 5, and 9 would practically ensure a strike.*

SPOT BOWLING



*The second arrowhead from the right is the target spot.*

*Straight-ball bowlers make a delivery from the right side.*

*Hook-ball bowlers move the starting position to the left.*

## BOWLING THE FIRST BALL

Basically, the objective is for the ball to knock down all the pins with each roll of the ball. If all 10 pins are knocked over with the first ball of the frame, a strike is made. If one or more pins are left standing, the player rolls a second ball. Few bowlers are successful in making strikes with each roll of the ball. Usually (especially when bowling for the first time), a few pins are left after the first ball is delivered.

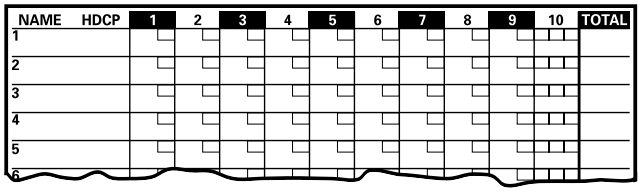
## MAKING SPARES

Most games are won by the player who can make a spare. When pins are standing on the left side of the lane, the player states his approach from the right side of the lane. This allows the player maximum use of the lane and permits his next delivery to have the best angle on the remaining pins.

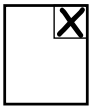
The player should aim the ball so that as many pins as possible will be hit. There are many configurations of remaining pins. The best way to learn where to have the ball hit the remaining pins is to practice different approaches. Always remember to approach the remaining pins from the opposite side of the lane.

### KEEPING SCORE

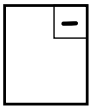
The score sheet used in bowling can at first appear to be confusing. With a little practice, however, what seemed complicated is really simple. A score sheet is divided into 10 segments just as a game has 10 frames.



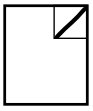

Each frame is indicated by a large box with a smaller box inside. The roll of each ball in each of the 10 frames is scored in the little boxes. The total score for the frame is written in the big box.




*When all pins are knocked down, mark the first box with an X.*

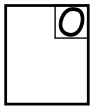



*If no pins are knocked down, score an error or miss by putting a dash (-) in the box.*

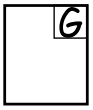



*When all pins are knocked down with the second roll, a spare is scored by putting a slash (/) in the second box.*


*If a foul is committed, put an F in the box.*




*If the second roll does not knock down any pins, a split is scored by putting a 0 in the second box.*




*If the ball rolls into the channel or gutter, put a G in the box.*

When a player rolls a strike, enter a 10 in the first box. These 10 points plus the score of the next two balls are added and that total is entered in the big box for the frame. When a player rolls a spare, the score of the next ball is added to the 10 and entered in the big box.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| 7 - | 8 1 | 9 / | 7 2 | X | 8 / | X | 9 - | X | X 8 / |
| 7 | 16 | 33 | 42 | 62 | 82 | 101 | 110 | 138 | 158 |

## CARE AND PREVENTION OF INJURIES

Safety awareness is as important to Varsity bowling as is learning the skills of the sport. All instruction and coaching should include appropriate safety measures, and it is always the responsibility of the coach to supervise the preparation of athletes for competition so that the likelihood of injury is minimized.

Varsity bowling is as safe as the environment established by adult leadership for the sport. Although injuries sometimes occur, coaches should take all necessary precautions to help prevent accidents, and be prepared to respond when they do occur. Coaches are responsible for both prevention and care of injuries, but the emphasis for everyone must be on prevention of injury and safe, accident-free play.

### COACHING SUGGESTIONS TO HELP PREVENT INJURY

Coaching styles are important in establishing a safe environment for players.

- Be creative and flexible, but be prepared and well-organized for practice sessions and games. Design drills to meet the special needs of each player and the team.
- Follow the practice outline suggested earlier in this manual. Be sure to include all segments of practice time, including warm-ups, drills, and games.
- Try to actively involve all of your players throughout practice with a minimum of sitting, standing, and waiting to bowl. Provide as many opportunities as possible for each player to practice on the skills that he needs most.
- Plan instruction and competition by taking into account individual differences in skill and experience. Try to teach skills in logical progression.

Players will play and act in league games in a direct relationship to the way they have been coached in practice sessions. Even when coaches emphasize prevention of injuries through proper warm-up, conditioning, supervision, and education, from time to time injuries do occur and first aid must be provided. Be prepared to respond immediately with appropriate first-aid procedures. Never move an injured player if you are in doubt, and never attempt treatment that goes beyond your own training and experience. Your responsibility is never to provide treatment, but to provide immediate first aid to the injured player.

There will be fewer major injuries in bowling than in contact sports. Recognition of serious injury, however, is the primary responsibility of the coach, and must be followed by appropriate treatment by trained medical personnel.

## GLOSSARY OF BOWLING TERMS

**ABC.** American Bowling Congress.

**AJBC.** American Junior Bowling Congress.

**Alley.** A bowling center.

**Anchorman.** The last person on a team to bowl.

**Approach.** An area at least 15 feet long behind the foul line where the player takes his steps before delivering the ball.

**Arrows.** Imbedded targets in the lane. Used by the player to align his starting position.

**Baby split.** Leaving the 2–7 or the 3–10 pins.

**Backup.** Term used when the ball curves left to right for right-handed player or right to left for a left-handed player.

**Back swing.** The path the arm follows behind the body as the next-to-the-last step during the delivery.

**Bedposts.** Leaving the 7–10 pins standing.

**Big fill.** Knocking over seven or more pins with the first ball after a spare is rolled.

**Blind.** A score given for a missing team member.

**Blow.** An error or miss when attempting to make a spare.

**Bridge.** The distance between the finger holes on a bowling ball.

**Bucket.** Leaving the 2–4–5–8 or 3–5–6–9 pins remaining.

**Channel.** The area on either side of the lane. Also known as the *gutter*.

**Channel ball.** Term given to a ball that falls into the channel. Also known as *a gutter ball.*

**Chop.** Knocking over only the front pin of a spare, leaving the other pins standing. Also known as a *cherry.*

**Choke.** To tighten up in a pressure situation.

**Convert.** Term used when you are successful in making a spare.

**Count.** The number of pins knocked down on the first ball.

**Creeper.** A very slow-rolling ball.

**Curve.** A ball making a wide sweeping arc from the outside to the inside of the lane.

**Deuce.** Scoring a 200 game or having a 200 average.

**Dead ball.** A rolled ball without much action or spin. Term also used when a ball is illegally rolled, such as out of turn or in the wrong lane.

**Dead mark.** Making a spare or strike in the 10th frame and thereby not getting a bonus.

**Dodo Ball.** An illegal (weighted) ball used in the early days of bowling.

**Double.** Rolling two strikes in a row.

**Double Pinochle.** Leaving the 4–7–6–10 pins standing.

**Dutch 200.** Scoring a 200 game by making only alternating strikes and spares. Also called a *Dutchman.*

**Error.** Failure to score a spare. Also known as a *blow, miss,* or *open*.

**Fast lane.** A lane that is slippery. Restricts or does not permit the ball to hook.

**Fill ball.** Making a strike with the last ball in the tenth frame.

**Foul.** Stepping on or going beyond the foul line while delivering the ball.

**Foul line.** The line that separates the approach area from the lane.

**Foundation.** Rolling a strike in the ninth frame.

**Frame.** One-tenth of a full game.

**Graveyard.** Name given to a low-scoring lane.

**Grinder.** A hook or curve ball delivered in a powerful manner.

**Gutter.** The area on either side of the lane. Also known as the *channel*.

**Gutter ball.** Term given to a ball that falls into the gutter. Also known as a *channel ball.*

**Handicap.** Placing teams or individuals with various degrees of skill on an equal basis by adjusting scores.

**Head pin.** The first or No. 1 pin.

**High board.** A loose or elevated board in the lane that causes a ball to veer to either side.

**High hit.** A ball that hits fully on the head pin. Sometimes called a *nose hit.*

**Hook.** A ball that breaks to the left for a right-handed player.

**Kegler.** Derived from the German word *Kegel,* meaning bowler.

**Kickbacks.** Partitions on the side between lanes at the pit end.

**King pin.** Name given to the No. 5 pin.

**Lane.** The area, 60 feet in length, between the foul line and the head pin.

**Lead off.** The first team member to bowl.

**Leave.** The pins not knocked over after the first ball has been delivered.

**Light hit.** A ball that almost doesn't hit the pocket.

**Line.** A complete game of ten frames. Also, the path the ball follows.

**Lofting.** Throwing or releasing the ball late, thus causing it to hit the lane well beyond the foul line.

**Mark.** Making a strike or spare.

**Miss.** Failure to score a spare. Also known as a *blow* or *error.*

**Mixer.** A ball that lightly hits the pins, causing them to ricochet. Mixers usually result in a strike.

**Nose hit.** A ball that hits fully on the head pin. Sometimes called a *high hit.*

**Open.** A frame where the player does not get a spare or a strike.

**PBA.** Professional Bowlers Association.

**Perfect game.** Twelve strikes in ten frames for a score of 300.

**Pin.** The piece the player attempts to knock over.

**Pin bowler.** A player who visually aims at the pin when delivering the ball.

**Pin deck.** The playing area where the pins are sitting.

**Pitch.** The angle with which the finger holes are bored into the ball.

**Pocket.** The space between the 1–3 pins for right-handed players and between the 1–2 pins for left-handed players. Also called the *strike pocket.*

**Return.** The rails or track on which the ball travels when being returned to the player.

**Runway.** The approach area.

**Sandbagging.** Purposely keeping a player's league average down. Used to give a player a higher handicap in tournament or league play.

**Scratch bowler.** A player with no established handicap.

**Series.** Three or more games played in a league or in a tournament.

**Sleeper.** A pin hidden behind another pin.

**Sour apple.** Leaving the 5–7 pins standing.

**Span.** The distance between the thumb and the finger holes on the ball.

**Spare.** In the same frame, successfully knocking over all 10 pins with the second delivery of the ball.

**Split.** Two or more nonadjacent pins not knocked over with the first ball delivered in the frame, none of which is the head pin.

**Spot bowler.** A player who uses the finders or spots in the lane as targets.

**Strike.** Knocking over all ten pins with the first ball delivered in the frame.

**Strike out.** Getting three strikes in the tenth frame.

**Swinging the ball.** Releasing the ball so that it moves first toward the channel, then hooks back to the strike pocket.

**Tap.** A pin left standing after a good strike hit is made.

**Turkey.** Making three consecutive strikes.

**Washout.** Leaving the 1–2–4–10 pins standing by a right-handed player or leaving the 1–3–6–7 pins standing by a left-handed player.

**Water ball.** A poorly delivered ball.

**WIBC.** Women's International Bowling Congress.

**Working ball.** A ball with lots of spin action. Also known as a *mixer*.

**YBA.** Youth Bowling Association.

## CANOE CAMPING CONTENTS

# CANOE CAMPING

## BACKGROUND

**"The movement of a canoe is like a reed in the wind. Silence is part of it, and the sounds of lapping water, bird songs and wind in the trees. It is a part of the medium through which it floats, the sky, the water, and the shores. . . . A man is part of his canoe and therefore part of all it knows. The instant he dips a paddle, he flows as it flows, the canoe yielding to his slightest touch, responsive to his every whim and thought."**

*The Singing Wilderness*
*Sigurd Olsen*

Scouting introduces you to camping and canoeing through your troop and through summer camp. You probably have been going camping with your troop nearly every month. Your troop may have gone canoeing a few times or you may have been introduced to canoeing at summer camp. You may be familiar with the BSA national high-adventure programs in Minnesota. Councils across the United States also offer challenging canoe-camping trips on local waterways. In this program, you will combine and expand your basic skills to develop expertise in canoe-camping.

Canoe-camping is designed to challenge you. There will be a series of skills and techniques to learn in preparation for the ultimate adventure. The adventure could be a long weekend or a week on a waterway. It could take you to one of Scouting's high-adventure areas for six to 10 days of canoe-camping in some of the best canoeing territory in North America, whether in the mountain lakes of the Adirondacks or the Boundary Waters Canoe Wilderness of Minnesota.

Take your time preparing for your ultimate adventure. Make sure you master each skill level and have the knowledge to deal with a challenging situation. Physical conditioning also is an important aspect of canoe-camping, as it requires great endurance to paddle and portage for several days in a row.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a Canoeing merit badge clinic.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida, Sea Base, etc.).
- Conduct a canoe camping activity.

### PERSONAL DEVELOPMENT

- Have a member of a historical society present a program on the early settlers in your community. Encourage team members to begin researching their family trees.
- Visit an outdoor sports equipment facility (sales or manufacturing) and learn about associated careers.
- Invite young women to participate with the team members in a discussion on the importance of wilderness preservation.

### SERVICE

- Conduct an awareness program on recycling for a local organization of the team's choice.
- Design and carry out a conservation project for the community.

### SPECIAL PROGRAMS AND EVENTS

- Conduct a session on homemade camping equipment.
- Contact other teams and invite them to participate in the session on making equipment.
- Build a canoe from natural materials.

## PLANNING

Careful planning leads to an enjoyable canoe-camping experience. First make sure the team is physically fit and has the necessary skills and proper equipment for a safe canoe-camping experience. In addition, to ensure a safe and enjoyable adventure, make sure your pretrip planning is thorough.

### CANOEING SAFETY POLICIES

The best way to ensure safety is to be sure each team member has the necessary swimming skill and understands what it takes to stay safe afloat. Before embarking on a canoe-camping trip, each member and leader should review and ascribe to BSA Safe Swim Defense and Safety Afloat procedures. Also remember that BSA policy requires all persons engaged in activity on the open water to wear personal flotation devices (PFDs). Take time to review these policies before you begin planning your first canoe-camping trip. You will find them in the *Canoeing* merit badge pamphlet.

### TRIP PLANNING

When you know you have the necessary swimming, safety, paddling, and camping skills for canoe-camping, then it's time to plan your trip. Planning can be half the fun.

Start with an overnight or three-day trip before embarking on a week-long trek. This gives you time to test your gear and your skills. And the penalty for leaving something behind will be a smaller inconvenience.

Planning a canoe-camping trip is much like the planning you have done for other Scouting activities. Some of the necessary steps are described in Safety Afloat. This program feature will expand on these and other preparations for successful canoe-camping. Other sources of information include the *Canoeing, Whitewater,* and *Camping* merit badge pamphlets, and the *Backpacking* and *Whitewater* program features.

In planning a canoe-camping trek, you must make many decisions and answer several important questions:

- Where to go
- When to go
- How difficult the trip should be
- How to scout the planned route
- How group size and fitness will affect your plans
- What your training needs are
- How much to budget

Let's look at each concern.

### WHERE TO GO

Thousands of canoeing areas exist in the United States. Each state has waterways specifically designated for canoeing. Canoe dealers or liveries often have racks of materials, including waterway guides for the region they serve. Canoe clubs are another excellent source. Every state in the United States and each province of Canada has a department of tourism that can provide information. State departments of fish and game, natural resources, lands and forests, or parks and recreation are other excellent sources. Your local library will have resources. Always check a guide's publication date. A recent flood in an area may have greatly changed a river's characteristics.

Maps reveal much about a river, including the average gradient or slope, dams and other obstructions, and access points for emergencies and rescues. Two excellent sources for maps are the United States Geological Survey, 509 National Center, Reston, VA 20192, and the Canada Map Office, Geomatics Canada, Natural Resources Canada, 130 Bentley Avenue, Nepean, Ontario K1A OE9, Canada. Be aware that maps may not show new roads or other development. In addition, not all of the details that maps provide about rivers will prove to be accurate.

Magazines such as *Canoe and Kayak* publish articles about canoe tripping and often report on waterways of a particular region or state. Other useful periodicals include *Backpacker, National Geographic, Outside,* and *Canadian Geographical Journal.*

Conservation officers, local canoe clubs, or outfitters who are familiar with a particular river on a daily basis can provide current information. Even so, check the river gauge or lake advisories just before embarking on your trip.

Many prime canoe-camping areas exist. Only a few can be mentioned here. In upstate New York, there is Adirondack State Park; in northern Minnesota, the Boundary Waters Canoe Area Wilderness (BWCAW) and Quetico Provincial Park. You could follow the Rio Grande River in Big Bend National Park in Texas and Mexico. Or you might canoe in the Land of the Quaking Earth in the Okefenokee Swamp. The Buffalo River in Arkansas is another possibility.

## WHEN TO GO

The timing of your trip will depend on the season of the year and how much solitude you seek. Local weather patterns may dictate the best times of the year for canoeing. The summer months provide prime canoeing weather in most areas. However, trips before Memorial Day or after Labor Day may offer fewer bugs and people and better fishing. July and August are the usual vacation months, so you can expect more company on and near waterways.

## TRIP DIFFICULTY

Canoe trips can vary from leisurely to strenuous. The number of miles traveled influences the difficulty of the trip. The need for portaging or the presence of white water increase difficulty. The time of year can be a factor.

How many days do you have? How far do you want to travel? How challenging should your trip be? The answers to these questions will depend on the abilities and stamina of each member of your team.

Trip length will depend on members' skills, the time available, the nature of the waterway, your budget, activities planned along the way, and personal preferences of the group. An inexperienced team should make several short trips before undertaking a long one.

Consider other planned activities along the way. Do you want to make side trips, fish, practice backcountry navigation, learn ecology, swim, or earn merit badges? Are you planning to work on the BSA 50-Miler Award or other awards?

*On most lakes and flatwater rivers, you can expect to travel 8 to 10 miles a day.* Swift-flowing rivers will allow you to cover more miles each day. White water and portages will reduce your mileage. For longer trips, you may want to plan a layover day (a campsite in which you stay two nights). This gives you an ''out'' if travel plans do not go as scheduled. If necessary, you can travel on that day to make up for wind, bad weather, or overestimating what can be accomplished.

Before planning the trip, poll the group and learn what the members want to do. Select the top five choices. Compare this list of options with available canoe-camping areas and other considerations.

## ADVANCE SCOUTING

Advance scouting is an important and exciting part of planning. Obtain accurate and current maps and information on the chosen waterway. In selecting rivers, use the International Scale of River Difficulty. Canoeing guidebooks describe sections of rivers by the international scale. Base selections on the skills of your group. Assign someone the responsibility of obtaining information from local canoeists. If possible, adult members of the group should run the course before the trip. On the day of the proposed trip, paddlers should check the river for quickly changing water levels. Those who canoe on lakes should check for lake wind advisories.

## GROUP SIZE AND FITNESS

Many managed canoe recreation areas limit group size and many have preregistration for starting dates or campsites. If your group is larger than the limit, be sure you have the necessary leadership for two teams.

For environmental reasons, your group should not be larger than 12 people. Larger groups place undue stress and pressure on campsites. See the section on Minimum-Impact Camping in this program feature for more about environmentally responsible camping.

Paddling a canoe and managing a campsite require physical fitness. Does your team have the stamina to paddle a canoe 50 miles or more over a week to 10 days? Are you prepared to portage your gear and canoe around a waterfall or from lake to lake? A pretrip exercise program that includes running and strenuous exercises will produce a physically fit group.

Two or three weekend shakedown trips before the long trip help to ensure readiness. On the shakedown, practice the canoe strokes—the forward stroke, J stroke, sweep, backstroke, pry, and draw. These are illustrated in the section on Canoes and Strokes. If you are going to an area where portaging is required, learn the techniques and build your endurance on your shakedown weekends.

## TRAINING

All persons participating in unit activity afloat on the open water must be trained and practiced in craft-handling skills, safety, and emergency procedures. A minimum of three hours' training and supervised practice or meeting requirements for "basic handling tests" is required for all unpowered craft. All persons planning to participate in unit activity on white water must complete additional special training conducted by a BSA Aquatics Instructor or qualified equivalent.

Before your trip, train and practice in canoeing techniques and rescue procedures as needed. Make a shorter shakedown trip before an extended canoe-camping trip. As the team advances to more remote areas and water of increasing difficulty, carefully match skills of participants to the demands of the environment.

## COSTS

The cost of a canoe-camping trip will depend on the length of time you will be gone, the distance you must travel to the canoeing area, shuttle fees, canoe/equipment rentals, and fees (if any) for camping. Food and transportation will be your major costs.

Many popular canoeing areas have canoe liveries and trip outfitters. For a fee, outfitters can provide food, packs, and other equipment besides canoes. Car and canoe shuttle services are usually available as well.

If you decide to canoe-camp a day or more away from home, you will need to find overnight accommodations. Many military installations routinely allow Scouts to stay on their facilities for a minimum fee. Campgrounds are often available. In addition, other councils' summer camp facilities may have overnight accommodations. You will find other travel ideas in *Tours and Expeditions,* a BSA publication.

## TRIP PLAN

Once your plans are final, you will be ready to complete your trip plan. Refer to the sample below.

Team No. 701A

**NORTHERN TIER NATIONAL HIGH ADVENTURE PROGRAMS**

**BOY SCOUTS OF AMERICA**

**TRIP PLAN**

**(Please print.)**

Advisor Daniel West — Base Ely

Assistant Brent Owens — Return to base 7/10

Interpreter Bryan Craft — Leave for Home 7/11

**Members**

1. Dave Smith
2. Tom Murphy
3. Terry Wolf
4. Leigh Walker
5. Bob Hall
6. Billy Mack
7. 
8. 
9. 
10. 

**Proposed Route**

| Date | Start at: | Via: | Overnight | |
|---|---|---|---|---|
| 7/02 | Moose Lake—base | Prairie portage | Burke Lake | (1) |
| 7/03 | Burke Lake | Shade Lake | Silence Lake | (2) |
| 7/04 | Silence Lake | Agnes | Kawnipi-Rose Island | (3) |
| 7/05 | Kawnipi-Rose Island | Kawnipi | Montgomery Lake | (4) |
| 7/06 | Montgomery Lake | Cairn | Sark Lake | (5) |
| 7/07 | Sark Lake | Keefer | Kahshawpiwi Lake | (6) |
| 7/08 | Layover | | | (7) |
| 7/09 | Kahshawpiwi Lake | Nest | Washington Island | (8) |
| 7/10 | Washington Island | Wind Lake | Mouse Lake—base | (9) |
| | | | | (10) |
| | | | | (11) |

Approved by: Joe Scout—trail supervisor

Notes:

Layover trip to Donna Lake

Fishing is important.

## GEAR

Being prepared for any camping trip is important. The proper clothing, sleeping gear, and pack enhance personal comfort. Tents, cooking utensils, canoeing equipment, and other camping essentials provide at least a minimum level of comfort for the entire group.

### PERSONAL ITEMS

Each member is responsible for collecting personal items that are appropriate for the type of canoe-camping trip planned. Personal items include clothing, sleeping gear, and pack.

| | **CLOTHING LIST** |
|---|---|
| | The following list may help you decide what clothing to take on a canoe-camping expedition: |
| ☐ | Swimsuit or shorts |
| ☐ | 2 pair long pants (Scout pants, synthetic blend or wool, not jeans or sweatpants) |
| ☐ | Belt or suspenders |
| ☐ | T-shirts |
| ☐ | 1 long-sleeved shirt |
| ☐ | Underwear |
| ☐ | 2 pair wool socks |
| ☐ | 2 pair cotton or polypropylene socks |
| ☐ | Wool shirt or wool sweater (no sweatshirts) |
| ☐ | Rain jacket with hood |
| ☐ | Rain pants or chaps |
| ☐ | Shoes with nonslip tread that dry quickly and stay secure on the foot:<br>High-top sneakers<br>Lightweight hiking boots |
| ☐ | Sneakers or moccasins to wear in camp |
| ☐ | Hat with brim or visor for warm weather, wool for cold weather |
| ☐ | Bandanna handkerchiefs |
| ☐ | Work gloves |
| ☐ | Pajamas (if desired) (polypropylene long underwear is a good choice) |

### CLOTHING

Layering your clothes makes adjusting to changing temperatures and activity levels easier. You can easily put on or take off a series of light shirts or sweaters. In addition, your PFD, topped by a rain jacket, acts as an effective insulator to ward off chills.

Training and experience will teach you what you really need and what to leave at home. When deciding what clothing to take, consider each item's usefulness, weight, durability, and bulk. Give preference to items that can serve more than one purpose. For example, you may have a swimsuit that can be worn both as shorts and swimwear, or a long-sleeved wool shirt that can double as a lightweight jacket. Multipurpose garments help reduce the weight of your pack and make room for other items you need.

**Rain Clothing.** No matter how nice the weather or the forecast, always prepare for storm clouds. Storms may last 15 minutes or days on end. Be ready with a quality rain jacket (and possibly rain pants). Your rain clothing should fit loosely to permit freedom of movement and allow perspiration to evaporate without condensing on the inside of the fabric.

Good quality rain clothing is essential. Inexpensive vinyl suits tear easily and separate at the seams. Garbage bags with holes for arms and head will do in an emergency, but do not rely on them for rain clothing as they tear easily and give no protection to the head.

Ponchos, a longtime favorite of backpackers, are a poor choice for canoeing. If you capsized, you would find it very difficult to swim in a poncho. The fabric could prevent your arms and legs from moving freely. Drowning could easily result. Ponchos also can be hazardous around a campfire.

Quality rain suits (hooded jacket and pants) keep your clothes dry. You will be more comfortable and happier if you stay warm and dry. If you get wet, you may get chilled. In cold, windy weather, being wet and cold can lead to *hypothermia.*

**Footwear.** Going barefoot on a campout is not wise. A foot injury is difficult to deal with when you are away from civilization and is a burden to the whole group.

For canoe-camping, two types of footwear are necessary. For canoeing, wear shoes you can get wet. These can be high-top tennis shoes or lightweight boots. Either will protect your feet and ankles from sharp objects or rocks. The high tops also provide ankle support to prevent twisted ankles. Boots are preferred for rugged terrain, such as at the BSA's Northern Tier high-adventure bases. Your canoeing shoes should be worn when loading and unloading canoes, ''frogging'' canoes, stepping in the water, and paddling.

In camp, change into a lightweight pair of tennis shoes or moccasins. After wearing wet shoes and socks during the day, you will welcome the comfort of dry shoes. In addition, the soles of tennis shoes do less damage to the campsite. Lug soles of boots contribute to erosion and trampling of vegetation.

Some manufacturers produce low-cut slippers and open sandals designed for wearing in water. However, these do not provide ankle support or protection and are not recommended where you will be portaging, wading, and frogging canoes. In muddy river bottoms, they could be sucked off your feet, leaving you with no foot protection.

**SLEEPING GEAR**

Your choice of sleeping gear depends on the part of the country and the season of the year. In the South, a summer-weight sleeping bag or a sheet and blanket may be enough. In the northern states, a three-season bag, ground pad, and ground cloth may be required. Choose either a high- or low-temperature rating, depending on where and during what season you plan to take your canoe trip. Bags with synthetic insulation or polyester batting are better choices than cotton- or goosedown-filled bags. A synthetic insulated bag will keep you warm even when damp or wet. Cotton and goosedown lose their ability to insulate when wet. In addition, they are much heavier than synthetics when wet. Carry your bag in a waterproof sack to minimize wetness problems.

For canoe-camping, a sleeping bag should be 18-by-10 inches or smaller when in the stuff bag. This will allow more room for the other items you need to pack.

A ground pad insulates you from the cold ground as it cushions the lumps and hard ground beneath you. A necessity in some climates or conditions, it is optional in others.

Ground pads come in various materials and sizes. A closed cell foam pad or self-inflating air mattress with waterproof skin is preferable to an open cell pad. The open cell pad easily absorbs water and is heavy and uncomfortable when wet.

The appropriate length for the ground pad depends on your activities and the weather. The three-quarter length is less bulky and weighs less if you also will be backpacking. The full-length pad gives maximum warmth for snow camping in winter. A ground cloth, or sheet of plastic, beneath your tent or sleeping bag guards against moisture and abrasion.

**PACKS**

At BSA's Northern Tier high-adventure bases, all personal gear is packed into two-person packs with food in its own frame pack(s) and group gear in another frame pack. For your own adventure, you have several options.

The *soft pack,* known as a rucksack, haversack, or Duluth pack, is basically a cloth bag with shoulder straps attached. The cloth may be canvas or a tough synthetic. The bag may have exterior pockets, accessory straps, and zippered flap compartments. Its shape conforms to the back. The soft pack will hold plenty of gear and can be stowed in tight places.

Built much like a soft pack, the *internal frame pack* has several metal stays sewn into it so that they form a frame. This directs the weight of the load into a hip belt attached at the base of the bag. The compact shape and snug fit of internal frame packs make them good for combining canoeing and backpacking.

The *exterior frame pack* works on the same principle as the interior frame pack. However, since the frame is outside the bag, it can be larger and more rigid. Most frames also provide room to lash on a sleeping bag or tent. While many Scouts use exterior frame packs, they have several disadvantages when used in canoes. The frames catch on things. The rigid design prevents efficient use of space, which can lead to a poorly balanced load. Further, it is difficult to waterproof the contents of the many zippered compartments.

For short, close-to-home trips, you can use alternatives to expensive pack sacks. You can make do nicely with inexpensive duffel bags. Line them with one or two heavy plastic sacks before packing to make them completely waterproof.

If you will be traveling a river or waterway with little or no portaging, an inexpensive alternative to packs are 5-gallon pickle containers with lids. Ask for them at local restaurants. With the lids on, gear is waterproofed. The containers are easy to carry, store well in canoes, and can double as chairs in camp. Be sure to wash them thoroughly before use or everything you own will smell like pickles.

**PACKING**

No matter how much or how little you carry, for canoe-camping make it watertight. Pack as if you are certain your canoe will swamp, though you hope it won't.

Watertight packs and containers can be purchased, but heavy-duty plastic bags work well and are less expensive. Pack all your items in small plastic bags, goosenecking each by twisting the top, then bending the top over and wrapping it with a strong rubber band. Place these small, plastic-wrapped bundles in a pack lined with a large, heavy-duty (3–6-mil) plastic bag.

For your sleeping bag, line your stuff sack with a heavy-duty plastic bag and stuff the sleeping bag into both. Gooseneck the large plastic bag and secure with a rubber band. Protect your food in similar fashion. With this packing method, your clothes, food, and equipment will stay dry and will float in case of a turnover.

You will want some items, such as cameras, binoculars, maps, compass, and lunch, to be quickly accessible. Stow these in commercial waterproof bags or containers, or heavy-duty plastic bags. Store these items near you in the canoe.

| | **OTHER PERSONAL ITEMS** |
|---|---|
| | Besides your clothes, here are some other items you may want to bring: |
| | **Packing and Sleeping** |
| ☐ | 12 plastic bags (assorted for waterproofing clothing and other gear) |
| ☐ | Handful of large rubber bands |
| ☐ | Sleeping bag in waterproof stuff bag (18" × 10" or smaller) |
| ☐ | Ground pad |
| ☐ | Ground cloth |
| | **Other Items** |
| | *Toiletries* |
| ☐ | Soap |
| ☐ | Comb |
| ☐ | Toothbrush and toothpaste |
| ☐ | Metal mirror |
| ☐ | Small towls |
| | *Remedies* |
| ☐ | Insect repellent |
| ☐ | Bug bite relief |
| ☐ | Insect headnet |
| ☐ | Sunblock |
| ☐ | Sunglasses |
| ☐ | Eyeglass strap |
| ☐ | Extra eyeglasses |
| ☐ | Extra shoelace/bootlaces or nylon cord |
| ☐ | Lip balm |
| ☐ | Canteen or water bottle |
| ☐ | Foot powder |

| | |
|---|---|
| Flashlight and batteries | ☐ |
| Waterproof match case | ☐ |
| Pocketknife | ☐ |
| Waterproof watch | ☐ |
| Whistle (for communication) | ☐ |
| Fishing gear | ☐ |
| Compass | ☐ |
| Small binoculars | ☐ |
| Sleeping bag liner | ☐ |
| Camera and film | ☐ |
| Pouch (for storing valuables) | ☐ |
| Garbage bag | ☐ |

## GROUP ITEMS

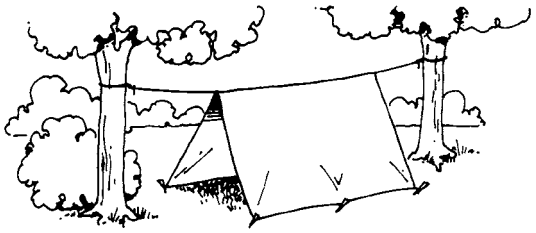
On any adventure with a group, there will be equipment shared by all. These items can be divided between the packs the way you do when backpacking. However, you may find it easier to dedicate one or two packs to carry the group gear. This way, the gear is all together with no need to search through everyone's packs to find the dining fly or a tent pole.

| | COMMON GROUP GEAR |
|---|---|
| | Tents with poles and pegs |
| | Dining fly |
| | Cooking gear (see list below) |
| | Shovel (compact) |
| | Ax (optional) |
| | Saw |
| | Matches |
| | Toilet paper |
| | Water purification chemicals |
| | Sanitizing chemicals for cleaning |
| | Collapsible water container(s) |
| | Soap and scrub pads |
| | Bear ropes |
| | First-aid kits |
| | PFDs |
| | Paddles (include spares) |
| | Bailers |
| | Helmets (on Class II rivers and above) |
| | Throw rope(s) (for white water) |

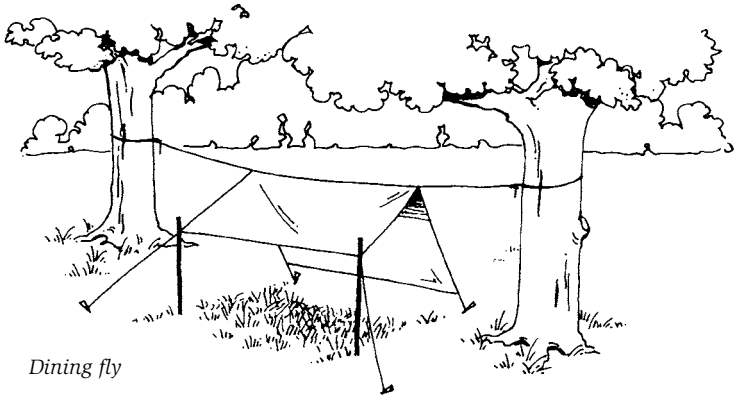
## SHELTERS

Your team will need some form of shelter. The type to use will depend on where you are canoe-camping and what you have available. The five basic shelters are tarps, bivouac bags, A-frame tents, dome tents, and hybrid tents.

**Tarps.** Tarps are lightweight and easy to set up in various ways. In some places, a tarp can be used as your primary shelter or as a dining fly to protect the group cooking area from rain and wind. A tarp has no floor, which can cause problems in wet climates. It has no mosquito netting, a problem when mosquitoes abound.



*Trail tarp*



*Dining fly*

**Bivouac Bags.** Bivouac bags are one-person shelters originally developed as emergency shelters for mountain climbers forced to spend the night away from camp. They essentially are waterproof covers that slip over a sleeping bag to protect the person from wind and rain. There are two basic designs. One uses a fabric that is waterproof but allows the body's moisture to pass through to the outside. The other looks like a miniature tent that holds the fabric out with fiberglass wands, stakes, poles, etc. These come equipped with zippered doors, mesh windows, and separate rain flys. Bivouac bags are extremely lightweight, weighing only 1 to 3 pounds. However, they are small and confining, especially if you must spend a day or two in one waiting out a storm.

**A-Frame Tents.** A-frame tents are probably the most common type of tents used. This style tent has four poles, two at each end in the shape of an ''A'' to hold the tent open. Many brands have a ridgepole to help make the tent self-supporting and keep the waterproof rain fly spaced away from the tent. Using modern technology like no-see-um netting and waterproof floors, these tents can keep two to four campers protected from the elements in roomy comfort. A-frame tents for two persons usually weigh 4 to 6 pounds.

**Dome Tents.** Though not as popular as A-frames, dome tents made of modern materials can provide shelter in various weather conditions. The dome slope will withstand high winds, heavy rains, and heavy snow (if you winter camp). These tents provide spacious accommodations for two to four Scouts. Most dome tents are self-standing. Compared to A-frame tents, fewer stakes are needed to anchor dome tents to the ground. Three to six poles made of fiberglass or spun aluminum provide the support for tent fabric.

**Hybrid Tents.** Borrowing materials and design ideas from both A-frame and dome tents, tent manufacturers make many different styles. You can get tube-shaped tents, wedge-shaped tents, tents with front and back doors, tents with only a side door, tents with rain flys attached, or tents without floors. Your team may want to check out different designs before deciding which works best for you. Talk with experienced campers. Shop around. You may want to rent, borrow, or trial test several styles.

Once you select a particular tent style, choose an earth color like green, brown, or rust. These low-visibility colors conform to minimum-impact camping ethics. Bright colors are distracting in the backcountry and can make the outdoors seem crowded.

No matter what type tent you have, practice setting it up at home. Do this before you take your weekend shakedown trip. It is better to learn the ''trick'' to setting up a tent at home than in a wilderness campsite under a downpour.

## COOKING UTENSILS

The cooking utensils you take will depend on your cooking style. The list below suggests useful items. However, you may not need all of these. Your menu, the size of the group, and your cooking style will determine your needs. Regardless, select items that are lightweight, compact, and nest together.

**Bear Ropes.** Bear ropes are used to hang your food bag from a tree. This keeps your food safe from ground squirrels, mice, raccoons, and dogs, as well as bears. The rope should be strong enough to withstand repeated friction as it is pulled up and down across tree limbs.

| | **BASIC COOKING UTENSILS** |
|---|---|
| | Nesting pot set including 2-, 4-, 6-, and/or 8-quart pots with lids |
| | Nesting coffee pot with lid |
| | Frypan or griddle |
| | Trail oven or Dutch oven |
| | **Utensil set (select items needed)** |
| | Long handled spoon |
| | Slotted spoon |
| | Pancake filipper |
| | Long-handled fork |
| | Ladle |
| | Rubber spatula |
| | Small whisk |
| | Sharp knife |
| | Bread knife and/or filet knife (when fishing) |
| | Can opener |

| | |
|---|---|
| Plastic mixing buckets | |
| Food storage containers | |
| Measuring cup | |
| Fire grate (if using fires) | |
| Backpacking stove(s) with fuel bottles | |
| Water containers | |
| **Cleanup supplies** | |
| Biodegradable soap | |
| Sanitizing agent | |
| Scouring pads | |
| Nylon scrubbing cloth or sponge | |

## CANOEING EQUIPMENT

You will need personal flotation devices (PFDs), paddles, kneeling pads, bailers, and yokes. This equipment is described in the *Canoeing* merit badge pamphlet. If your route includes white water, you also will need helmets, an extra paddle, and a repair kit. Special safety equipment is described in the *Whitewater* merit badge pamphlet. For canoe-camping, also include throw ropes as part of your emergency equipment.

**Throw Ropes.** Use about 60 feet of ⅜-inch line. The larger the diameter, the easier the rope is to hold and belay. Polypropylene fiber ropes are recommended. Polypropylene doesn't absorb water. It floats and is available in bright colors, making it easier to see by a person being rescued.

Learning to use a throw rope requires both preparation and practice. A throwing bag is a popular way of using a throw rope because it is easily thrown, convenient to pack, and ready to use. However, a throwing bag has some disadvantages. It can get caught on rocks or limbs. It is more difficult to retrieve and recoil the rope for a second throw when the first attempt fails. Use of the throw bag and throw rope is described in the *Lifesaving* merit badge pamphlet.

## FIRST-AID KIT

Carry a basic first-aid kit in a compact, waterproof container. You can use a food storage container with a snap-on lid. Another option is a commercial dry bag made of PVC-coated polyester, a tough fabric that is air- and watertight. Suggested items to include in your first-aid kit are in the box to the right.

Depending on the container selected, the first-aid kit should be stowed in a pack or securely attached to the canoe. That way, if you capsize, it won't float free and become lost.

For information about how to prevent and treat first-aid situations, refer to the section on Safety, Rescue, and First Aid.

Because of the possibility of exposure to communicable diseases, first-aid kits should include latex gloves, eye goggles, and antiseptic to be used when giving first aid to bleeding victims, as protection against possible exposure. Mouthpieces or mouth barrier devices should be available for CPR.

| FIRST-AID KIT CHECKLIST | |
|---|---|
| Adhesive bandages | |
| Adhesive tape (1" × 5 yards) | |
| Elastic bandage (4" wide) | |
| Triangular bandage | |
| Small bar of soap | |
| Non-aspirin pain reliever | |
| Antacid tablets | |
| Lip balm | |
| Antihistamine | |
| Tweezers | |
| Poison ivy lotion (where needed) | |
| Sterile pads (3" × 3") | |
| Disposable alcohol wipes | |
| Antibiotic ointment | |
| Steroid cream | |
| Moleskin or molefoam | |
| Needle | |
| Scissors | |
| Safety pins | |
| Pliers with side cutters | |
| Thermometer | |
| Pencil and paper | |
| Coins for phone calls | |
| 2-inch roller bandage | |
| 1-inch roller bandage | |
| 1-inch adhesive tape | |
| Assorted gauze pads | |
| Sunscreen | |
| Small flashlight (with extra batteries and bulb) | |
| Absorbent cotton | |
| Water purification tablets (iodine) | |
| Paper cups | |
| Foot powder | |
| Instant ice packs | |
| Two pairs latex gloves | |
| Mouth-barrier device | |

### WOODS TOOLS

In many managed recreational canoeing areas, there is little or no need for woods tools. Many canoe-campers find they need only a pocketknife, small folding saw, and small shovel. In some areas, a small hand ax or ''Hudson's Bay'' splitting ax may be handy.

Scouts using minimum-impact techniques are more interested in preserving trees in recreational areas than in cutting them down. No one enjoys camping in areas where trees have been chopped, sawed, or carved by previous campers.

Woods tools are safest and easiest to use when sharp and in good repair. Sheathe saw and ax blades for storage or carrying to prevent injury to flesh or equipment. The sheath also protects the edge on the tool. If you have not used these tools recently, review the use, safety, and sharpening techniques for each in your *Boy Scout Handbook.*

### WATER PURIFICATION

Nowhere in backcountry areas should one assume the water is safe to drink. Bacteria that cause diarrhea, nausea, and vomiting can thrive in remote lakes, rivers, and streams.

To prevent infection, purify all drinking water. The best way to make water safe is by boiling for 10 minutes, then letting it cool. This will kill all pathogens.

Using iodine is, for the most part, effective in purifying water. Be sure to follow instructions on amounts to use and the time the purifying agent needs to be in contact with the water. The colder the water, the longer you need to wait before using it. The same is true of highly contaminated water. Compact filtering devices are available to clean drinking water. Check with your local outdoor supply store for types that will suit your needs.

### EMERGENCY REPAIR KIT

Having repair items along can prevent an unexpected rip or equipment failure from becoming trip-threatening. Following is a list of suggested items. You may want to add additional materials for repairing the packs, tents, cooking stoves, and other equipment you will carry.

- Duct tape (repairs almost anything)
- Heavy needle and thread
- Strong wire
- Safety pins
- Spare buttons
- Rubber bands
- Pack pins or clevis rings
- Spare stove parts
- Any special items for your own equipment

## FOOD

Paddling and portaging a canoe through the day burns many more calories than your usual, everyday activities. Meals and menus must provide the calories needed to fuel this extra activity. When planning menus for your expedition, consider nutritional needs, the size of the group, the strenuousness of the planned trek, and the amount of time you want to spend cooking and cleaning up.

### NUTRITION

Meals for the trail can be as basic or as gourmet as you like. No matter what your menu, each day's meals should include a combination of proteins, carbohydrates, and fats. These nutrients provide the energy your body needs. In addition, protein helps to build and repair body cells.

Include plenty of water as well, at least 2 to 3 quarts per day. Water aids in digestion and is essential to prevent dehydration during strenuous activities, especially in warm weather. Three or four quarts are needed each day during warm weather or when you are very active. If you drink too little water, the resulting dehydration decreases the efficiency of your body. If severe, dehydration can be life-threatening.

Be sure your source of water is safe to drink. If not, use one of the treatment methods described previously.

Beyond these basics, your body needs vitamins and minerals to carry out body processes. You can meet these needs by choosing a variety of foods from the four basic food groups: meats, poultry, fish, eggs, dry beans and peas, nuts, and seeds; breads, cereals, and other grain products; milk, cheese, yogurt, and other milk products; and fruits and vegetables.

## PROVISIONS

The group's size will determine the amount and types of food you take. Remember, for environmental reasons and minimum-impact camping, group size should be no larger than 12 people. If the group is larger, break into two or more groups and stay at separate campsites.

The type of trip planned also influences the type and amount of food needed. A leisurely trip covering a short distance each day requires less food than for a strenuous trek.

Nutritious food is fuel for the body. The harder the body works, the more fuel you'll need. By knowing what type of canoeing is planned and what your activities will be, you can adjust the kinds and amounts of food taken to meet the energy demands of the body.

### TYPES OF FOOD

A century ago, adventurers had a limited choice of provisions that were compact enough to carry and stable enough to last until they were needed. Wilderness travelers relied mostly on flour, beans, and jerky or pemmican. Canoe-campers today still carry some dried foods, but modern processing methods have filled the shelves of stores with an array of foods preserved in other forms.

**Fresh.** Fresh foods are tasty and nutritious. Many won't keep long without refrigeration, but if you don't mind carrying the weight you can include fresh fruits, vegetables, and some meats for meals during the first days of a trek.

**Canned.** So many foods are canned that you can build almost any menu around them. The disadvantage is the weight of not only the can and the food it contains, but also the water in which the food is packed. You'll probably want to keep canned foods to a minimum. Always take empty cans home for proper disposal.

**Dehydrated and Freeze-dried.** Dehydrating and freeze-drying processes remove some or all of the moisture from a food. The result is a product that weighs only a few ounces, takes up little room in your pack, and keeps until you are ready to use it. Trail preparation varies from letting dehydrated ham cubes soak overnight, to simply adding boiling water to freeze-dried main dishes. The disadvantages of commercially prepared dehydrated and freeze-dried foods are their high cost and some loss of nutritional value.

**Dry Foods.** Pastas, flour, beans, popcorn, rice, seeds, and other naturally dry foods can be a major part of your camp diet. Other good choices are dried (powdered) dairy products and dried meats.

**Convenience Foods.** Every supermarket has dozens of convenience foods that are quick to prepare. Intended primarily for home use, many also are ideal for camp meals. Instant rice, gravy mixes, granola bars, pancake mix, and entrees in flexible pouches are just a few you may want to use. However, be sure to consider their nutritional value. While many convenience foods are high in nutrients, others are loaded with fat, sugar, and salt or are so heavily processed that they have lost much of their nutritional goodness.

**Retort Foods.** In food marketing, ''retort'' packages are sealed foil containers packed with entrees and side dishes. The military calls them MREs, or Meals Ready to Eat. Essentially a flexible metal can, a retort container will keep food fresh until you are ready to eat it. Usually, you need only drop the package into boiling water to heat the contents to serving temperature. Since no water has been removed from the food, retort meals can be heavier than dry or dehydrated foods. As with any litter, empty foil pouches must be carried out of the backcountry and disposed of properly.

Retort foods are available mainly through two sources. Military supply stores often have MREs for sale. In addition, outdoor specialty stores and catalogs are sources of several commercial brands of retort foods.

**Spices and Herbs.** Enhance the flavor of your meals with spices and herbs. Empty 35-millimeter film canisters make good spice containers, as do empty plastic pill bottles. Label them with masking tape so you'll know what is inside, and carry them in a plastic bag. For starters, include salt, pepper, cinnamon, and garlic powder. Use each spice or herb sparingly. If you need more, it's easy to add, but if you add too much, it can't be removed.

### SAMPLE MENUS

There is no single right way to plan canoe-camping meals. As long as the food you prepare and eat is nutritionally balanced and there is plenty of it, menus can be as varied as you like. A typical day's menus are described below.

**Breakfast.** Breakfast may be the most important meal of the day. Breakfast provides an energy base to power you until lunchtime. Skip breakfast, and by midmorning you'll find you're slowing down.

Every breakfast should include some fruit, a drink, and a main course. The fruit can be fresh or dried, in juice form, or chopped up and mixed into the main course. On chilly mornings, nothing beats a steaming cup of cocoa, though a glass of juice or milk might be more appealing in the summer.

The dish you choose for a main course depends on how much time you have to prepare it. If you're eager to get out of camp, a bowl of nutritious, homemade granola with nuts and grain will do the job. Cold breakfasts can be convenient, but they must provide enough food value to satisfy the energy needs of hungry campers.

You may want to crank up your stove and cook a pot of hot cereal, or prepare pancakes, hash browns, bacon and eggs, or French toast. During berry season, stir wild fruit into muffin and pancake batters. (Just be sure you know that what you're picking is edible!) Scramble fresh, powdered, or freeze-dried eggs, or make omelets full of cheese, onions, and bits of jerky or sausage.

**Lunch.** As the breakfast calories burn away, recharge with a good lunch. Some adventurers like to sit down at noon and have a meal, while others prefer to nibble a few bites of food at each rest break during the morning and afternoon. Try each way and see how your system responds.

If you'll be away from camp, plan foods that need no cooking, though a cup of soup or cocoa tastes great when the wind is cold and sharp. Fill up on whole-grain crackers or bread spread with peanut butter and jelly, cheese, sausage, sardines, or freeze-dried chicken salad, egg salad, or ham salad. Add a little fresh or dried fruit, and you'll be ready for the afternoon.

**Dinner.** At the end of the day, you'll have time to relax and enjoy a good meal. Dinner will give you a chance to catch up on any nutrients your other meals may have lacked, and you'll have the fuel you need to keep warm during the night. To begin, sip a cup of soup while the main course simmers. Add variety to your dinners by trying various ethnic foods—a Mexican dinner one night, for instance, and an Oriental meal the next. Include a vegetable in the main dish or serve it separately. Drink cocoa, milk, juice, or water with your meal. End with a satisfying pudding, cobbler, or other dessert.

**Trail Snacks.** When you're active, you are bound to feel an occasional energy lag between meals. Keep going with a trail snack that's high in energy, easy to carry, and a pleasure to eat. You'll feel better and have more endurance if you avoid excessive amounts of refined sugar. Instead of candy bars, try a trail mix of nuts, unsweetened coconut, and raisins. Eat some fresh or dried fruit. Have a handful of granola, or some homemade honey-sweetened cookies.

**MEAL PLANS**

Here are some suggestions for meals that are easy to fix and for meals that require more involved preparations.

**Quick Breakfast**

- Cocoa
- Dried fruit or juice made from fruit crystals
- Cold granola cereal with reconstituted powdered milk

**Quick Lunch**

- Fruit drink
- Cheese and crackers
- Canned meat spread
- Dried fruit, nuts

**Quick Dinner**

- Tuna/macaroni cheese casserole (prepackaged macaroni and cheese mix, canned tuna fish)
- Bread or crackers
- Instant pudding
- Cocoa or milk
- Fresh fruit

**Full Breakfast**

- Cocoa
- Fruit or fruit juice
- Freeze-dried scrambled eggs with cheese, onion, and summer sausage
- Hash browns
- Toasted bread

**Full Lunch**

- Soup
- Bread with peanut butter and jelly
- Fresh fruit, nuts
- Water

**Full Dinner**

- Beef stew with vegetables (use fresh or dehydrated and freeze-dried ingredients)
- Biscuits
- Peach cobbler
- Cocoa or milk

**PURCHASING FOODS**

After you've decided what you want to eat, studied the recipes, and listed how much of each ingredient you'll need to feed your companions and yourself, you are ready to buy provisions. The best place to start is your neighborhood grocery store. There you'll find fresh fruits, vegetables, meats, and plenty of canned, dried, and convenience foods. Food co-ops, particularly those specializing in health foods, often have extensive offerings of nuts, grains, and honey. Ethnic shops can supply the more exotic ingredients for your recipes. Backpacking stores and sporting goods outlets usually stock dehydrated and freeze-dried meals packaged especially for canoe-campers. Their selections can be expensive, but may provide just the item you need.

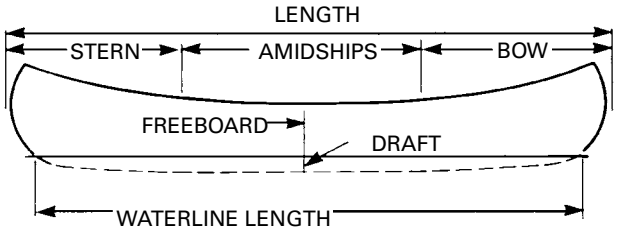
## CANOES AND STROKES

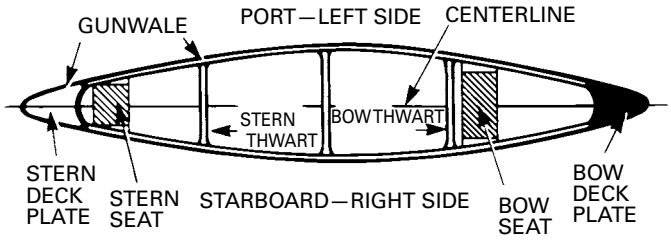
Gone are the days when canoes were made of only a few basic materials and in a few ''all-purpose'' designs. Canoes have changed greatly in recent years as new materials and processes have been introduced. Technological advances have made possible specialized equipment for different types of canoeing as well as for individual paddling styles.

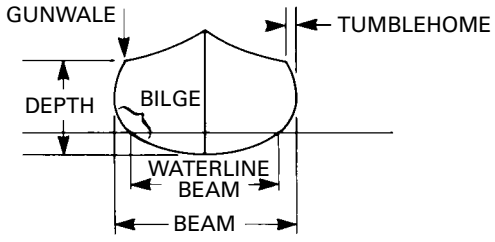
### TYPES OF CANOES

Choosing a canoe today is not easy. While you will want to learn some basics about canoe shapes and the purposes of these variations, begin by reviewing the basic parts of a canoe.

*Parts of a Canoe*



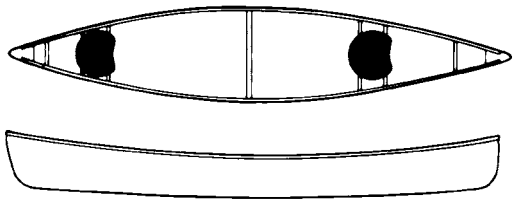

| |
|---|
| **Stern.** Aft or back end |
| **Stern seat.** The rear seat |
| **Thwart.** A cross-brace that runs from gunwale to gunwale; pronounced ''thort'' |
| **Beam.** The widest part of the canoe |
| **Waterline beam.** The widest point when a boat rests in water |
| **Amidships.** The center or middle of the canoe |
| **Skin.** The outer covering |
| **Bow seat.** The front seat |
| **Gunwale.** The upper rails; pronounced ''gunnel'' |
| **Painter.** Lines attached to the bow and stern |
| **Deck plate.** Panels at the bow and stern that attach to the gunwales |
| **Keel.** Reinforcing fin that runs along the bottom on some canoes |
| **Keel line.** The line of the keel no matter whether the canoe has an actual keel |
| **Bow.** The forward or front end |

#### CANOE DESIGNS

Variations in materials and design make possible a wide variety of canoes. Canoe design affects performance. Paddlers can select boats geared to their specialized interests, whether it's pleasure, canoe-camping, racing, or shooting the rapids.

**Materials.** Canoes are made of various materials: wood, aluminum, fiberglass, and synthetics. Wood canoes are expensive, vary widely in weight, and require considerable maintenance. Aluminum canoes are durable, lightweight, inexpensive, and require almost no maintenance. Fiberglass canoes vary considerably in quality, design, weight, and cost, but are strong, require little maintenance, and are easy to repair. Canoes made of synthetic materials vary in weight and tend to be expensive, but are quite durable.

**Length.** Canoes vary in length from 10 to longer than 20 feet. *Length* refers to the total length of the boat from end to end. Basic recreational canoes for two paddlers are generally 15 to 18 feet in length. Canoes over 18 feet provide the load-carrying capacity needed by expeditioners. Other things being equal, a long canoe is faster and has better tracking ability than a short canoe.

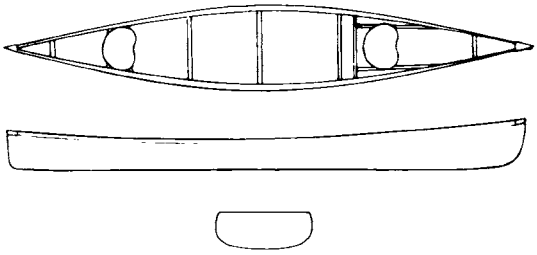


**DOWNRIVER**

LENGTH 16½' TO 18½'

WIDTH 32"

WEIGHT 50 TO 60 LBS.



**TOURING**

LENGTH 17'

WIDTH 33/31"

DEPTH 12½"

**DECKED CANOE SLALOM C-2**

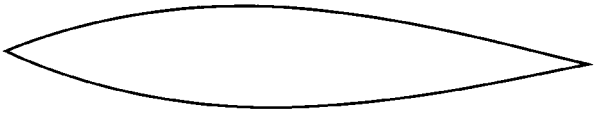
LENGTH 14'8"

WIDTH 2'7"

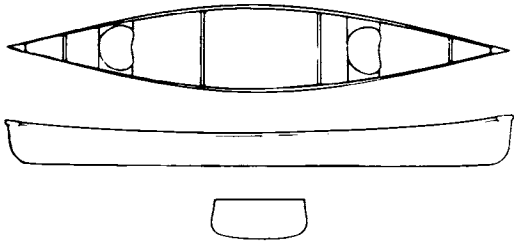
WEIGHT 33 LBS.

**Shape.** Canoes vary widely in shape. Viewed from above, the bow and stern may be sharp or snub-nosed. The canoe may appear narrow or wide amidships. The canoe may be *symmetrical* (the same shape fore and aft) or *asymmetrical* (narrower bow, wider stern). Symmetrical canoes are best for quick maneuvering, while asymmetrical designs give more directional control but are harder to turn.

*Symmetrical*



*Asymmetrical*



**CASUAL RECREATION**

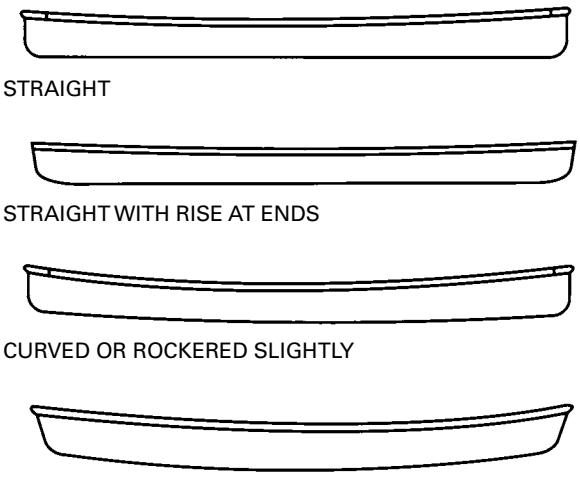
LENGTH 16'–17'

WIDTH 34/33"

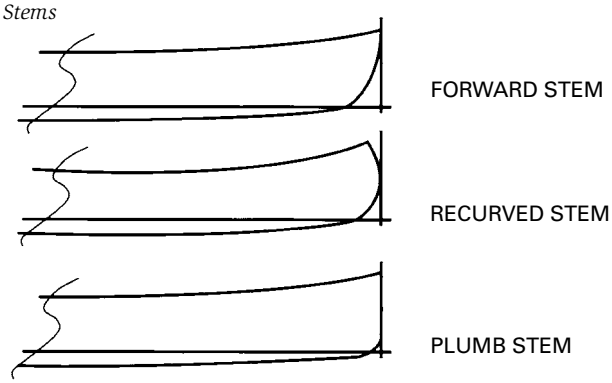
DEPTH 13½"

Viewed from the side, the canoe may have a straight, flat keel line or a *rockered* (curved) keel line. The straighter the keel line, the more difficult the boat is to maneuver, but tracking is easier. A rockered keel line makes turning easier, but tracking harder. The *stem* (shape of the bow or stern along the keel line above the water) may point forward, curve, or be straight.

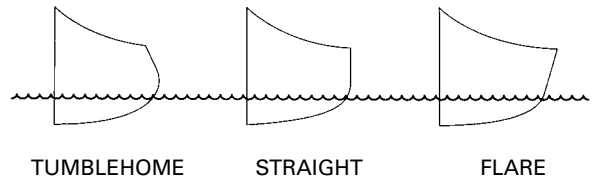
*Canoe Rocker*




*Stems*

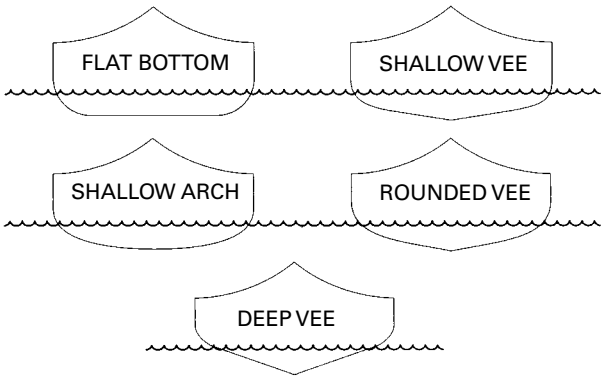



*Canoe Flare and Tumblehome*




Viewed from the end, the shape of the canoe above the waterline may be *tumblehome* (narrower at the top than at the waterline), straight, or flared. Canoes with flared sides have greater stability than canoes with extreme tumblehome, especially when leaned. The hull may be flat, arched, or V-bottomed. Flat-bottomed canoes feel very stable in quiet water; canoes with rounded bottoms are forgiving when the boat is leaned; the ''V'' shape increases the canoe's directional ability, but decreases stability.

*Canoe Vees, Arches, and Flatbottoms*




**Depth.** The *depth* of a canoe is measured at the centerline from the gunwale down. A taller canoe deflects spray and waves and stays drier, but may catch wind. A shallower canoe has less wind resistance but a greater probability of taking on water.

**Volume.** *Volume* indicates how ''full'' a canoe's shape is or how much weight it can carry. How much a canoe holds depends on its length, depth at center, width, and fullness at the waterline. Closed canoes have low volume. Medium-volume canoes can carry more gear and are suited for general river running. High-volume canoes carry more than 200 pounds and are used for extended travel. An open canoe suitable for a variety of uses should hold between 650 and 1,000 pounds of paddlers and gear. There should be at least 6 inches of the canoe's side showing between the level of the water and the upper edge of the canoe when it is fully loaded. This is known as the freeboard. Less than 6 inches of *freeboard* is unsafe. Surprisingly, a larger-volume canoe will handle more easily than a shorter, small-capacity canoe.

**Stability and Maneuverability.** Canoes vary considerably in stability and maneuverability. Each element described above, singly and in combination with other elements, affects the performance characteristics of a canoe. In addition, a particular design may perform differently in one situation than in another. For example, a flat-bottomed canoe is stable in quiet waters, but unstable in white water.

**Type.** Tandem canoes are designed for two-person paddling. They may be open or closed *(decked)*. Canoes are designed for a variety of purposes. Types of tandem canoes include: casual recreation, day tripper/weekender, touring, wilderness tripping, downriver, competition cruising, whitewater play, whitewater slalom, or Olympic flatwater.

### SELECTION

It is difficult to provide exact guidelines for choosing a canoe. Every variation in material or design changes the characteristics of the canoe. In general, you should avoid the extremes in design, boats that are too short or too long, and those that weigh too much—more than 80 pounds. Don't choose the lowest-price canoe, as it is unlikely to meet your needs. The canoe design and material that meet your most frequent and most likely use is the right choice.

Canoes with keels are great on lakes or slow-moving rivers because the keel limits sideways drift. The bow and the stern should be low to offer less surface to the wind. A round bottom will increase speed but also will make the canoe less stable.

For whitewater or river canoes, the bow and stern should have a higher profile and the freeboard should be higher. These features keep water out of the canoe as you go through standing waves. The bottom should be flat or have a shallow arch with no keel. A round bottom and keel will interfere with the ability to move sideways. A canoe made of synthetics or plastic will slide or slip over rocks more easily than an aluminum canoe. Aluminum will tend to bend and catch on rocks, causing loss of control and swamping.

## CANOE STROKES

Paddling a canoe can be hard work, especially if one does not know the proper strokes. The real joy of canoeing comes when you can glide quietly across the water with the canoe responding to every dip of the paddle. To be able to comfortably maintain a pace over long distances, you will need to master the general principles of paddling as well as the basic strokes.

### PADDLING POSITION

The first essential is to assume a good position for paddling. For the most efficient paddling, sit solidly on the seat with your knees braced against the gunwales. Think of yourself as a part of the canoe, lodged securely to allow the reactions of the paddle against the water to flow through you to the canoe to move forward, backward, or sideways.

### PRINCIPLES OF PADDLING

The canoe is controlled primarily by paddle strokes. Paddling strokes can be classified into three categories:

1. *Power strokes* that provide primarily forward or reverse momentum.
2. *Turning or corrective strokes* used to alter the course of the canoe.
3. *Braces,* which have the primary function of stabilizing the canoe, although they also can be used to help the boat turn.

These strokes are accomplished from either the bow or the stern, or both. They often are combined in a sequence for smooth, consistent movement. The basic canoeing strokes are described in detail in the *Canoeing* merit badge pamphlet.

Strokes executed on the selected paddling side are called *onside* strokes. Strokes executed on the other side of the canoe are called *cross* or *offside* strokes. The original grip on the paddle is maintained when executing cross strokes.

Strokes can be static or dynamic. In a *static* stroke, the blade of the paddle is simply positioned and held. The oncoming current strikes the stationary blade and the deflection of the current causes the canoe to move. For a static stroke to be effective, the canoe must be moving faster than the current. A *dynamic* stroke is one in which the blade of the paddle is moved actively against the current. When a dynamic stroke is used, the canoe can be moving either slower or faster than the current.

A canoe stroke has two phases. All strokes begin from a ''ready'' position called the *catch* or *plant.* In the first or *propulsion* phase of the stroke, the force of the paddle against the water results in movement of the craft. In the *recovery* phase, the blade of the paddle is returned to the ''catch'' position. Recoveries can be *feathered* above the water or *sliced* under the water. In the final part of the recovery, the paddle is repositioned for the next stroke. Paddlers should practice until they can smoothly blend the phases of a stroke.

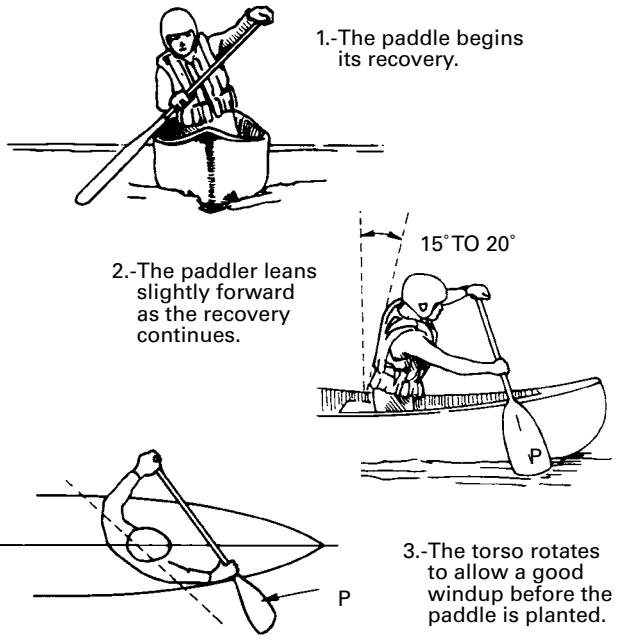
The blade of the paddle has two sides that can be used in executing various strokes: the powerface and the backface. The *powerface* is the side that presses against the water during a forward stroke. The *backface* refers to the reverse side of the blade, which presses against the water during a backstroke. All cross strokes except the cross low brace use the powerface. Compound strokes require a change from the powerface to the backface (or vice versa) during the propulsion phase of the stroke.

### POWER STROKES

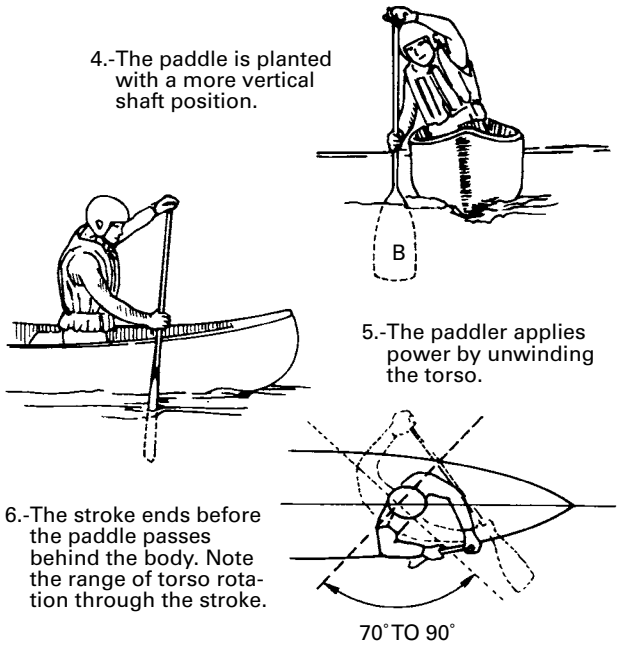
Power strokes give the canoe momentum. They are dynamic strokes that move the canoe either forward or backward. For power strokes, you should use a long, smooth, steady stroke. A short, choppy stroke is less effective and uses excessive energy.

**Forward Power Strokes.** Forward power strokes are used to move the canoe forward or to turn without halting forward progress. The *forward stroke* is the most important for moving the canoe forward. The purpose of this stroke is to pull the canoe forward by pulling the water past the canoe. The power should come from rotation of the torso rather than by use of the arms only. The *cross forward stroke* is made from the opposite side of the canoe, again using the power-face. It is used primarily by a tandem bow paddler.

**Recovery phase illustrations 1–3**

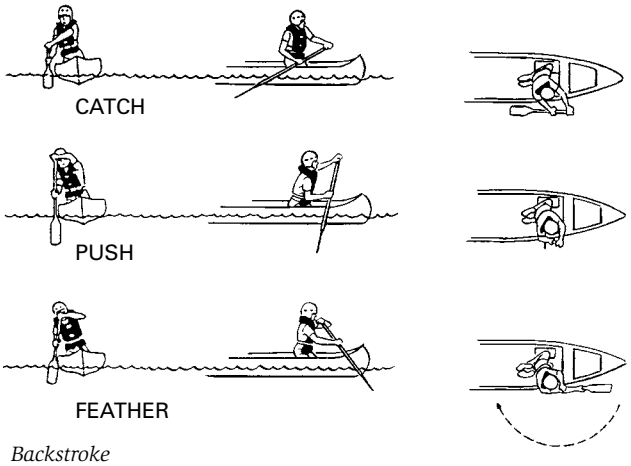



**Force application illustrations 4–6**




*Forward Stroke Illustrating Body Rotation*

**Reverse Power Strokes.** Reverse power strokes are used to stop the forward motion of the canoe or to move the canoe backward, not to correct its course. Reverse power strokes include the *backstroke* and the *cross backstroke.* Each can be accomplished by the bow paddler or the stern paddler.

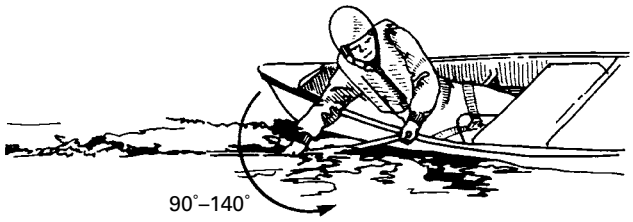



*Backstroke*

## TURNING OR CORRECTING STROKES

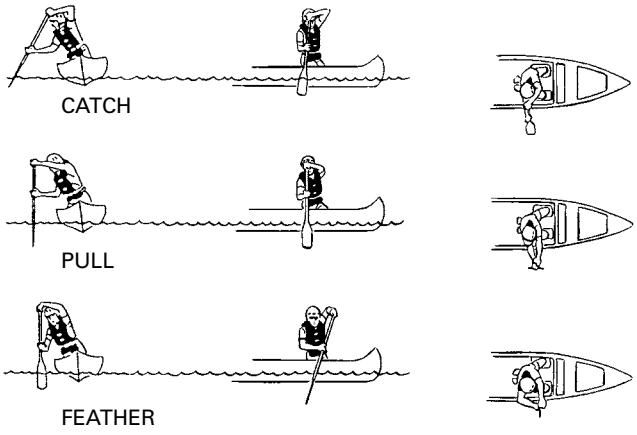
Besides moving in a straight line forward or backward, canoeists must be able to turn the canoe to port (left) or starboard (right). Turning strokes move the portion of the canoe where the paddler is. Turns are accomplished using *onside* or *offside* strokes. In addition, paddlers frequently must make slight corrections to keep the canoe on course.

**Onside Strokes.** Onside strokes cause movement toward the ''on'' or selected paddling side of the paddler. For example, these strokes move the canoe toward starboard (right), if the canoeist's selected paddling side is starboard. Two basic onside strokes are the draw and the reverse sweep. The *draw* moves the canoe sideways toward the paddle. The *reverse sweep* is used to pivot the canoe toward the paddle.



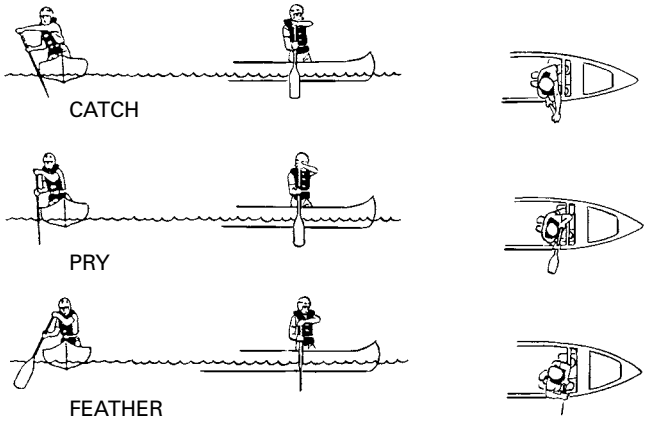

*Reverse Sweeping Low Brace*

Both hands remain low as the paddle sweeps from the stern, past a point directly opposite the hip. The brace is usually converted quickly to a forward stroke somewhere beyond 90° from the stern.




*Drawstroke*

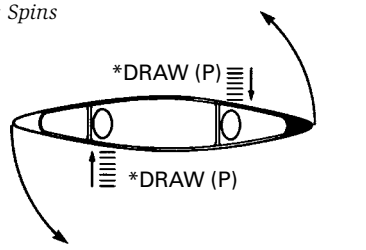
**Offside Strokes.** Offside strokes cause movement away from the paddler's selected paddling side. Two basic offside strokes are the forward sweep and the pry stroke. The forward sweep is used to spin or pivot the canoe to the offside paddler. The pry stroke forcefully moves the canoe sideways away from the paddle side.

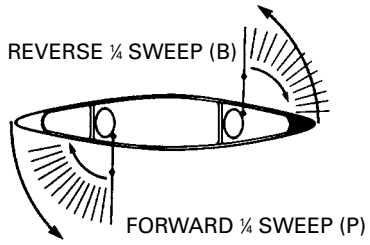


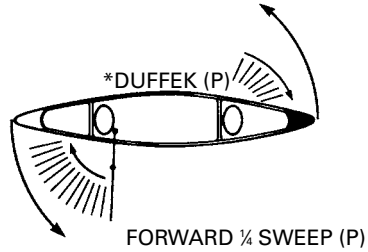

*Pry*

*Maneuvers: Spins*

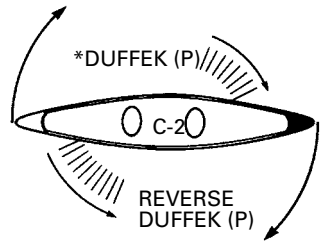
**ONSIDE**

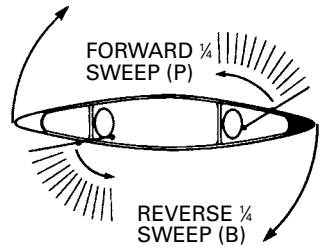


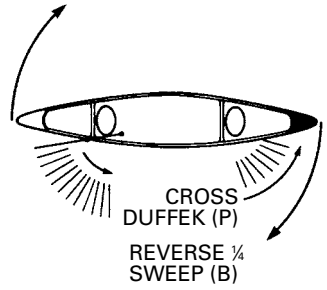




**OFFSIDE**



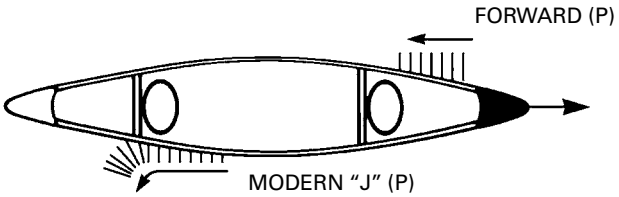




*Note: Underwater recovery; turn control thumb out.

**Correcting Strokes.** Correcting strokes are turning strokes used to maintain a straight course. They may be used when the canoe is moving either forward or backward. They are done from the ''following'' or ''eddy-resistance'' end of the canoe. (*Eddy resistance* is the vacuum created when the canoe displaces water or wind at its widest point.)

The most basic correcting stroke is the *J stroke,* or *hook*. The J stroke helps keep the canoe on a straight course. It is a combination of strokes. For the solo paddler, the J stroke combines a slight diagonal draw, followed by a forward stroke, and ending with a slight pry off the gunwale with the thumb of the grip hand pointing down toward the water. In tandem canoeing, the stroke is made from the stern position and may omit the slight draw at the beginning of the stroke.



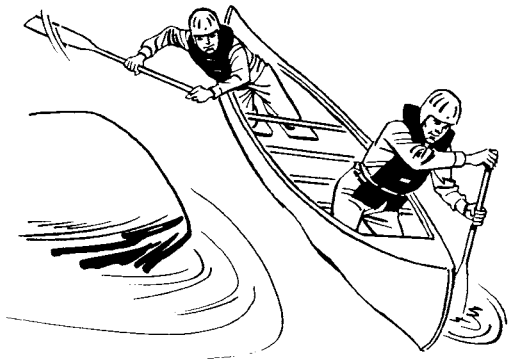

Each part of the J stroke has a purpose. The draw corrects the canoe's side-slipping. The forward stroke propels the canoe forward. The slight pry turns the canoe back on a straight course. There are many variations of the basic J stroke.

Paddlers also can use ruddering to maintain a straight course. *Ruddering* is a static stroke that requires the boat to be moving faster than the current to be effective. It can be accomplished using either the powerface or the backface of the paddle. Ruddering involves holding the face of the paddle against the current in a way that keeps the canoe on course.

## BRACING STROKES

*Bracing strokes* are used to keep the canoe upright and stable. Various faces of the blade are used to accomplish these strokes. Bracing strokes include the high brace (powerface), low brace (backface), cross high brace (powerface), and cross low brace (backface). Braces are ''high'' or ''low'' depending on the position of the paddle shaft.

HIGH BRACE
The paddle remains in the water with a dynamic high brace draw, which stabilizes the boat.



LOW BRACE
Both hands remain low and outside the boat for an effective low brace. The control hand may be lower as long as the hip snap is initiated with the blade near the water surface.

The *high brace* is the most common canoe brace. The blade is inserted into the water somewhat vertically, with the knuckles of both hands up. A *low brace* is used when the canoe suddenly tips toward the paddler's side. For a low brace, both hands remain low and outside the canoe. The paddle is nearly horizontal, with the knuckles and thumbs of both hands facing down. The force of the brace is applied to the backface of the paddle. Most braces may be accomplished from any paddling position.

## MANEUVERS

The basic canoeing strokes are used to accomplish a variety of maneuvers: spins, forward straight, reverse straight, sideslips or shifts, eddy turns and peelouts, bracing, and ferries. The choice of strokes often depends upon the paddler's skill and the canoeing conditions. Canoeing maneuvers are classified as ''onside'' and ''offside'' rather than ''left'' or ''right'' maneuvers. This makes it easier to communicate what needs to be done regardless of the paddling side selected.

**Spins.** *Spins* turn the canoe with little forward or stern movement. They involve turning on a point, called the pivot point. The *pivot point* is generally amidships of the craft. For an onside spin, tandem paddlers can both use the drawstroke, or the bow paddler can use a reverse quarter sweep while the stern paddler uses a forward quarter sweep. An offside spin can be accomplished by using a forward quarter sweep (bow) and reverse quarter sweep (stern). Solo canoeists accomplish onside spins by using a reverse half sweep. Solo paddlers can make offside spins using the forward half sweep.

**Forward Straight.** The tandem canoe moves straight forward when the bow paddler uses a forward stroke while the stern paddler uses a J stroke. Solo canoeists move forward by using the *C stroke.* The C is a sequence of strokes: a draw to the bow, a forward stroke, and a J stroke. Alternatively, the solo paddler alternates a cross forward stroke with a J stroke to maintain a straight path.

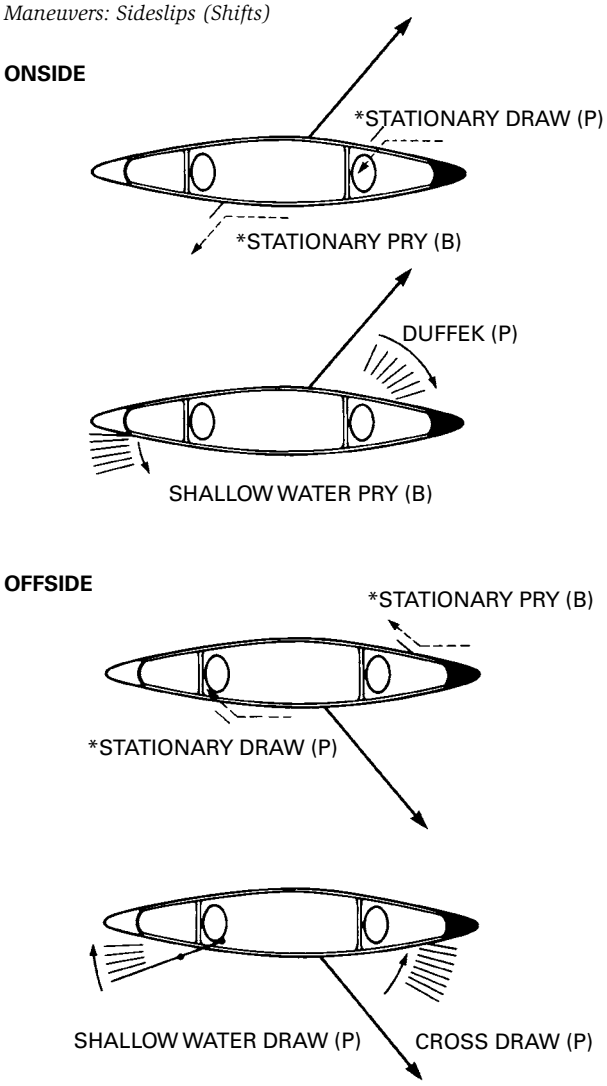
"C" STROKE (P)

**Reverse Straight.** To move the tandem canoe backward, the stern paddler uses the backstroke while the bow paddler uses the reverse J stroke. Solo paddlers can use several strokes to move backward: the reverse J stroke, the cross backstroke, or the backstroke.

**Sideslips (Shifts).** *Sideslips* or shifts are used to avoid rocks when paddling downstream. They shift the boat sideways while keeping the boat in alignment with the current. These strokes may be executed in either a static or dynamic manner. Sideslips are used most commonly in open canoes. (Decked boat paddlers generally turn, paddle forward, and then realign with the current to avoid an obstacle.)

If the sideslip cannot be accomplished well ahead of oncoming obstacles, use the decked boater's strategy. Tandem paddlers can accomplish an onside sideslip using the stationary draw (bow) and stationary pry (stern). Two paddlers can accomplish an offside sideslip by these two methods: (1) stationary pry (bow) and stationary draw (stern), or (2) cross draw (bow) and shallow water draw (stern).

*Maneuvers: Sideslips (Shifts)*



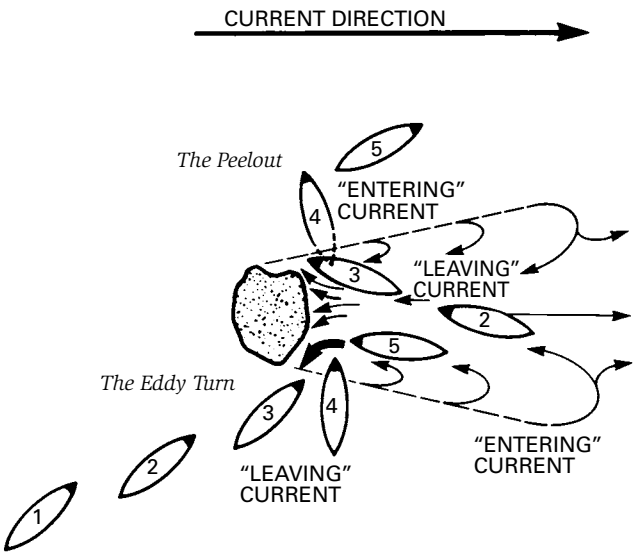

*Note: These static strokes require that the craft be moving faster than the current.

**Bracing.** Braces stabilize the canoe and prevent it from tipping over. In tandem paddling, teamwork and timing are essential when using braces. One paddler uses a low brace, while the other uses a dynamic high brace draw to counter tipping.

**U-Turns.** When paddlers want to change direction in the river, U-turns may be accomplished using the eddy turn or the peelout. The *eddy turn* is a technique for leaving the fast current by pivoting the canoe to enter the relative calm of an eddy. When the canoeist is ready to leave the resting place in the eddy, the *peelout* is used to reenter the current. The canoe must enter or exit at an angle to the eddy line so the currents will turn the boat around.

The object is to enter or exit the eddy close to the obstacle creating the eddy, but avoid striking it. The paddlers must paddle forward to obtain the momentum needed to cross the eddy line. Just before the canoe crosses the eddy line, the paddler begins to spin (or ''torque'') the canoe. Just as the bow of the boat slides over the eddy line, the paddlers must lean into the U-turn. The lean reduces the water's tug or ''catch'' on the edge of the canoe, preventing it from tipping to the outside of the turn.

**Ferries.** *Ferries* are a frequently used canoeing maneuver. They move the canoe from one side of the river to the other. Ferries can only be accomplished when the canoe is moving slower than the current and at an angle to it. The stronger the current and the more angled the canoe, the quicker it will move. There are two basic types of ferries: a back (downstream) ferry and a forward (upstream) ferry. In a *back ferry,* the paddlers are facing downstream and back paddling to slow the canoe's descent. In *a forward ferry,* the paddlers are facing upstream and paddling forward to slow the canoe's descent.

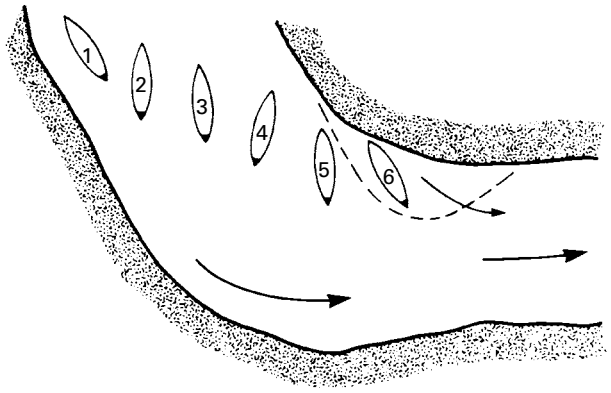



U-TURNS

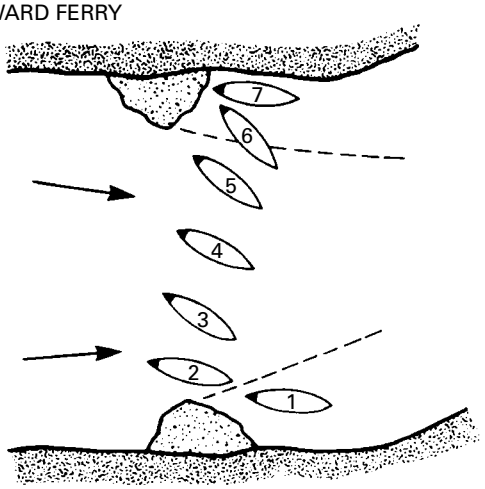
- Develop entering momentum at position 2.
- Begin the initial torque at position 3.
- Must lean downstream to the entering current as soon as the "entering end" of the boat crosses the eddy line.
- A turning brace (i.e., duffek) is placed in the entering current. This brace should initially broach the entering current. If entering the eddy high, this means the power-face is almost at a right angle to the boat since the entering current is flowing out (see dark arrow above).



BACK FERRY



FORWARD FERRY



To accomplish a ferry, you must first choose a destination across the river. Then, you must change the boat's alignment with the current to an angle against it. The proper angle will depend on the current speed, the distance between the boat and its destination, and the speed with which the paddlers want to reach the destination. The smaller the angle against the current, the slower the canoe will move. To maintain the canoe's angle, execute turning strokes near the downstream end. To prevent sliding downstream, use power strokes in the upstream end of the canoe. The wider the angle against the current, the faster the movement will be. You can slow the canoe's descent by paddling forward or backward. The upstream end of the canoe will enter its destination first.

### CARRYING A CANOE

A canoe can be carried, gunwales down, by one or two persons. The technique used will depend on the distance the canoe must be carried.

For short distances, one person can move a canoe by balancing it on the front of the thighs. Two people can pick up a canoe from each end and move it. The canoe also can be carried short distances with one person on each side, as long as each person is the same distance from opposing ends of the canoe.

For longer portages, the canoe must be carried overhead. If you are going to carry a canoe more than a short distance, a carrying yoke is recommended. Both wooden and padded portaging yokes are available commercially. Some canoeists use a keyhole life jacket or their canoe paddles as portaging yokes.

With experience and experimentation, the two-person overhead carry can be executed with one person at either end of the canoe. It may be easier to have your partner hold up one end of an overturned canoe while you step under the canoe. Then your partner lowers the canoe onto your shoulders and steadies it. One person can rest the stern thwart on his shoulders, using the paddles as a yoke. The other person can carry the bow resting on one shoulder so as to maintain a view of what is ahead. At the end of the carry, simply reverse the sequence.

## UNDER WAY

With planning and preparation done, you are ready to get your canoe-camping trip under way. A few basic precautions will help make your voyage both pleasant and safe.

### LOADING AND UNLOADING

When loaded, a canoe should lie evenly in the water with the bow slightly higher than the stern. There should be at least 6 inches of *freeboard*—the distance between the top of the lowest gunwale and the water. This is easiest to achieve and the canoe is less likely to be damaged if the canoe is in the water when being loaded.

In loading the canoe, your goals are to keep your gear dry and to distribute its weight evenly. To keep your gear dry, use a waterproof liner and raise packs slightly off the floor. You can do this by laying several poles on the bottom of the canoe. Position heavier items first. To preserve your low center of gravity, concentrate the weight toward the center of the canoe, with as little showing above the gunwale line as possible.

Tie or strap your gear to the canoe, particularly if your route includes rapids. A shock-cord method is an effective way to secure packs. Run at least two rubber ropes across each pack. Secure the ropes to cords attached to anchor hooks or water-drain holes along the gunwales of the canoe. Where heavy rapids will be encountered, add a length of nylon parachute cord to connect all your packs together. To make gear easy to retrieve in case of an overturn, tie the cords with a quick release knot. All gear should be carefully secured to avoid a paddler's entanglement with ropes, rope systems, and gear.

Because of potential damage to both canoe and land, many youth camps have initiated a *''wet-foot'' policy.* This means that canoes must be loaded, unloaded, picked up, and set down in a minimum of 12 inches of water. This eliminates most damage to canoes. It also reduces damage to the land.

### NAVIGATION

*Navigation* is the art of knowing where you are in terms of where you want to go. Navigation involves the use of map and compass skills. It also involves learning to use the natural elements in your surroundings to orient yourself.

Good maps and a compass are essential to keep your voyage on course. Your maps and compass are important tools for locating obstacles, deciding when and where to get off the river to scout or portage, and locating campsites and fresh water. Maps provide reference points that are useful in navigation. An occasional check of the compass will keep you oriented as you attain each reference point. You may need to polish your orienteering skills before your first canoe-camping trip.

All maps should be up to date. A map that shows some of the difficulties along the way is useful in route planning. It also makes it possible to determine a reasonable day's distance and create a realistic trip schedule. Although maps may be quite detailed, recent changes may have occurred. Therefore, it is important to obtain additional information about the waterway from an area contact and mark any changes or additions on the maps used for the trip.

Your maps and compass are important in many navigational situations. On multi-channeled rivers, you must choose the proper channel. Finding your way down a sizable lake to locate a stream outlet or other point presents a navigational challenge. Maps and compass also can prevent problems when portaging or making side backpack trips.

As you paddle, keep your map spread out before you on your packs so you can count off reference points. Make an occasional check of the compass to keep you oriented. Although your paddling may not take you on a straight course, attentiveness and basic navigation skills will usually ensure success.

As you travel, make a mental map of where you have been. Look over your shoulder frequently and make a mental snapshot of the terrain so that if you come back this way, you will remember the landscape and its landmarks. Remember that the size, color, shape, and importance of an object change with distance. The large tree you just passed becomes only another tree on the shore when you look from half a mile away.

Learn to use other natural objects to determine your orientation. At night, as the earth moves, the planets appear to move from west to east and the Big Dipper points to the North Star. During the day, the prevailing winds move from west to east.

**THE CANOE ROUTE**

Following your route is usually simple when you are traveling downriver. The more important problem is locating obstacles, portaging points, campsites, and fresh water. On less traveled routes, taking time to carefully scout any potential problems aids in making wise route decisions.

**DISTANCE TRAVELED**

The number of miles you cover each day on a canoe trip can vary greatly. The distance traveled will depend to some extent on the type of trip planned and the proficiency of the group. The conditions of the waterway, its gradients, and obstacles such as falls, rapids, or dams may increase or decrease your speed. Time spent scouting or portaging also affects how far you travel. On a leisurely trip with few portages and several layovers, you may average no more than 7 to 10 miles per day. An experienced team may descend a reasonably challenging river averaging 15 to 30 miles a day. Some big rivers with considerable gradient and few obstacles may permit 30 to 50 miles in a long day.

**DAY'S SCHEDULE**

The day's schedule depends on the purpose of the trip, the activities planned, and the preferences of the group. If the purpose of the trip is primarily paddling, you may spend most of the day on the water. If you are combining fishing or backpacking with canoeing, you may have longer, more frequent layovers.

Some groups prefer to get up early and get under way. Others like to cook a hot breakfast and take their time in the morning. However, the best hours for travel are early in the day. As the sun gets higher, the winds tend to rise. Sometimes it may be necessary to start later to give fog or mist time to burn off.

Allow an hour and a half to two hours for morning routines. The cooks should rise first and start breakfast. When breakfast preparations are under way, the cooks rouse the others. While the cooks tend breakfast, others wash up and assemble and pack their personal gear. They may even have time for a morning dip. The cooks can wash as their breakfast preparations allow.

After breakfast, cooks pack their gear while the kitchen equipment is cleaned. Others secure supplies and group gear. Pack tents and flies last. This gives them a chance to dry from the night dew. Move loads for the canoes to a loading area as they are readied. As each canoe is loaded, it can be paddled out from the landing.

Take brief rest breaks every hour. Simply pick the lee of a point or island in adverse wind, or let the canoe drift with the wind or current and rest for a few minutes. Frequent rest breaks keep paddlers from tiring later in the day.

You may choose to lunch on or off the water. You may nibble while you paddle as your hunger dictates. For a more leisurely meal, you may want to get off the water, cook a simple hot meal, eat, and rest a while. If possible, lunch stops are best taken when you must leave the river to scout or portage. This avoids unloading gear unnecessarily and saves time.

Planning ahead makes the lunch break go smoothly. Supplies should be grouped so that only the equipment needed and a single food container need be opened. This saves unloading everything when stopping for lunch at a scouting or portage point is not possible.

Most canoeists stop paddling about midafternoon to avoid rising winds. Stopping early allows more time for setting up camp and preparing the evening meal. This is an important consideration if you don't like cleaning up in the dark. In the summer when waterways are crowded, you may have to stop early to get a good campsite. If you are canoeing in a managed area, you will have to head for a designated campsite. In wilderness areas, you must look for a suitable location.

On a long trip, plan some days that are less strenuous so you'll have more strength on the following days. You can do this by simply varying the number of hours you spend on the water each day. Or you may want to build a rest day or two into your schedule. This provides a time ''cushion'' that can be used on a windy or rainy day. If you are behind schedule, you can use this day to make up for lost time.

## PORTAGING

*Portage* is a French word referring to a carrying place. No matter where you canoe, you will encounter impassable rapids, waterfalls, or other obstacles that make it necessary to carry your canoe and equipment overland. After many hours afloat in a cramped canoe, a portage can be a welcome change of pace. Portage trails give you a chance to stretch your legs, exercise your muscles, and regain your perspective.

Being organized and knowing how to negotiate a portage can keep it from becoming an ordeal. If you know your route includes many portages, pack accordingly, keeping weight to a minimum. Pack freeze-dried and lightweight foods. Take fewer, but larger, packs. Take fewer changes of clothing. Select lightweight canoes, tents, and bedding. Choose comfortable portaging yokes. Consider the number of trips that will be necessary to portage everything from one point to another. In trip planning, allow a minimum of an hour for each portage.

At the start of a portage trail, take time to plan. First, look for a walkable path where it will be easiest to carry the canoe on your shoulders. Cut branches only if necessary to make a safe path. Usually, on anything but a far wilderness expedition, someone has been there before you and a well-worn path is obvious. Portages are frequently marked on canoeing trip guides.

Once the path is sure, organize your equipment. Consolidate any loose gear to eliminate having to carry items in your hands. If it's bug season, take time to apply insect repellent. Make sure all team members know the right portage route. Each member should use a whistle for communication. Each member should carry compass and maps, just in case.

Keep safety in mind when portaging. It is potentially very dangerous to overload. Prolonged carrying of heavy weights can lead to lower back problems. Make two trips if necessary, comfortably loaded. Use your legs, not your back, for lifting heavy loads. Be sure your load does not prevent a clear view of the trail. Remember to step over, not on, rocks and logs. Keep your eyes open for snakes and wild animals. Always watch where you are going.

On a long portage, you can carry one pack halfway, then return for a second load. Carry the second load all the way to the end, then go back halfway for the first load. The return walk will serve as a rest. In canoe-camping, this method is referred to as a ''pipe'' or a ''pose.'' This phrase originated with the French who traveled the area in the fur-trade days. They would make a practice of carrying their load to a certain point, rest and have a pipe, and then continue. Lakes were also measured in ''pipes.''

Rest as frequently as needed during the portage. Canoe carriers may prefer to rest the bow of the canoe in a tree crotch for a rest stop. This eliminates getting the canoe up and down from the shoulders again and again.

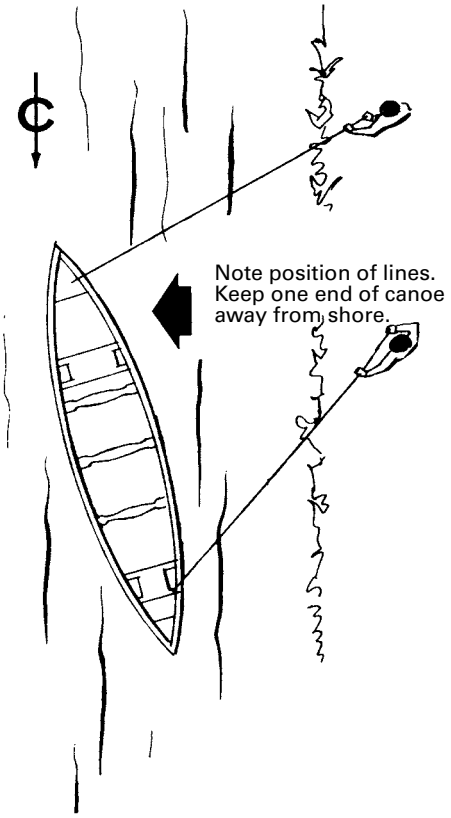
## WADING ("FROGGING")

When the water level is low, wading or ''frogging'' is a refreshing and sometimes easier alternative to portaging. It provides an opportunity to study the way the water flows around and over rocks and other obstacles. There are a few dangers in wading. Always wear protective footwear to prevent cuts and bruises. Be careful not to jam your foot between rocks. In swift water, falling downstream could cause you to be held under water. You might not be able to get up without help. Always wear your PFD.

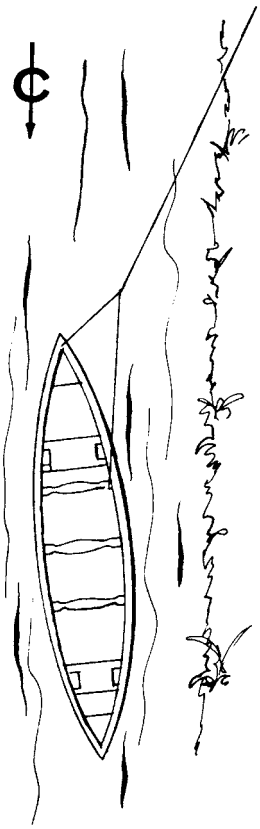
## LINING

When a ledge, a severe drop, or a too-shallow pool makes paddling dangerous or impractical, *lining* may be an alternative to portaging. Lining is most useful when the canoe is heavily loaded. Using sturdy lines attached to the bow and stern, canoeists can alternately guide and restrain the canoe down and around obstacles or through shallow water. This technique, when used for towing the canoe upstream, is called *tracking.*

Lining can be managed from shore, but often requires the canoeists to do some wading. Depending on the situation the canoe may be left loaded or, if necessary, be unloaded.




*Two lines upstream*



*One line upstream*

Line only one canoe at a time, so everyone in the party is available to help. Continue to wear PFDs. To line, use two strong ropes tied securely to the bow and stern. One or more people can help hold the lines. The idea is to nudge the canoe along by pulling on the front rope, or to stand in the water, if this is safe, and push by hand. Keep the canoe close to shore where it can be handled easily. Work it around larger rocks and through chutes by floating or dragging it. If it's necessary to move the boat away from the bank, then quickly pull it back toward the bank as soon as possible.

Good communication and understanding the basic physics of water and current are essential when lining. Where the canoe is able to float freely downstream, position it at a 45-degree angle so that the back end is angled out into the current. This position helps push the canoe along.

Use extreme caution whenever you use ropes, especially in fast water. Be sure to stay clear of the lines. Do not allow the rope to become tangled around your legs or body. Do not wrap the rope around your hand. Use gloves to prevent rope burn.

Do not allow the canoe to get broadside during any of the lining process. Once broadside, the canoe can easily get pinned against rocks. Should the canoe get broadside to the current, catastrophe can be averted by immediately letting go of the stern line so that the canoe swings full around as the person at the bow continues to hang on tightly.

The canoe is less likely to broadside in the current if a bridle is used. One way to tie a bridle is to double back one end of your line about 6 feet and knot both ends together in the center. Dropping the long end, pass the rope under the bow and tie the two ends onto the leading edge of the bow seat. Be sure to position the knot directly on the keel line at dead center. Follow the same procedure with the second line at the stern, securing the line to the stern seat.

If it is safe, one or more people can walk beside the canoe, helping to lift and pull it over rocks. Use caution whenever walking in rivers. If your foot should be caught, even in shallow swift water, you can be quickly pulled down and held under the water.

Lining should not be done where the shoreline is inaccessible or where paddlers must wade into water up to their waists or higher. Portaging, although more work, is considerably safer.

### POLING (SNUBBING)

*Poling,* or *snubbing* as it's called when you use the pole for going downstream, is another alternative to portaging. You can use poling to ascend streams with strong currents and shallow, moderate rapids; or you can carefully pick your way downstream. Rivers with gravel-bottom shallows are ideal for poling.

Although saplings have traditionally been used, today the pole is usually a strong, lightweight, aluminum pole about 12 feet long. A dull, pointed metal shoe can be attached to each end of the pole to keep it from sliding and slipping on the rocks.

Poling is usually done by the stern paddler. The poler assumes a standing position in the canoe, forward of the center thwart when descending a stream, and behind it when ascending. The important thing to remember is to put weight in the downstream end. From this position you will be able to see into the water to watch for underwater logs, rocks, and other hazards.

Polers use three poling methods—the jab, climbing-the-pole, and the change-over. For jabbing, simply jab the pole into the water, then pick it up and repeat the process. To use the climbing-the-pole technique, grab the pole in its midsection with the right hand 18 to 24 inches above the left hand. Jab the shoe end of the pole into the water at right angles to the canoe, no more than 3 or 4 inches from the gunwale. Thrust the pole lightly but firmly backward, shoving the canoe forward. Continuing your thrust, climb the pole by placing one hand above the other and then repeating the process. When you reach the top of the pole, give a final firm thrust. Repeat the process to keep the canoe moving forward.

When using change-over poling, jab the end of the pole into the water just behind your body. Then, climb the pole, hand over hand, the same as for the climb-the-pole technique. Continue this process until your hands are about 4 feet from the top end of the pole. Then, flip the pole out of the water and jab its top end into the water on the opposite side of the canoe.

Poling is a skill that requires coordination and considerable practice. Practice in very slow shallows until you get the feel of it.

### TAKING ON WATER

Canoes take on water for various reasons. A little water may drip off the paddle tip. Water may be brought in when you launch. When it rains, water falls in the canoe, too. If you paddle in choppy water or run rapids, you are likely to take on water. This is not a serious problem as long as you are able to sponge or bail it out faster than it gets in.

Water in the bottom of your canoe will affect your paddling as the water shifts and runs inside the canoe. The more water you have sloshing around, the more difficult it is to keep your trim and balance. Take on enough water and the canoe will no longer respond to the paddle, and down you will go.

### SWAMPING AND CAPSIZING

A canoe can be swamped or capsized by a canoeist who moves carelessly, by taking on more water than can be bailed out, by being struck by a wave, by striking an obstacle, or by going over a ledge into a souse hole broadside. *Swamping* simply means that the canoe fills with water. *Capsizing* means the canoe rolls over upside down. A canoe is most vulnerable to capsizing when the paddlers are standing.

Overboard maneuvers and capsize procedures are described in the *Canoeing* merit badge pamphlet. You may have practiced capsizing and emptying your canoe when you received your initial canoeing instruction. Take time to review these procedures before you need them.

## HAZARDS

To avoid accidents, you must be able to recognize the hazards associated with canoe-camping. You can do much to prevent accidents by simply avoiding hazards whenever possible. It is especially important to avoid hazards that are beyond your capabilities. As your canoeing abilities develop, you will learn how to deal safely with hazards of weather, water, and campsites.

### WEATHER HAZARDS

Every canoe-camper should know how to deal with hazards presented by weather. These include sun, temperature extremes, wind, and storms.

### SUN

Overexposure to the sun can be very serious. The glare off the water on a river or lake can cause a worse sunburn than the same sun in your own backyard. Remember that an overcast sky may filter out bright light, but it does not filter out all of the rays that tan or burn. You can avoid sunburn by wearing a broad-brimmed hat and using plenty of sunscreen. Wear sunglasses to reduce the effects of glare from the water.

**TEMPERATURE EXTREMES**

Our bodies have an internal heat-regulating system that helps us adjust to changing temperatures, with more or less comfort. We can enhance this capacity by wearing more or less clothing or by altering our environment to increase or decrease the temperature. Without artificial means of temperature control, we do not tolerate a very wide range of temperatures. Our ideal comfort zone is in the mid-80s. In only a short time, extreme temperature—either too hot or too cold—can create danger.

**High Temperatures.** In warm weather, raised body temperature can make it difficult to maintain the body's normal core temperature of 98.6 degrees. This may occur when you are exerting yourself and the outside temperature is high. The problem is worse when high humidity makes it difficult for your body to cool itself by sweating. When your sweat does not evaporate, no cooling occurs. You feel tired, maybe a bit faint and dizzy, and become pale. These are early signs of *heat exhaustion* and should be heeded before the situation becomes more serious.

As the body's core temperature rises, you become increasingly unable to release excess heat. A rapid and weak pulse and rapid breathing signal growing distress. The skin becomes red, dry, and hot. You may experience dizziness, headache, or abdominal pain. As the situation worsens, there may be delirium, muscular twitching or convulsions, and unconsciousness. *Heatstroke* or sunstroke has occurred. Unless the overheating is corrected, the circulatory system can collapse. A person who starts developing a gray pallor will die without prompt hospitalization.

To avoid life-threatening *hyperthermia,* every member of the group should take precautions and watch for early signs of overheating. Wear a hat to reflect the sun's radiation. A cotton shirt and shorts will help cool the body by evaporation. Remember that slower movements generate less heat and use less energy. In warm weather, you can do much to avoid hyperthermia by simply taking your time. If you or any members of your team show signs of being affected by heat, you can do several things to cool off. Have a drink of water or juice mixture. Make sure your fluid intake is high. Remove your socks and shoes and go wading. Bathe your hands, face, and neck with cool water. Put on a hat to shade your head. If there is a breeze, wet your shirt and let the wind provide natural evaporative cooling. With a breeze, a loose-fitting shirt is cooler than no shirt.

**Low Temperatures.** Canoeing early or late in the season exposes paddlers to low temperatures. Even as temperatures rise, wind can make the air seem cooler than the temperature suggests. This effect is described as the *wind chill factor.* The greater the wind speed, the cooler the air seems. A temperature of 54 degrees with a 25-mile-per-hour wind can be deadly if you aren't wearing enough clothing or are in poor condition. In addition, if the sun goes behind a cloud or behind a mountain in the late afternoon, the heating loss to the body is equal to a 6˚ to 8˚ Fahrenheit change in temperature.

People vary in their perceptions of cold. These perceptions are affected by your fat reserves, your food intake, and your metabolism. A small person will feel cold faster than a large one. A person with little body fat will feel cold faster than someone with more body fat. This is because fat serves both as an insulator and as fuel for the body to convert to heat. Your body will feel warmer if you keep your extremities warm—your head, hands, and feet.

When the body encounters cold temperatures, it automatically works to keep internal organs warm. First, it reduces the flow of blood to the extremities. If the chilling continues and becomes extreme, priority goes to keeping the brain and heart warm at the expense of the extremities—fingers, toes, ears, hands, and feet.

Physical activity is an important response to cold. The person may shiver and probably will become more energetic trying to warm up. This calls on the body to convert its stored fuel supply into heat. The person's breathing rate will quicken and the heart will beat faster as blood is diverted from cold feet, fingers, and ears. In response to all this metabolic activity, much water is lost through the breath. A person can dehydrate in cool temperatures without realizing it.

Prolonged exposure to cold increases the risk of *hypothermia.* Because hypothermia can come on gradually, it is important to recognize its signs. As the person gets colder, the body is doubly stressed. Both the cold and the body's defense against it are a strain. If the person has become very cold (the body core temperature is down to 86 degrees), shivering will stop. The system of nerves to muscles is no longer functioning. This is a serious situation. However, if the person warms slightly, shivering will start again.

You usually can prevent hypothermia by taking proper precautions. Check local daytime and nighttime temperature patterns before your trip. Consider the effect of wind chill on apparent temperature. Take appropriate equipment and clothing for anticipated conditions. Layered clothing insulates in cool weather better than a single garment of the same thickness. Put on your rain suit before you get wet. Because it covers most of your torso, wear your PFD to help keep you warm. Avoid getting too tired. Plan how to deal with emergencies before they happen. Should an unexpected situation arise, stay calm.

## WIND

When planning your canoe-camping schedule, pay attention to the daily pattern of winds. Mornings tend to be calm, making paddling easier. For this reason, most paddlers like to get an early start. In the late afternoon, around 3:30 or 4 P.M., the wind starts picking up, making paddling more difficult. Many paddlers start looking for a campsite around this time. The wind generally drops again around 7 P.M. After the wind dies is a good time for fishing.

Paddling a canoe into the wind is hard work. The stronger the wind, the stronger the paddlers must be. It is best for the casual paddler to paddle into the wind at the beginning of the trip rather than at the end. Then, the return trip, with the wind, is easier. Wind can greatly increase the difficulty of running rapids. Strong and gusty winds can turn a rapid of moderate difficulty into a dangerous one. Take the wind into consideration when deciding whether to run a rapid.

As much as possible, avoid being on a large lake when the wind is strong. Always check lake wind advisories before setting off. If you canoe on large lakes, however, you are eventually likely to meet heavy winds. If you must work your way upwind, ''quarter'' into the waves, keeping the canoe at a 30-degree angle to the waves so that the canoe climbs. Take short, choppy strokes. Alternate strokes to hold the canoe on a steadier course and to help stabilize it. While you may find yourself at a standstill when winds gust, you'll make headway during the lulls between. If you're traveling downwind, paddle only enough to maintain control. Let the wind and the waves carry you. When your stern drops into the following trough, paddle. While you're in turbulent waters, keep your center of gravity low by kneeling. Above all, wear your life jacket! Whether you're going with or against the wind, it's wise to work your way gradually into the lee of an island or point of land.

## PRECIPITATION AND STORMS

On a canoe trip of any length, expect to be rained on at least once. A look at precipitation data available from the National Weather Service will give you an idea what to expect. This data will tell you the average amount of precipitation to expect and the average number of days on which precipitation is likely each month. Weather data also helps you to anticipate the likelihood of thunderstorms. A combination of warmer temperatures and greater precipitation means thunderstorms may occur. Learn to recognize cloud formations that signal approaching storms.

Avoid being on the water during a thunderstorm. Storms often raise big waves that can swamp a canoe. When a storm approaches, get off the water. Haul your canoe onto the beach and secure it so that it will not blow into the lake or river. Move it behind trees or bushes. In heavy winds, secure the canoe with lines. If you must paddle during a rainstorm, be prepared for frequent bailing. Wrap all packs inside a nylon tarpaulin to keep them dry.

While lightning deaths are infrequent, people have been killed on the water, in the water, and standing in the open. You are at greatest risk during a storm if you are on the water. Get off at the first hint of lightning. Head for the trees, away from shore.

If you are caught on a lake in a thunderstorm, make as low a profile as you can and head for land. If you are fishing, stash your fishing rods in the bottom of the boat. And don't even think about swimming during a storm!

On land, you are at greatest risk if you are standing in the open where you are the tallest thing around. Hunker down, reducing your height, keeping your feet close together. Avoid the tallest tree in the vicinity and remember that live trees carry a charge more swiftly than dead ones. Also stay away from trees that have been previous lightning targets. You can identify these by the long scars on their trunks. Don't lie on the ground, as you may become the target of the horizontal streamers that spread over the ground after lightning strikes a tree. Most campers killed by lightning die while lying on their sleeping bags in their tents. While being struck by lightning is a minor risk to campers, knowing what to do and not do reduces that risk.

Camping in rainy weather requires special precautions. Choose a campsite far from the natural targets of lightning. Avoid summits, sharp ridges, shallow caves, lone trees, and open fields where you would be the tallest object. Also avoid camping on floodplains or other areas susceptible to rising water. Secure your tent well in stormy weather. Place dry firewood under your canoe or inside your tent. If you bring firewood inside, be careful not to puncture the tent floor. Use paddles or poles to elevate packs inside the tent. To keep wet packs and tents from mildewing and rotting, dry them thoroughly as soon as possible.

## WATER HAZARDS

Learning to read the water is an important skill for any canoeist, whether you are planning to tackle whitewater or not. The basics of reading the water involve knowledge of lakes, rivers, and obstacles.

## LAKE HAZARDS

Conditions on the surface of a lake can change rapidly from calm and glassy to frothing with whitecaps driven by gusty winds. Unless reports indicate that calm water is nearly certain, it is wise not to cross a lake, leaving the shoreline far behind. You can always make at least a partial circle of the lake, following the contours and keeping the shoreline within easy reach just in case of a squall or sudden burst of wind.

If it does get rough and windy, head for shore and wait it out, or crawl along the shoreline under the protection of the trees and hills that deflect the wind upward. It is always less windy near the shore, even if the wind is coming directly to the shore you are hugging. The wind carries over the tops of nearby trees, cliffs, or hills, leaving a partial vacuum.

If you must head into the wind, quarter or angle slightly off the wind direction either to the right or the left to give your canoe more lift. You will find paddling less tiring and bouncy. Also, you will decrease resistance to the wind and find it easier to maintain your center of gravity if you kneel to paddle.

Paddling with the wind behind you is easier unless you are buffeted from side to side by oncoming high waves. If this happens, you will again find it easier going if you angle your course to one side and then the other, taking the waves on a slight angle. In exceptionally rough water with high waves, the wind and waves can make your canoe broach or turn sideways. If this happens, the canoe will quickly swamp as the waves hit it.

Squalls, thunderstorms, high winds, and lightning are all hazards when you canoe on lakes. Keep an eye on the weather and the clouds. As recommended under ''Precipitation and Storms,'' head for shore when thunderstorms threaten. Don't be lured by the glassy calm before the storm. Use that time to find a safe harbor in the lee of the wind. Bring your canoe well up from the water and tie it to a rock or tree stump. If you are caught on a lake and the wind is driving you to shore, go with it rather than against it. You can always head for your desired destination when the wind dies down.

Cold temperatures are especially hazardous on lakes. Some deeper lakes never get warm enough to cease to be a danger. Most northern lakes are cold, even in August. In water at 80 degrees, a swimmer must exert vigorously to stay warm. In 75-degree water, a person will begin to chill. Lake water that is 70 degrees or colder is particularly dangerous. These temperatures are more likely either early or late in the season.

Obstacles on and under the water can present hazards when you canoe on lakes. Look out for floating debris or submerged or partially submerged trees and large rocks. Floating debris can be present any time, but is a greater problem after heavy rains or spring runoff. Submerged and partially submerged obstacles are more likely near shore and when the water level is lower than normal. Such hazards are especially plentiful on artificial lakes.

## RIVER HAZARDS

Understanding how water flows downhill on its journey to the sea is important for the serious canoeist. The basic characteristics of a river are created by its gradients (fall or downward slopes), water volume, water temperature, and currents. These characteristics determine the speed, size, conditions, and flow of the river.

Obstacles may interrupt the natural flow of the current in almost any river or large stream. These may include rocks, boulders, ledges, stumps, gravel and sandbars, bridge abutments, and sunken or partially sunken logs and trees. Obstructions may occur singly or in combination. Their effect on the water sends you the signals you need to decide the best course of action—to paddle, scout, line, pole, or portage. Refer to the Whitewater Canoeing program feature for more detailed discussions of river reading.

## LAND HAZARDS

Canoe-campers encounter various hazards on portages and at campsites. These can include insects, wild animals, snakes, poisonous plants, falls, burns, cuts, and getting lost.

## INSECTS

In spring and early summer when it's hot, humid, and windless, insects such as black flies, mosquitoes, and sand flies (no-see-ums) can be merciless around camp or on a portage. To avoid attracting biting insects, dress so they can't get to you. Tight-woven fabrics are harder for insects to penetrate. Clothes should be loose fitting, but have tight cuffs. A hood will keep them off the back of your neck and ears. Applying insect repellent to your clothing also will help.

If you are allergic to bee and wasp stings, you could suffer a violent reaction. It may be sufficient to take along appropriate medication, or you may want to consider taking shots to build up your immunity. Check with your family physician to determine the best precautions for you.

## WILD ANIMALS

Always treat wild animals with respect and give them enough space to feel safe. Avoid any animal that acts oddly or seems too friendly; it may be suffering from rabies. Never feed wild animals. Doing so creates a taste for processed food and a danger to future campers.

No matter where you camp, it's a good practice between meals to protect your food from wild animals. Bears, ground squirrels, mice, raccoons, and dogs may devour unprotected provisions. In areas where bears roam, keep all food items away from your tent.

### SNAKES

If you spend much time in the backcountry, you probably will encounter a few snakes. While many snakes are benign, several kinds of poisonous snakes live in North America. These include the rattlesnake, copperhead, cottonmouth or water moccasin, and the coral snake. Before you go canoe-camping, learn how to recognize the poisonous snakes in the area and find out what you should do if bitten by one.

### POISONOUS PLANTS

Touching poison ivy, poison oak, or poison sumac may cause your skin to redden and itch. Blisters may form. Learn to recognize the poisonous plants in the areas where you plan to go canoe-camping. Avoid coming in contact with them by wearing proper clothing and watching where you are going.

### FALLS

Falls may occur when portaging or hiking. When portaging, avoid overloading. Keep a clear view of the trail. Step carefully over, not on, rocks and boulders. If necessary, sit on and then swing your legs over a log or fallen tree. Above all, watch where you are going.

### BURNS

You can get a burn by touching a hot coal, by sloshing hot water on yourself, or by staying in the sun too long. All these can be avoided by planning ahead and keeping your mind on what you are doing. Avoid horseplay near fires and stoves. Always follow precautions to avoid forest or grass fires.

### CUTS

Knives, saws, and axes are the most dangerous tools you will take on a camping trip. Short-handled axes are particularly dangerous, because if you miss or glance off a log, the ax can end up in your foot or leg. Ax injuries are almost always serious. Only those who are experienced ax users should handle one.

### GETTING LOST

When you make camp, look around and orient yourself. Note any landmarks visible from a distance. Before you leave camp, always tell your group leaders where you are going, what you'll be doing, and when you expect to return. Never go out alone. Take at least two team members with you. When you leave camp, take along your basic survival gear—pocketknife, matches in a waterproof case, map, and a compass. For longer hikes, take rain gear, a sweater or jacket, a trail lunch, and a canteen of water. If you become lost, don't panic. Use your orienteering skills to find your way back. If you can't get reoriented, find or build a shelter, make yourself comfortable, and wait for help to come. You can build a fire, blow a whistle, or shout in groups of three to help rescuers find you.

## SAFETY, RESCUE, AND FIRST AID

A primary concern in canoe-camping is safety. Canoeing is a potentially dangerous activity. Camping in the backcountry has its hazards, too. While knowledge and skill help to minimize the dangers, risk cannot be eliminated completely from this activity.

Every paddler must be prepared for the consequences of mistakes that lead to a swamped canoe or an injured person. Tipping a canoe over and having to swim in a river are an integral part of canoeing. Canoe-campers must be prepared to rescue themselves and others if necessary. Scouts also should be prepared to render first aid until an injured group member can be evacuated.

### SAFETY

Whatever the type of adventure planned, take adequate precautions. Observe the following guidelines:

- A responsible adult must supervise all activities afloat and must be experienced and qualified in water safety (BSA Lifeguard, or lifeguard or lifesaver certification by a recognized agency) and in canoeing skills, or use qualified assistants.
- **Wear a personal flotation device (PFD) whenever you are on or near the water.**
- Never canoe alone. Every individual should have a buddy and every canoe should have a ''buddy canoe'' when the craft are on the water.
- Maintain adequate physical fitness for the type of activities planned.
- Know your canoeing ability. Do not participate in an activity that exceeds your skill level. Do not enter a rapid unless you believe you can safely navigate it or swim the entire rapid should you capsize.
- Learn to float and swim well; learn to handle yourself underwater and in moving water.
- Make sure equipment is safe and appropriate for expected conditions.

The American Whitewater Affiliation Safety Code includes the following recommendations:

**AMERICAN WHITEWATER AFFILIATION SAFETY CODE**

The American Whitewater Affiliation (AWA) Safety Code includes 10 recommendations for river safety:

1. Be a competent swimmer
2. Wear a PFD.
3. Keep your canoe under control, always!
4. Be aware of river hazards and avoid them.
5. Boating alone is not recommended; preferred minimum is three craft.
6. Be suitably equipped.
   a. Wear shoes (tennis shoes or special canoeing shoes are best).
   b. Tie your glasses on
   c. Carry knife and waterproof matches (also compass and map).
   d. Don't wear bulky clothing that will waterlog.
   e. Wear a crash helmet where upsets are likely.
   f. Carry an extra paddle and canoe repair tape.
   g. Open canoes should have bow and stern lines (painters) securely attached. Use at least 15 feet of ¼-or ⅜-inch rope. Secure them to the canoe so they are readily available but will not entangle feet and legs in case of a spill.
7. Swim on your back in fast water, keeping your feet and legs downstream and high. Keep watching ahead.
8. When you start to spill, keep the upstream gunwale high.
9. If you do spill, hang on to your canoe and get to the upstream end. (Note: If you are heading into rough rapids and quick rescue is not expected, or if water is numbing cold, then swim for shore or a rock where you can climb out of the water.)
10. When you are with a group:
    a. Organize the group to even out canoeing ability.
    b. Keep the group compact for mutual support.
    c. Don't crowd rapids! Let each canoe complete the run next canoe enters.
    d. Each canoe is responsible for the canoe immediately behind it.

## BSA POLICIES

In planning a canoe-camping trip, review applicable BSA policies. These include the Safe Swim Defense plan, Safety Afloat (which outlines the lifeguard requirements), and conditions regarding the wearing of personal flotation devices. These may be found in the section on Planning.

## GROUP ORGANIZATION

Every member of the team should be assigned specific responsibilities to promote safety. In addition, each participant should critically judge his own qualifications before deciding to participate in the activity.

The team should consist of at least three canoes. No one should paddle alone. Assign one canoe the role of lead craft, another the role of sweep craft (last canoe). The remaining canoes stay between these two. Experienced paddlers should be evenly distributed among the canoes.

The *lead craft* stays ahead of the rest. It should carry at least one experienced paddler with good river-reading skills. The paddlers in this canoe set the pace and keep track of the other canoes. They select the general course to be followed and communicate the route to the others. They scout any rapids where a clear route is not visible. They carry extra equipment and rescue lines.

The *sweep craft* is the last canoe in the group. It should not pass any other craft except in the event of an emergency. The sweep craft is responsible for helping with emergencies. The paddlers in this craft should be experienced in rescue and first aid. The sweep craft carries spare gear, extra paddles, and first-aid equipment. It is responsible for keeping the group together.

The paddlers in the other canoes also have specific responsibilities. They help keep the group compact, yet allow enough space between themselves and other canoes to avoid collisions. Each craft is responsible for keeping the next canoe upstream in sight and stopping if it isn't visible to the canoe behind. Each canoe is responsible for communicating messages upstream and downstream. Paddlers in each canoe must allow a descending boat the right of way. They also are responsible for avoiding crowded drops or eddies when there is not room for another boat. The paddlers in each canoe must judge the difficulty of each rapid and be safety-conscious in their decisions to run the rapid or abort. For specific tips on canoeing in white water, review Schmidt's Tips in the *Whitewater* merit badge pamphlet.

## SPACING CANOES

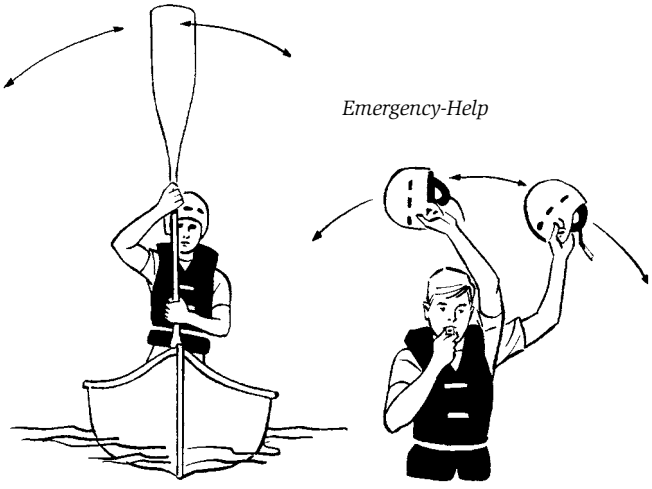
The amount of space needed between canoes varies with the conditions. For flatwater paddling, one canoe generally remains within sight of the canoes ahead of and behind it. In bad weather, paddlers should stay within voice contact.

Spacing in white water is generally from 50 to 150 feet. Even greater spacing is recommended for more difficult rapids. Each canoe should allow enough space between it and the canoe ahead to maneuver around, should the downstream boat be broached. A canoe should never overtake another craft in rapids. Let each canoe complete the run before the next canoe enters the rapids.

## COMMUNICATION

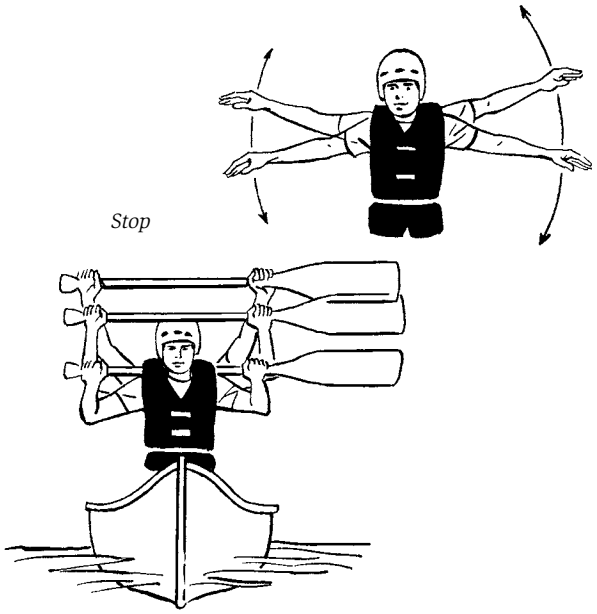
Good communication is essential for a safe canoe-camping adventure. When voice communication is not possible, use the AWA Universal River Signals.

**Help/Emergency.** When you need assistance as quickly as possible, give three long blasts on a whistle while waving your paddle, helmet, or life vest over your head in a circular motion. If you do not have a whistle, use the visual signal alone. (It's a good idea to attach a whistle to the zipper of your life vest.)



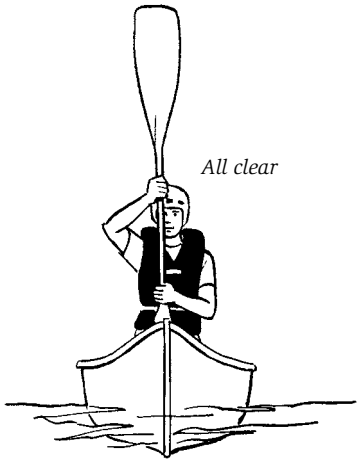
*Emergency-Help*

**Stop.** To indicate a potential hazard ahead, form a horizontal bar with your paddle or outstretched arms. Move the paddle up and down using a pumping motion or make a flying motion with your arms to attract attention. If you see this signal, stop, then pass it back to others in the party. Wait for an ''all clear'' signal before proceeding, or scout ahead.

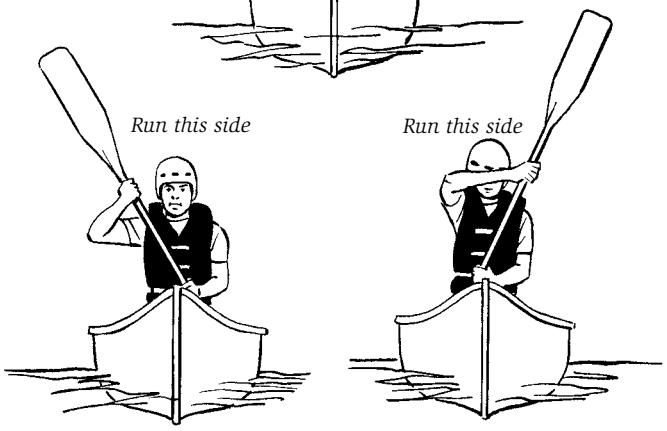


*Stop*

**All Clear.** To indicate that it is safe to come ahead, form a vertical bar with your paddle or with one arm held high above your head. Turn the paddle blade flat so it can be seen easily. If you see this signal, proceed down the center. To signal direction or a preferred course, lower the vertical ''all clear'' by 45 degrees toward the side of the river with the preferred route. You can use this signal to indicate the best course through a rapid or around an obstruction. *Never* point toward the obstacle you wish to avoid. If you see a directional signal, proceed in the direction indicated.



*All clear*



*Run this side* *Run this side*

**Attention.** To get the attention of other canoeists, make a series of short ''chirps'' on a whistle. This is an audible signal with no visual component. It is used when no emergency exists. It lets others know that important and necessary communication will follow. Do not use this signal casually. Use it only when other common forms of communication are having little or no effect.

### RESCUE

Moving water is a force to be respected. It can quickly capsize a canoe and dump paddlers into the water. Then, the force of the water is a hazard both to the canoe and to the swimmers. A capsized canoe can easily be pinned against a rock with a force strong enough to collapse the craft. Swimmers run the risk of being struck by the canoe, striking rocks or other obstacles, or being propelled downstream by the current.

To promote quick, efficient rescue, the American Canoe Association has established the following rescue priorities: people, canoes, equipment. If paddlers understand their responsibilities, a rescue operation is more likely to be effective.

*The first priority is a paddler in the water.* Each paddler is responsible for initiating self-rescue procedures in the event of swamping or capsizing. Paddlers should swim to safety immediately if a clear danger exists (strainers, hazardous rapids, or cold water). Each paddler also has a responsibility to his buddy. If a paddler cannot see his buddy, he should establish voice contact to be sure the other person is conscious, uninjured, and initiating self-rescue procedures.

*The second priority is the swamped canoe.* Self-rescue should involve using the swamped canoe for flotation if possible. If the canoe inhibits the paddlers' safety, they should leave the canoe and swim to safety.

*The third priority is equipment.* Equipment often will take care of itself. On flatwater, it will float near the swamped craft until paddlers can safely collect it. In white water, equipment gathers in eddies or along river bends and can be collected later.

When a canoe capsizes or swamps, all paddlers must evaluate the situation and determine the best course of action for rescue. Rescue situations can vary greatly and dictate what techniques are appropriate.

In general, as soon as the incident occurs, alert other paddlers that there are victims in the water. Swimmers initiate self-rescue procedures immediately, and also should be ready to accept assistance from others. Other paddlers help those in the water to the best of their abilities when it is safe to do so. Those not involved stop as soon as they can safely do so and monitor the situation in case their assistance is needed. Paddlers should avoid converging on the rescue scene to prevent more accidents.

Before you go canoe-camping, review overboard maneuvers, rescues, and capsize procedures in the *Canoeing* and the *Whitewater* merit badge pamphlets.

### FIRST AID

The *First Aid* merit badge pamphlet and the *Boy Scout Handbook* describe first-aid techniques for a variety of situations. Take time to review these before you go canoe-camping.

Several situations are of special concern to canoe-campers. These include heat exhaustion and heatstroke, hypothermia, dehydration, fungus infections, and sunburn. Review first-aid procedures for these and be sure to pack appropriate first-aid supplies.

## MINIMUM-IMPACT CAMPING

The outdoor areas you enjoy as a canoe-camper are a heritage worth protecting. All canoe-campers should practice the principles of low-impact and "no trace" camping. Although a canoe crossing the water leaves no trace, campsites do. In established camps, you should leave campsites in better shape than you find them. When you camp in wilderness areas, you should leave no trace that you have been there. Review the Seven Principles of Leave No Trace in the *Boy Scout Handbook.*

### CAMPSITES

Your responsibility to protect the land begins with your choice of a campsite. When you travel in a park or on a well-traveled route, good campsites are already established. Creating new ones is illegal in parks and not recommended on most rivers. When you plan your proposed day's distance, make sure campsites will be available. And have a backup plan in case you find all campsites in the area already taken. To be sure you could make it to the next campsite, don't plan your original destination to match your energy limits. On seldom-traveled wilderness rivers, you will have to create your own campsite. Either way, your chances of locating a desirable site, or sometimes any site at all, are considerably better if you start looking in midafternoon.

Potential campsites can be identified by studying a topographical map. The mouth of a small mountain stream is usually an ideal spot. Islands or small peninsulas in lakes or rivers can make excellent locations. In choosing a campsite, avoid the following whenever possible.

- **Sandy beaches.** The sand will get in your bed, your food, and your gear. You will have to live with it for the rest of your trip.
- **Gravel bars.** Gravel is uncomfortable both for sitting and for sleeping.
- **Swampy areas.** Swamps attract insects even during the off-season.
- **Rocky sites.** Unless your tent is free-standing, rocks will make it difficult to pitch.

When you locate a potential campsite, notice its pluses and minuses. These are the most important considerations:

**Check the Landing Area.** How easy will it be to load and unload a canoe there? Can you land alongside the shore or will you have to pull the canoe up on shore for unloading? Is there a good place to put the canoe on the shore for the night?

**Check Sleeping Facilities.** Where are the tent pads located? Is the area level and free of rocks, roots, and ants? Can you position your tent to provide comfortable ventilation? A light breeze helps reduce the bug population.

**Check Cooking and Housekeeping Facilities.** Is water available nearby? Is there a fire pit with a grate if cooking fires are permitted in the area? Is firewood or fuel available if the group is not using stoves? Are rocks nearby that can be used to put pots and spoons on while you cook? Are there logs to sit on? Can the fire pit or stove be shielded from the wind? Are there well-placed trees for stringing up a dining fly? If you are in bear country, where is the best place for flying the food pack? Where can you string a clothesline?

**Check Provisions for Comfort.** Is there a latrine and is it a safe distance (at least 200 feet) from the lake or stream? If not, is it possible to dig a latrine in that area? Does the location of the latrine permit sufficient privacy to the user?

**Check the Environment.** Is plant life in the area too fragile to withstand the impact of tents and hiking boots? Is the site protected from wind? (During rainy spells or in areas subject to high winds, a site sheltered by trees on three sides is ideal.) Is the site elevated enough to avoid rising water? Does it have good drainage? Does it offer adequate shade or sun? Does the site offer privacy from trails and other sites? Does it offer natural beauty? scenic views? good fishing spots?

**Check Opportunities for Service Projects.** If you are working on the 50-Miler Award, you will want to look for a campsite that needs improvement. What problems exist in the campsite? Does it need to be cleaned up? Does your group have the time and skills to make needed improvements? Can you make it look ''natural'' before you leave?

Once you have located an acceptable campsite, unload the canoe and secure it on the shore. Next put up the dining fly. It should be reasonably near the fire pit if you are using an open fire for cooking. In bear country, you may want to put it several hundred feet downwind from your tents. Find a tree for flying the food pack.

After the dining fly is up and your gear is stowed underneath, pitch your tents. Be sure there is adequate drainage. In wilderness areas, pitch your tent to disturb as little of the undergrowth as possible. Trenching should not be done as it is damaging to the area, leaving it highly vulnerable to erosion. Organize your personal gear and sleeping equipment inside your tent. Unroll your sleeping bags so they can air. Complete your campsite preparations by making arrangements for waste disposal.

## FIRES AND COOKING

If an open fire is permitted, always kindle it on a fire lay. Established campsites often have permanent fire lays in the form of large metal rings, grills, or stone fireplaces. If you must establish your own, locate it in the open, away from overhanging tree branches, heavy brush, and boulders that could be blackened by smoke. Review procedures for building a fire lay in the *Camping* merit badge pamphlet and *Boy Scout Handbook*.

In some areas, only stoves are permitted for cooking. A stove makes possible a hot breakfast in a short time. Even if you plan a cold meal, you can use a stove to prepare a hot beverage. When conditions are dry, you run the risk of forest fire using a stove. If you use stoves for cooking, observe the Guidelines for Safely Using Chemical Stoves and Lanterns found in the *Backpacking* program feature.

Even when traveling on the open water of lakes and streams, you should purify water for drinking and cooking. Make this one of your early chores when you set up camp. Boil water for 10 minutes or treat it with purification chemicals. Remove debris by pouring water through a bandanna or handkerchief. Let muddy water sit a while in a pot. After the silt has settled, gently dip the clear liquid off the top and purify it.

If you purify water by boiling, use your largest pot. When the water boils, move the pot to the far corner of the grate if you are using a fire pit. Then you can dip out water as needed for cooking and dishwashing.

A little thought by the cook during food preparation can make cleanup easier later. When finished with the frypan, fill it with water and put it on the fire to boil. Do the same with any kettle containing a sticky residue. If you add a little butter or margarine to the water when preparing cereal, the pot will be easier to clean. After the meal, use your pot of boiled water for cleanup. Mix part with cold water and a little biodegradable soap for washing. Add a sanitizing agent such as a few drops of bleach to the remaining hot water for rinsing. Each Scout wipes out his cup, bowl, and plate with leaves, pine needles, or snow, then washes and rinses his gear and lets it air dry by placing it on a plastic sheet. Store all personal gear in a flyproof container. The cleanup crew washes the utensils and scours the pots and pans with a scrub pad or sand. Dispose of dishwater by sprinkling it over a wide area far from camp and any sources of water (at least 200 feet). *Never* wash pots and pans in a river or lake.

Food wastes must be carefully disposed of to avoid attracting flies and wild animals or damaging the environment. Small quantities of leftover food can be burned in the fire pit as long as you do a thorough job. Leave no traces of foil, cans, scraps, or other garbage. Anything that will not burn must be carried home in a trash bag. Wash and flatten tin cans before putting them in the trash bag. *Do not* bury any garbage, even in the latrine.

Do not keep food in tents or under the dining fly. It will attract bears and other wild animals. Instead, hang food in a bear bag from a tree. Make sure the food is at least 15 feet off the ground.

Last, reassemble the cook kit and store it with the utensils under the dining fly.

### LATRINES VS. CATHOLES

Whether you should use catholes or latrines is a matter of opinion. Some people feel that each person should take responsibility for digging and covering his own toilet. Others believe it's better to dig one toilet for the whole group.

A small group of no more than five or six can easily use catholes to dispose of human waste. The microorganisms in the top 6 inches of soil will break down the small amount of waste deposited in each cathole. Whichever you use, always wash your hands when you are finished to prevent spread of germs.

Each camper should make his cathole at least 200 feet from any campsite, trail, or water source. With a small trowel or the heel of a boot, dig a hole 4 to 6 inches deep, but no deeper than the rich organic topsoil. After use, cover the hole completely. In a few days, microorganisms will dispose of the waste and small amounts of biodegradable toilet tissue.

In managed campsites, latrines may be provided. In wilderness areas, a latrine may be the best disposal method for a larger group of campers. Locate it in a secluded site at least 200 feet from water, trails, and campsites. Dig a trench several feet long, 6 inches wide, and about 6 inches deep. The exact size depends on how large the group is and how long it will stay at the site. Leave the shovel nearby. As each camper uses the latrine, he covers his waste with a little soil to prevent flies from infesting it. If the latrine needs more capacity, dig it longer, not deeper. Microorganisms are only in the top layer of earth. Be sure to completely cover the latrine before you break camp.

Put nothing into the latrine or cathole except human waste. Animals will dig up and scatter buried garbage. Microorganisms cannot break down plastic, glass, metal, paper, or cardboard. Take any unburnable garbage home with you. If you packed it in, you can pack it out.

### BATHING AND LAUNDRY

On a short canoeing trip, bathing and doing laundry is usually unnecessary. On a longer trip, these should be done in a way that will not damage the environment.

To bathe, choose a secluded spot away from shore (at least 200 feet). Lather with biodegradable soap and pour a pail of water over yourself. Your bath should come before you dive into the lake or river for a swim.

Also do laundry at least 200 feet away from the waterway. Use only biodegradable soap. To dry laundry, you can string a line between two trees.

### BREAKING CAMP

Breaking camp is everyone's responsibility. Every camper is responsible for packing his personal gear. Everyone should share the work of packing group gear. Pack tents last to allow plenty of time for morning dew to dry. Make a final check of the area before you leave. Refrain from taking any natural objects as souvenirs. Remember—take only pictures, leave only footprints.

## CAMPSITE ETHICS

When you go canoe-camping, you are likely to camp in wilderness areas. Camping in these areas requires that you observe special rules to help prevent damage to the environment. Before you go canoe-camping, review the BSA Wilderness Use Policy.

**WILDERNESS USE POLICY OF THE BOY SCOUTS OF AMERICA**

All privately or publicly owned backcountry land and designated wildernesses are included in the term ''wilderness area'' in this policy. The Outdoor Code of the Boy Scouts of America applies to outdoor behavior generally, but for treks into wilderness areas minimum-impact camping methods must be used. Within the outdoor program of the Boy Scouts of America, there are many different camping skill levels. Camping practices that are appropriate for day outings, long-term Scout camp, or short-term unit camping do not apply to wilderness areas. Wherever they go, Scouts and Venturers need to adopt attitudes and patterns of behavior that respect the right of others, including future generations, to enjoy the outdoors.

In wilderness areas, it is crucial to minimize our impact on particularly fragile ecosystems such as mountains, lakes and streams, deserts, and seashores. Since our impact varies from one season of the year to the next, it becomes important for us to adjust to these changing conditions as well, to avoid damaging the environment.

The Boy Scouts of America emphasizes these practices for all Scout units planning to use wilderness areas:

- Contact the landowner or land managing agency (Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, state, private, etc.) well in advance of the outing to learn the regulations for that area and to obtain required permits and current maps.
- Obtain a tour permit (available through council Scout service centers), meet all conditions specified, and carry it on the trip.
- Limit the size of groups generally to no more than 8 to 11 persons, including at least one adult leader (maximum: 10 persons per leader). Two leaders per group are required. Do not exceed the group size established for some wilderness areas. Organize groups to function independently by having each plan a trip on a different date, serve its own food, provide its own transportation to trailhead, secure individual permits, and camp in a separate and distinct group. When necessary to combine transportation and planning or buying, small groups should still camp and travel on the trail separately from other groups of the same unit.
- Match the ruggedness of high-adventure experiences to the skills, physical ability, and maturity of those taking part. Save more rugged treks for older youth members who are more proficient and experienced in outdoor skills.
- Participate in training for adult leaders on low-impact camping or be proficient and experienced in the leadership and skills required for treks into wilderness areas.
- Conduct pretrip training for your group that stresses proper wilderness behavior, rules, and skills for all of the conditions that may be encountered.
- Use backpacking stoves, particularly where the fuel supply is limited or open fires are restricted. Supervision by an adult knowledgeable in the use of the stove(s) must be provided. If a fire is necessary, keep it as small as possible and use established fire lays where available. After use, erase all signs.
- Emphasize the need for minimizing impact on the land through proper camping practices and preserving the solitude and quietness of remote areas. Camp at low-use areas—avoid popular sites that show signs of heavy use.
- Leave dogs, radios, and tape players at home.
- Use biodegradable (not metal or glass) or plastic food containers. Carry out unburnable trash of your own and any left by others.
- Dig shallow holes for latrines and locate them at least 200 feet from the nearest water source. Cover the latrines completely before leaving.
- Wash clothes, dishes, and bodies at least 200 feet from any source of natural water.
- Select equipment of muted colors that blend with natural surroundings.
- Look at and photograph; never pick or collect.
- Follow trail switchbacks and stay on established trails.
- Treat wildlife with respect and take precautions to avoid dangerous encounters with wildlife. Leave snakes, bears, ground squirrels, and other wildlife alone.

| OUTDOOR CODE |
| --- |
| *As an American, I will do my best to—* |
| *Be clean in my outdoor manners.* I will treat the outdoors as a heritage. I will take care of it for myself and others. I will keep my trash and garbage out of lakes, streams, fields, woods, and roadways. |
| *Be careful with fire.* I will prevent wildfire. I will build my fires only where they are appropriate. When I have finished using fire, I will make sure it is cold-out. I will leave a clean fire ring, or remove all evidence of my fire. |
| *Be considerate in the outdoors.* I will treat public and private property with respect. I will use low-impact methods of hiking and camping. |
| *Be conservation-minded.* I will learn how to practice good conservation of soil, waters, forests, minerals, grasslands, wildlife, and energy. I will urge others to do the same. |

## RESOURCES

Many resources are available through your local library. Resource materials include but are not limited to the following:

### BSA PUBLICATIONS

*Boy Scout Handbook,* No. 33105

*Fieldbook,* 33104

Merit badge pamphlets:

*Camping,* No. 33256A
*Canoeing,* No. 33305B
*Cooking,* No. 33349B
*Lifesaving,* No. 33297A
*Orienteering,* No. 33385A
*Whitewater,* No. 33405A

### SELECTED FIRST-AID PUBLICATIONS

*Being Your Own Wilderness Doctor,* by E. Russel Kodet and Bradford Angier. Stackpole, 1975.

*Hypothermia,* by William W. Forgey. ICS Books, 1985.

*Wilderness Medicine,* by William W. Forgey. ICS Books, 1987.

*Basic Essentials Series,* BSA and Red Cross first-aid publications; ICS Books.

### OTHER PUBLICATIONS

*Backwoods Ethics,* by Laura and Guy Waterman. Stonewall Press, 1979.

*Be an Expert with Map & Compass,* by Bjorn Kjellstrom. Charles Scribner's Sons, 1976.

*The Canoe,* by Philip Shackleton and Kenneth Roberts. International Marine Publishing Co., 1983.

*Canoeing and Kayaking, Instruction Manual,* by Laurie Gullion. American Canoe Association, 1987.

*The New Wilderness Handbook,* by Paul Petzholt. Norton, 1984.

*River Rescue,* by Les Bechdel and Slim Ray. Appalachian Mountain Club Books, 1989.

*Path of the Paddle,* by Bill Mason. North Word Press, 1984.

*Roughing It Elegantly: A Practical Guide to Canoe Camping,* by Patricia J. Bell. Cat's Paw Press, 1987.

*Soft Paths,* by Bruce Hampton and David Cole. Stackpole, 1988.

*Song of the Paddle: An Illustrated Guide to Wilderness Camping,* by Bill Mason. North Word Press, 1988.

*The White-Water River Book: A Guide to Techniques, Equipment, Camping, and Safety,* by Ron Watters. Pacific Search Press, 1982.

*The Wood and Canvas Canoe,* by Jerry Stelmok and Rollin Thurlow. Harpswell Press, 1987.

### PERIODICALS

*Canadian Geographical Journal*

*Canoe and Kayak*

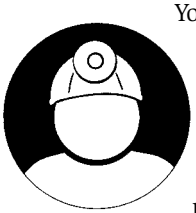
*National Geographic*

*Outside*

## CAVING CONTENTS

# CAVING

## BACKGROUND



You have already learned many of the basic skills necessary to go cave exploring. The knot tying, first-aid, and safety skills you have mastered will take on special significance as you go underground. You will depend on your other team members for help, support, and first aid if you are injured, and they will depend upon you.

Like all Varsity Scout program features, caving is designed to give you a challenging experience. There will be a series of skills and techniques to learn in preparation for your ultimate caving adventure.

Take your time preparing for your ultimate adventure. Make sure you master each skill and have the knowledge and gear to deal with a challenging situation. Keep in mind that caving requires more physical endurance and mental concentration than most activities you have encountered in Scouting. Even minor mistakes will reduce your exploration time and possibly have dire consequences. If you meet the unexpected, then you were not prepared. Good luck and good caving!

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with the help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a Geology merit badge clinic.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida Sea Base, etc.).
- Conduct a caving activity.

### PERSONAL DEVELOPMENT

- Visit a local, state, or federal caving facility. Learn about the rules or laws that apply to the facility. Also learn about possible career opportunities in caving.
- Carry out a physical fitness program for the team. Concentrate the program on those muscles needed for carrying out the caving feature.

### SERVICE

- Contact and carry out a service project for a public caving facility.
- Assist an elderly homeowner in preparing his or her yard for the coming season.
- Manage an information or lost-and-found booth at a local community event, such as a fair or special holiday celebration.

### SPECIAL PROGRAMS AND EVENTS

- Invite a member of a caving organization to present a program on his or her caving specialty.
- Conduct a family night program to share photos, slides, and videos made during the team's caving experience.

## SELECTING A CAVE GUIDE

The selection of an experienced cave guide is critical to a team's success and safety in cave exploration. If you have difficulty locating a suitable cave guide, send a self-addressed, stamped envelope to the National Speleological Society (NSS), 2813 Cave Avenue, Huntsville, AL 35810-4413, to request assistance in locating qualified cavers in your area.

The cave guide should have at least four of the five following qualifications:

- Three years of continuous membership in the National Speleological Society
- Three years of continuous membership in a grotto (the proper name for a cave club) sanctioned by the NSS
- Three years of experience in cave exploration, verifiable by trip log or grotto attestation
- Current certification in first aid and CPR
- Access to the desired caves

The vertical caving instructor should meet the above standards, as well as:

- Have verifiable experience in vertical caving.
- Be willing to abide by and follow the Boy Scouts of America guidelines for vertical ropework. (**Note:** For more information, review *Topping Out: A BSA Climbing/Rappelling Manual*.)
- Have instruction in or exposure to cave rescue techniques.

## CAVE GEOLOGY

### LIMESTONE CAVES

Limestone was formed more than 60 million years ago when the skeletal remains of prehistoric ocean-dwelling creatures fell to the bottom of ancient oceans. These layers of calcium skeletons accumulated over the years until they reached depths of more than 2,000 feet. Under the pressure of a shale/sandstone layer, calcium carbonate formed. In some cases, the layers were lifted by the movement of the earth layers to heights of more than 5,000 feet above sea level.

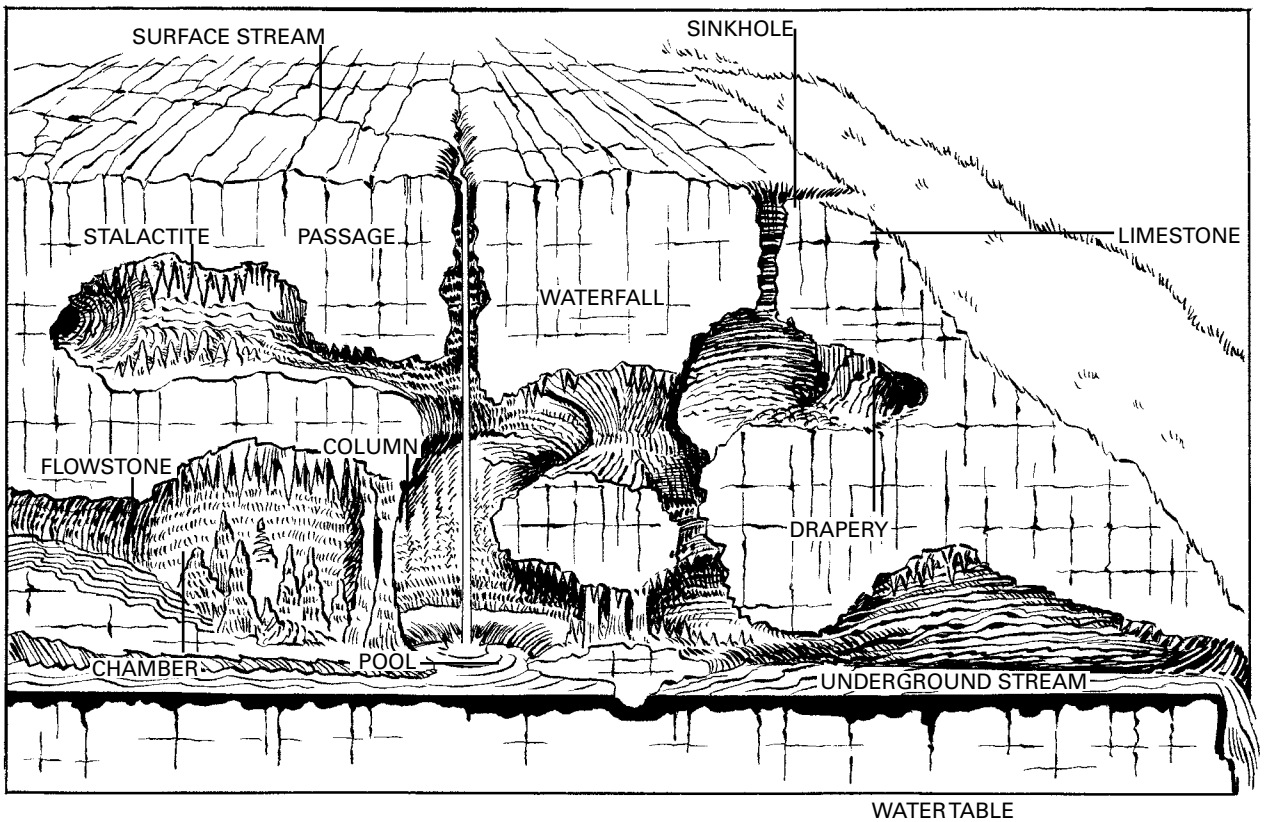
As the limestone rose above sea level, caves began to form. Rain falling on decaying plant and animal matter picked up the carbon dioxide given off by decomposition. The carbon dioxide and water mixed to make carbonic acid. Carbonic acid dissolved the limestone as it followed the cracks or joints in the limestone layers. The process continued for millions of years and dissolved huge passages and rooms such as the Sarawak Chamber in Southeast Asia, which can hold the equivalent of 17 football fields.

When the water flow slows to a trickle, shimmering *stalactites, stalagmites,* and other unusual shapes are formed. For instance, as carbonic acid water drips out of the limestone, the drop may hang on the ceiling until it dries, leaving the solid material, called calcite, in a ring. If this constant drip and dry action continues, a slender tube of calcite forms what is called a *soda straw.*

When the end of the straw becomes clogged, the calcite-laden water runs over the outside of the tube and begins to form a stalactite. Other minerals, like aragonite and gypsum, can also form stalactites, which explains the various colors you might see. Water falling off the end of speleothems (formations) accumulates on the floor, forming stalagmites.

Because gravity is pushing the water down and out of the limestone, strange shapes can occur, including stalactite branches growing up. When a drop of water runs along an overhanging shelf or wall, a trail of minerals builds into thin sheets called *drapes.* If different minerals are involved in the process, they can produce bands of different colors and the speleothems are called *bacon strips.* Often the stalagmites grow up as the other speleothems grow down and when they meet they form a *column.*

Flowstone occurs as calcite-laden water flows over rocks and ledges creating frozen waterfalls. These can grow to the size of houses. Rimstone dams occur when standing water deposits its calcite along the edge of the puddle. These dams can attain heights of 6 to 8 feet, but usually are only a few inches tall.




*A sectional view of a solution cave.*

Do not touch speleothems. Your natural body oil can forever alter the pattern of growth and dirt from your hand can stain the speleothem. Do not walk on or crawl across speleothems because they can break beneath you.

There are different rates of speleothem growth in each cave region. Growth rate depends on available decaying matter, amount of rain or snow, average temperature, humidity, and whether a wind blows through the cave. The average growth rate is 1/10 of an inch a year; that is, 1 inch of growth every 10 years. A broken formation, if still growing, may not recover its original form until your grandchildren visit the cave.

Limestone caves can develop interesting and unusual passages. You may walk through high-walled canyons or cross over deep gorges. Tubes and rectangles may characterize some passages, while others defy simple description. Some passages can run straight for yards, while some have more turns than a murder mystery. The ceiling might be only inches above the floor, or so lofty you cannot see it with a strong light. Some passages might cross over lower ones and connect at a hole in the floor, ceiling, or wall.

Occasionally, loss of limestone becomes great enough that the ceiling can no longer be supported. The ceiling falls to the floor in what is called *breakdown blocks.* This does not always mean the passage is obstructed. Sometimes a way can be found over the top of the breakdown or by squeezing between and under the breakdown blocks. Then again, you may only need to travel around the breakdown to continue into the cave. Whichever route you choose, be sure to maintain three points of contact with the passage. For example, move one foot while bracing with two hands and the other foot or knee. A breakdown block should never be considered stable even if another team member has just walked over it. He may only have been lucky and not stepped on a loose stone.

It is important to remember that caves are abandoned watercourses and do occasionally flood. "Flooding" and "marking the route" are covered in the safety and travel sections of this program feature.

## MARBLE CAVES

Marble caves, usually only 2,000 to 3,000 feet in length, are made by the same hydraulic forces that create limestone caverns. They make up for their lack of speleothems with passageways of parti-colored bands of very hard limestone and marble deposits that are usually 200 to 300 feet thick. These passageways often have floors of breakdown blocks or meandering waterways, which causes marble caves to have a confusing labyrinth of passages. Most marble caves occur in northern California, Vermont, and New Hampshire.

## LAVA CAVES

Lava caves form much faster than solution limestone caverns. Volcano lava flows in two ways. One is called *aa;* it flows like pancake batter poured on a hot skillet. The other flow is called *pahoehoe.* It flows fast and snakelike.

The outside of pahoehoe lava might cool, producing a pipe or tube through which molten lava continues to flow. These lava tubes can have a diameter of 50 feet and the passage can continue for miles. Sometimes pahoehoe lava will cross old tubes and build a multilevel passage. Or the lava tube will run inside an old tube creating a maze of horizontal and vertical passages. Occasionally, rocks and trees are picked up by lava flows. Their shapes may be preserved in molds that can last for years.

Speleothems are created differently in lava caves than in limestone caverns. The shapes remain the same, and stalactites and drapes still form, but they are crystal clear or white and they can melt.

Ice formations can occur in lava caves and do so more frequently than in limestone caves. The explanation is simple. In areas where severe winters occur, heavy cold air seeps into the lower chambers of the cave. Rainwater seeping into the cave or moisture from the air is trapped in ice formations. This makes lava caves a challenge to get through without melting or breaking the formations.

**Note:** Heavier clothing, gloves, and kneepads are required for lava caves.

## GLACIER CAVES

Near the Arctic circle, ice caves grow in glaciers. The melting water running under glaciers carves out delicately sculptured walls in long tubes.

These caves are not always accessible since some flood during the day and freeze at night. However, if a short exploration can be done in daylight, you will see a beautiful aqua-green light in the walls. Wear proper winter clothing when visiting a glacier cave.

## TECTONIC CAVES

The movement of the earth crust forces slabs of hard insoluble bedrock together until one either slips above or splits the other. The resulting cracks leave what are called *tectonic caves.* These caves are usually not deep, but some can continue for hundreds of yards. They may have a few speleothems and breakdown areas.

### SEA CAVES

Continuous wave action against rock can create sea caves, also called *littoral caves.* A few littoral caves can be found along the eastern coast of the United States but most occur along the western coast. Most require a boat to enter.

There are several littoral caves, however, in the southwestern desert region around the remains of the Great Salt Lake. Several occur at 4,500 feet above sea level. The map of such caves, whose floors are often of flat, dry sand, is usually measured in feet and inches. Around several caves, you will see evidence of anthropology digs in search of evidence of prehistoric people's use of caves. Some of these caves have insects and snails, left by the receding salt lake, that are not found anywhere else.

### GYPSUM (CALCIUM SULFATE) CAVES

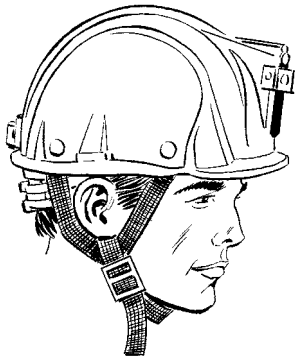
The gypsum cave passage is similar to a limestone cave. Speleothems are similar in shape but are brilliant white in color. Gypsum caves develop more flower petal and needle formations than do limestone caverns.

Be extremely careful in gypsum caves. Calcium sulfate is soft and flaky. Handholds and footholds can suddenly break away.

## CAVE GEAR

The success or failure of your cave exploration can depend on the quality of the equipment used. Every piece should be 100 percent dependable. Rigged gear should not be taken into a cave, though it may become necessary to put together makeshift equipment to get out.

A helmet is more than a place to mount a light source. It also will protect your head from bumps and scrapes as you travel through a cave. It should protect your skull from falling rocks. The helmet should meet or exceed American National Standards Institute standards z-89.1 or z-90.1. The z-89.1 helmet protects the head from an 8-pound steel ball dropped from 5 feet above. The z-90.1 assumes that protection during a fall is more important. Several speleo-vendors sell various brands of helmets and hardhats adapted for caving. They come with flat hook lamp mounting brackets and four-point chinstraps with quick-release buckles. Motorcycle and alpine climbing helmets provide good protection but most are expensive and heavy. Whichever helmet you choose, be sure the chinstrap will release or break if your helmet becomes lodged between rocks. This precaution will prevent strangulation or being left hanging by your chinstrap.



**Helmet.** A quality climber's helmet that is used for caving should contain a high-density, impact-absorbing, foam lining inside a fiberglass plastic shell. The caver's head is safely suspended away from the shell by means of a nylon strap suspension system. The helmet is held securely in place by means of a four-point attachment system.

If your helmet does not come with a headlamp bracket, be careful about securing the headlamp to the helmet. Bolts or screws should extend on the outside of the helmet, not pointed toward the skull. Remember that the best helmet is worthless if you don't use what's in the skull it protects.

### LIGHT SOURCE

A light source should be securely attached to your helmet. This leaves both hands free for traveling or climbing through the cave.

#### CARBIDE LAMPS

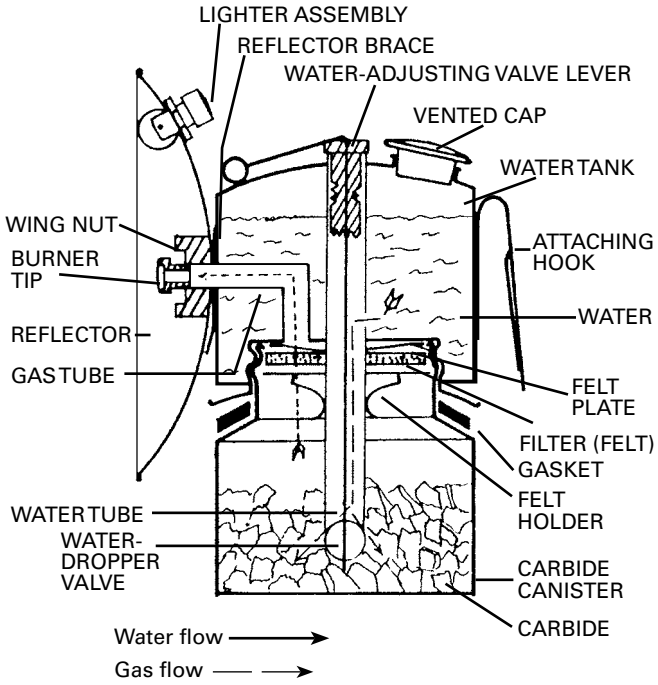
There are two types of headlamps used for caving. The first and oldest is the carbide lamp. This is a small brass lantern having a water tank in the top half. The water drips down into the lower half, which contains calcium carbide. The water and carbide react and produce acetylene gas, which is burned at the burner tip as a bright yellow flame. A reflector directs the broad diffused light where you need it.

There are several good reasons for using carbide.

- It is a self-contained unit, without a separate battery case and electric wire to snag rocks.
- A dollar's worth of carbide should last 24 hours.
- It can be used to warm soup or heat up an emergency tent.

The reasons for *not* using carbide follow:

- Carbide must be carried in a sturdy, water-tight container.
- Spent (used) carbide must be carried out of the cave and be disposed of properly.
- Carbide lamps make the helmet front-heavy.
- Carbide lamps have several parts that can break or clog, like the water tube or gas burner.
- The light can be bumped out in tight crawls.
- The lamps are useless in waterfalls.
- Carbide lamps should not be used while on rappels or while doing vertical ropework.
- The lamp makes and burns acetylene gas.
- A lamp needs good care and maintenance to minimize the risk of explosion.

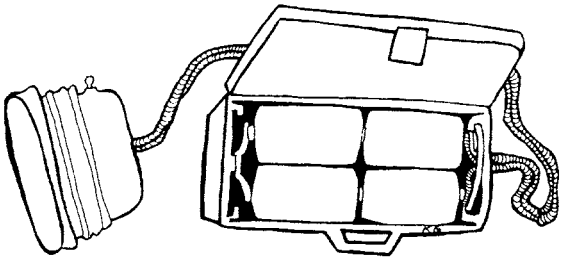



*Carbide Lamp*

Carbide lamps are used extensively by cavers and enjoy a good reputation. If you intend to purchase or borrow a carbide lamp, be careful to get one that is sturdy and reliable. A plastic carbide lamp is available but it has several major flaws, including the potential to be destroyed by its own heat. This type of plastic lamp should *not* be used for caving. Search antique and secondhand shops for the older carbide lamps. Spare parts are still available. Have your cave expert test and examine your lamp and show you how it operates before your caving expedition. Usually the lamps use a flat metal hook that clips to the bracket on the helmet.

**ELECTRIC LAMPS**

Electric lamps are used by many expert cavers. Electric lamps limit the time spent in the cave to the battery life. But most of your first caving trips should not be more than eight hours long, which can be covered easily by batteries.



*Electric Lamp*

Several types of rechargeable batteries are suitable for caving. Liquid-filled batteries such as lead-acid or nickel-cadmium wet cells pose special problems when being charged. Hydrogen gas and water vapor are released during the charging cycle. If batteries of this type are knocked over while charging, the electrolyte (acid water) can be forced out through the vent holes. This electrolyte is chemically similar to lye and drain cleaner, or may be sulfuric acid. Neither solution belongs on cave ropes or gear. The results can be disastrous.

Never store or transport batteries near your other cave gear. Serious injury could occur if the electrical system you use develops a short. Both wet cells and dry cells (flashlight batteries) have been known to explode when shorted. The wire can overheat and cause severe burns. A circuit breaker or fuse added to the system should prevent accidents. Electronic supply dealers carry small circuit breakers or fuses of 2.0 amps or less. Circuit breakers can be reset but fuses cannot, so you will need to carry spare fuses with you, possibly with your spare light bulbs.

Batteries have different recharge life cycles (the number of times a battery can be charged or discharged). Wet cells may have more than 2,000 life cycles. A nickel-cadmium cell has about 1,000 life cycles, while a lead-acid wet cell has only about 450 life cycles. The output curve or discharge rate differs as well. A nickel-cadmium battery produces a steady voltage until it reaches the end of its discharge cycle, then it just quits. Lead-acid wet cells and dry cells will "bleed" voltage down slowly over a period of six to eight hours or more.

Battery life depends upon the size and type of bulb used. For example, the bulb No. 425 uses 4 volts at a current draw of 0.4 amps, has a bulb life of 15 hours,

and a brightness measured at 2.3 candle power. The bulb No. 502 uses 5.1 volts at 0.15 amps, its brightness is 0.6, and its bulb life is 100 hours. So a No. 502 bulb lasts longer, but uses more battery voltage and produces less light than a No. 425 bulb. A No. 425 bulb is brighter, uses less battery voltage, but has to be replaced more often. Test and compare your battery and bulb differences.

Several types of electric lamps are available to cavers. Some can be found only in special catalogs but generally a large hardware store will sell or can order electric headlamps for you. The standard battery case is a fairly dependable plastic case that can be wired or taped closed if necessary, or you may use a metal battery case instead.

Some weekend cavers use a 6-volt dry cell lantern battery with a spring post. Using alligator clips (available at hardware stores and electronic supply shops), solder the clips to the wires and clip these to the battery. The battery can then be carried in a pouch. Or you can make a belt loop for your battery out of heavy wire such as coat hanger wire. Bend the wire to make a belt loop, then secure it to the battery with three or four wraps of fiber-reinforced duct tape. You can make the "181" cave light with only a few dollars' worth of parts. Be careful not to touch the ends of the bulb base to the side of the can and be sure to include a circuit breaker or fuse. Solder all connections and do not overtighten the bulb.

Just as for carbide, there are advantages and disadvantages to using electric systems. The advantages include the following:

- Electric lamps provide a bright, narrow beam of light good for looking down long passages or watching a caver on a climb.
- Electric lamps are simple to operate and can be made to work with a bulb, wire, and battery.
- They are clean and do not burn gas.

*"181" Cave Light*

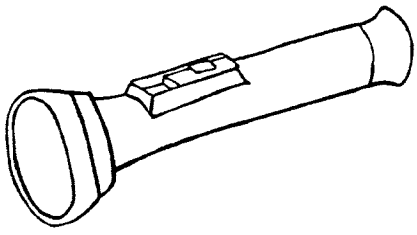
The disadvantages are as follows:

- The user must wear a heavy battery pack and carry a spare battery.
- The wire snags on rocks and speleothems and gets in the way. You could wear the battery pack and wire inside your clothes, but this becomes inconvenient should you have to shed all gear to pass through a tight squeeze.
- The operating cost is considerably more for batteries than for carbide.
- Cavers using electric lamps experience "tunnel vision" because of the fixed focus. Perception, even at short distances, is distorted as a result of the loss of normal stereoscopic vision.

If you purchase an electric headlamp, fasten the lamp to your helmet securely. Be sure the battery and battery case will be dependable. Carry spare batteries, spare bulbs, spare fuses (if you use fuses), and some fiber-reinforced duct tape for repairs. When it comes to light sources, it is critical that you "be prepared."

**BACKUP LIGHTING**

A good caving rule to follow is to make sure *each member* on the caving expedition carries three separate sources of light sufficient to allow him to exit a cave. It is a good safety idea to use the same mount for the backup light sources as the one that secures the first light source to the helmet. Some cavers own two of the same primary headlamps; they wear one and carry one in the pack. Or you might use a carbide lamp and carry an electric one. Some cavers mount twin electric lamps to the helmet.



*Your secondary light source might be a flashlight.*

Cavers commonly carry a small flashlight for an additional light source. Carry spare batteries and bulbs for this secondary light source. Frequently test the batteries with a meter even if they are not used. You might reverse one battery to prevent accidentally turning on the light, or use a rubber band to secure the switch. Disposable flashlights are also available. If you choose to wear a flashlight around your neck,

be certain that if it is caught on a rock, the flashlight will easily break free. Carrying a third light source will ensure your safe exit from the cave.

When cavers stop to rest and snack, they often will light three or four candles to conserve the main light source. Chemical lights, commonly known as Cyalume® or lightsticks, will give a yellow/green light equal to an "AA" flashlight during its first hour of operation. The light gradually will diminish to a level unusable for caving in about three hours, but it will continue to glow for about 24 hours. While lightsticks should be left in their foil wrappers until used, it will be difficult to tell if a light has been used.

A pressured gas lantern has only limited use in caves. It is good for large rooms but its exhaust is toxic to cave life and team members.

## CLOTHING

Check with the cave guide for the temperature and water conditions of the caves you will be entering. Some caves stay at or below freezing, and some streams can be as warm as 75˚F. Remember you may have to hike a few miles to reach the cave so be aware of surface weather conditions. The outer layer of caving clothes should be of rugged cloth; most cavers wear some kind of overalls. Generally, it is not advisable to use insulated coveralls or clothing because the bulkiness is bothersome in tight crawls. Wearing coveralls slows heat loss and conserves some body heat even when damp. The back pockets of coveralls should be removed and kept for patching. This will reduce the chance of clothing hanging up on rocks. Don't carry anything important in the side pockets because the items will fall out.

### BOOT CARE AND CLEANING

**With proper care, your boots can last for years. After each trip, remove any mud from your boots with mild soap and warm water. Pack the inside of the boot and wrap the outside with newsprint. Allow two days for the boot to dry indoors then apply a boot treatment. You or a cobbler can remove the speed lace hooks often found on boots. These can snag on cable ladders, or become bent and break off. Replace these with eyelets or lace rings. Tennis shoes, baseball cleats, and lightweight hiking boots are not good choices for caving.**

When choosing inner clothing, again check local cave conditions first. Cavers usually wear a polypropylene T-shirt under a wool shirt under the coveralls. They also wear wool pants under the coveralls. Some cavers carry a dry shirt in a self-sealing plastic bag. Remember the backpacking rule: If you don't take it with you, you cannot put it on.

Many cave accidents occur as the result of improper footwear. The choice of either high-top or low-top boots is an individual preference, but the boots should have lug soles. Vibram® is a brand name of such soles. These boots will be one of your best purchases and, with a little care and cleaning, can last a long time.

Cavers often wear gloves. Leather and cloth-leather combinations have been proven to better withstand the rigors of caving than other choices. Wearing gloves will protect your hands from sharp rocks and rope burns. Gloves will also help keep your hands clean for such activities as eating and changing film in your camera.

As a novice caver gains experience, he also gains bruised knees. A pair of kneepads is indispensable. The choice is as varied as it is for gloves. Athletic kneepads hold up well and cost only a few dollars. Professional construction kneepads also are suitable. With some foam rubber, cloth, and elastic, team members can make their own kneepads. Some cavers sew kneepads and elbow pads into their overalls. This eliminates the chance of your pads' being caught on a rock as you squeeze through a tight opening. Remember to inspect your gear before you go to ensure every piece is in perfect working condition. Always clean your equipment immediately upon your return.

### CAVE PACKS

A cave pack is used to carry a caver's gear. It must endure being dragged over sharp rocks for miles without spilling the contents. Do not use the day pack or bookbag-type pack. Military packs are ideal because they are made of heavy canvas. They usually are worn using a strap over the shoulder. Another strap goes around the abdomen to keep the pack from swinging under the abdomen during crawls. It often is necessary to add a strap, tie, or other closure to the bag to ensure that it stays closed.

You can make a polyurethane "pig" to carry your gear. Use two 1- gallon containers (antifreeze, bleach, or other containers made of *thick* plastic, for example), with the bottom quarter cut out. Slide the bottles together with the gear inside. Keep them together with a tie or strap. Attach a carrying strap at both jug handles.

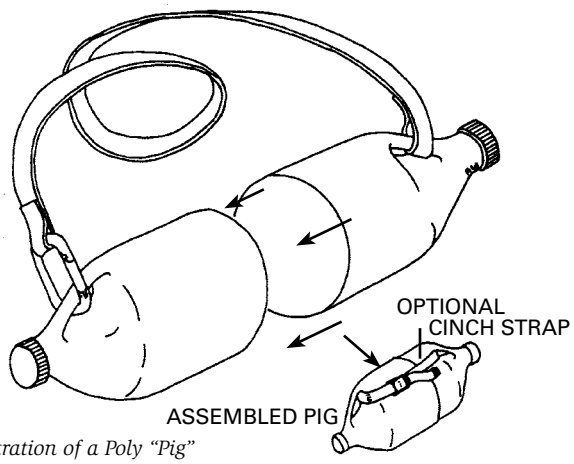


*Illustration of a Poly "Pig"*

Items to carry along include a belt-type, quart-size canteen with fresh water for thirst as well as first aid. Cave snacks are a must and should consist of high-energy foods. Granola bars are an excellent choice. You can make your own "gorp" from foods purchased at the grocery store.

Mix sugar-coated puffed wheat or puffed corn or oats with raisins, chocolate candies, peanuts, etc.—just about any snack food. Store it in a watertight container like a baby bottle or wide-mouthed camp bottle. Self-closing plastic food storage bags are not as rugged or dependable as a screw-top plastic bottle. Carry a personal first-aid kit in your cave pack, along with a spare light source and a pocketknife. Other, optional items follow:

- Pencil and paper for notes
- Surveyor's flagging tape
- Batteries
- 20 feet of ⅜" nylon rope or 10 tubular handline
- Compass
- Cave map
- A well-protected camera

Also keep a couple of large trash bags to make ponchos for waterfalls or emergency tents. Keep one trash bag or 5-gallon plastic bucket in your vehicle for dirty cave clothes. A small roll of fiber-reinforced duct tape and a short piece of ⅛" nylon twine are useful for repairs.

## CAVE MEALS

Food chosen for cave meals should meet several requirements.

1. The food should be simple and relatively neat to eat.
2. The food should not require refrigeration or cooking to be edible when it is needed.
3. Foods should be packaged to withstand abuse. Sandwiches, crackers, grapes, and chocolate bars are often smashed so badly during a caving trip that little is left of their original form by the time you are ready to eat. Also, food should be packaged in waterproof containers or bags to help keep dirt and water away. Airtight, plastic containers (like baby bottles or similar storage products) have been used successfully by many cavers to carry foods. Don't use anything breakable.
4. If the trip is long, it is best to pack food that can be eaten as several snacks throughout the day instead of one large meal.
5. Food taken into the cave should be palatable. No matter how nutritious a food is, it helps only if it is eaten. Take food into the cave that will be eaten and enjoyed.
6. Quick-energy foods make the best cave foods. Protein seems to be of little value as a cave food while foods high in carbohydrates seem best. Fruit juices, dried or fresh fruit, honey, hard candy, and food sticks are examples of quick-energy foods.
7. If food taken into a cave will have waste left over, make provision for carrying this material out of the cave. Apple cores, orange peels, and oil from canned meats do not belong in the cave environment. Anything brought into the cave should be removed from the cave by the caver.

## FIRST AID AND CAVE RESCUE

Preparation goes a long way toward avoiding emergencies. With all the readily available training and written information, the cave leader and expedition members should get themselves ready for caving emergencies. Be aware of the physical challenges of both the cave passages and any hikes to the cave. Also, know your own physical limits and the physical limits of the group.

A Personal Health and Medical Record should be on file for every participant. Begin a fitness program for all team members before going caving. Being overweight or out of shape can jeopardize the entire expedition. Brisk walking and stair climbing will help prepare team members for caving. Also, before entering the cave, eat a hot, high-energy meal and include plenty of liquid. You can easily dehydrate while caving.

## SAFETY LEADER

Before entering the cave, establish who will serve as safety leader for the expedition. Choose the person with the most first-aid training and experience. The safety leader, along with the cave guide, will terminate the trip should a safety or medical problem occur. There should not be any argument about the reasons to "call the trip." Safety is the number one consideration. No one should feel pressured or bullied into completing a trip. This could create an even more serious situation.

## HYPOTHERMIA

Hypothermia is one of the biggest problems faced by cavers. *Hypothermia* is the lowering of the body core temperature. It can occur at temperatures of 70˚F or below, especially if the person is wet, improperly dressed, and involved in strenuous activity. Total immersion in 55˚ water will limit the ability of an adult to swim and survive to one hour.

Symptoms include mood changes, loss of fine motor movement, and loss of ability to reason. For example, a team member who was talkative and excited about the trip may become moody and gloomy about the chances of getting out. The victim, while feeling fine and giving the impression of being in touch with the situation, may not be able to undo buttons or screw on bottle lids. Moderate hypothermia is characterized by prolonged uncontrollable shivering. The body will try to protect vital organs by cutting off the blood supply to the "non-essential" parts, such as hands, arms, feet, and legs. Often without treatment, shivering may cease, giving the impression that the victim is better. *Wrong!* It actually means the victim has no more energy to use for shivering and could be close to death. As hypothermia continues, the blood thickens, the heart is overtaxed, respiration may cease, or cardiac arrest may occur. This is sometimes called "cooling to death."

The general signs of hypothermia include the following:

- Slowing of pace
- Drowsiness, fatigue
- Poor condition
- Slurred speech
- Amnesia
- Irrationality, poor judgment, and disorientation
- Hallucinations and loss of contact with surroundings
- Blueness of skin (cyanosis)
- Pupils slow to restrict when light is shined into the eyes
- Decreased heart and respiratory rates
- Stupor
- Slow, irregular, or weak pulse

Prevention is always easier than treatment. This is especially true in a cave where you cannot build a campfire. *Never build a campfire in a cave!* First, dress in layers using wool close to the body. Next, stay out of water unless it is the only way to travel. Take a dry route, even if it is harder than wading a stream.

## FIRST-AID KITS

Each team member should carry a personal first-aid kit. This way, no one has to carry a bulky patrol first-aid kit. Personal items to carry in a watertight container include the following:

- 1" adhesive bandages
- 4" × 4" gauze pads
- 1 roll of 2" gauze
- 1 roll of 2" adhesive tape
- 1 clean handkerchief or Scout neckerchief
- 2 safety pins
- 1 small piece of soap for wound cleaning

A larger first-aid kit should be left near the cave entrance. It will be for a more severe emergency and its location should be known by all persons on the expedition. If it is locked in a vehicle, hide the keys nearby and let team members know where the keys are hidden.

Items for the team first-aid kit should include the following:

- More 4" × 4" gauze pads or larger dressings
- More rolls of gauze of different widths
- Triangular bandages
- Splint material
- Backpacker's stove with fuel and igniter
- 2 pots nested together
- 3 to 4 cups nested together
- Fresh water
- Blanket or sleeping bag
- Dry soup mix
- Hot chocolate mix

Note that the last two items are more for the first-aiders than for the victim. However, if the victim is threatened with hypothermia, small portions of weak soup or hot chocolate can be given if the victim is conscious.

If a person becomes injured or ill during the cave trip, it may become necessary to help the victim out of the cave. **Note:** Do not move an injured person: (1) until broken bones are splinted, (2) if spinal injury is suspected, or (3) unless the victim's condition will deteriorate if he is *not* moved, such as if he fell into water. Forcing someone to exit a cave when injured or hypothermic will probably result in even more serious injury.

If a team member is unable to exit even with assistance from others, stop and begin measures to treat the victim. Send three people to the surface for help. Two cavers should bring back the large first-aid kit and one should go for help. The one going for help should be equipped with the following information:

- The phone number for the local cave rescue unit
- The location of the cave
- The name of the cave
- The condition of the victim
- What first aid is being rendered
- The approximate location of the victim within the cave
- The time the accident occurred

The National Speleological Society maintains a list of phone numbers for all cave rescue units. Local fire rescue units do not always have cave rescue teams on staff.

Meanwhile, the first aiders should take steps to treat the victim and expect a long wait for rescue. If the victim is soaking wet, remove the top layer of clothing, wring it out, and replace it on the victim. Make a bed out of spare clothing from the other team members but do not jeopardize their safety. Try to maintain body-to-body warming. Keep the head covered, as 60 to 80 percent of the body's total heat loss is through the scalp.

Have someone keep notes of the time and what changes occur to the victim. This will aid the rescue team. Be ready to move once the rescuers arrive. Do not allow other team members to roam through the cave, but have all gear ready to travel. You may be asked to help get the victim out of the cave. Do *exactly* what the rescue team tells you to do—no more or less. The rescue team will probably need the cooperation of everyone. Keep your talking and suggestions to a minimum. Avoid talking about how bad the situation is since the victim is probably frightened.

Be careful about moving the victim and remember to protect him from even simple hazards. Do not cross over or lean over a victim, especially near the head. Loose sand or mud could fall into the victim's eyes.

## LOST

Whole groups rarely become lost in a cave, but individuals can get separated from the others. Remember, you're not too lost if you are in a cave. You know where you are; it will be up to the rest of the world to find you. Keep in mind that it is virtually useless to yell for help as sound does not travel far in a cave.

You can do a few things to make it easier for rescuers to find you. First, establish a base camp. Light *one* of your candles and take inventory of the gear and food you brought with you. Find a place to camp out of any wind that might be blowing through the cave. Remember to mark the way to your camp with items from your pack such as the gauze roll, flagging tape, or pieces of a T-shirt you cut off with your Scout knife.

Once a lost caver did such a good job of finding a camp out of the wind that rescuers spent an extra day searching for him. But when he was found, he was healthy and had food, water, and spare batteries left over. That may not sound like someone needing rescue; he just needed to know the way out.

## ENTRAPMENT

Occasionally, you hear of cavers being trapped in a cave by rising water. And you also hear that they all emerged under their own power. This is because they took notice of the weather forecast before entering and took extra food and gear.

Entering a cave with a known history of flooding during severe weather is dangerous and should not be done. The decision not to enter is that of the cave guide alone; his decision should not be questioned since he is more familiar with the cave's history. However, flooding can occur from unforeseen circumstances such as flash flooding, or rainfall on snow accelerating the melt runoff. Even a beaver dam break has trapped expeditions for a short time. A well-known cave in north Alabama once flooded to the ceiling (about 20 feet high) and the cause has never been found. Without knowing the cause, you may not know how long you will be delayed; but flooding rarely lasts longer than 24 to 36 hours. You must begin measures to ensure a successful rescue.

Cool water is the immediate problem. You might not drown standing in waist-deep water, but you can cool to death in as little as 1 hour. Find a ledge as high and dry as possible and huddle the team, back-to-back, as much as possible to conserve heat. Conserve all food and lighting supplies. If you must sit and rest, do so on your knees to minimize contact with the cold ground. Insulate yourself from the ground if possible. Do not rest lying down because, once you are asleep in

a prone position, you do not notice changes in water flow as much as when sitting up.

Make sure that a written trip plan is left with your unit leaders and parents of team members. In the trip plan, include what time you will call home and the phone numbers of cave rescue units that cover your area. Also include a description of the vehicles you are traveling in, along with the license tag number. *Always* call in before the appointed time.

## TRAVEL TECHNIQUES

### GETTING TO THE CAVE

Most caves in the eastern half of the United States are on private property. Most caves in the western states are on public (state or federal) property. The ownership of a cave usually belongs to the property owner of the entrance.

*Never* explore a cave without the permission of the owner. (Even public caves may have special rules or restrictions about who goes caving or when.) Without the owner's permission, you could be arrested for trespassing. A good relationship with the owner must be maintained if you and other Varsity Scout teams want to be allowed to come back. Briefly visit the owner before and after your caving trip. Share your experience. Often the owner will want to know about any vandalism in the cave so as to restrict the previous group. This is also true for publicly owned caves.

Ask the owner where to park your vehicles. There may be a preference as to where you leave your vehicles and change your clothes. Be careful about parking in a farmer's field. It may be freshly plowed or the farmer may have intended to mow the field the day you arrived. Also, ask the owner if gates are to be left open or closed. *Do not* climb on gates or over fences.

A helpful Scout always leaves an area better than he found it. Picking up litter in the parking area as well as around the entrance will encourage owners to welcome you and other teams again. Leaving trash may cause an owner to ban all Scouts and cavers from the cave.

## CAVING TECHNIQUES

Entering a cave is very exciting as you realize that you are about to test both your physical and your mental abilities to the limit. Never go caving with a group of fewer than five people. If one team member is injured, one stays with the injured and three cavers go for help and the larger first-aid kit. As one goes to call for help, the other two return to the victim. Never attempt "solo caving." Eight team members and two adults is as large as expeditions should be in noncommercial caves.

### CHECKING YOUR GEAR

Before you go, check your gear "just one more time." Check the knots and rigging before rappelling, even if an expert rigged the drop. Watch what is ahead. How are you going to make the climb? How did the others do and is there some other way to go? Do not panic if your gear or clothing gets hung. Calmly analyze the problem and a solution will usually reveal itself.

### HELPFUL HINTS

Some other useful tips are:

- Turn off your helmet lamp and flashlights at rest stops and use candles.
- Do not lie down on a cold rock but rest sitting up.
- An adequate supply of water and food will ward off hypothermia and dehydration.
- Carefully weigh the energy and time spent climbing along a stream or going into water, then take the route of least energy loss.

Running and jumping (including jumping down from a ledge) are dangerous. A cave is no place to start jogging. The "floor" could suddenly become a bridge 50 feet above a lower passage.

Carry your head and shoulders high. It gives you the best view of what is ahead. Learn where the top of your helmet is in relation to the ceiling. This will result in the occasional bump, but it will also give your hardhat character. You will need to learn your headroom to avoid breaking speleothems in decorated passages.

In a cave, travel as levelly as you can. Continually going up and down will waste your energy. Remember, you have only a limited amount of energy—conserve it!

Always go to the bathroom *before* entering a cave. Under *no* circumstances should you relieve yourself in the cave. This problem has caused many fine caves to be closed for health concerns.

A brief study of mountain climbing techniques will help you develop your own style of cave climbing. All pitches (slopes) greater than 40˚ should have a handline. Pitches greater than 55˚ should have a belay (refer to the section on vertical caving).

### FINDING YOUR WAY

Somehow, people got the idea that it was necessary to find the way out of a cave by tying string to a tree outside, or making smoke marks with candles. These marks or arrows usually point the way out, but how do

you know someone did not make his mark as he went in? This is a form of vandalism and spoils the natural beauty of the cave. Suppose John Muir or Daniel Boone had spray-painted arrows as he went west?

Use common sense when caving. Stop and look back to see how the passage will appear on the way out. Keep written or mental notes of *undisputed* landmarks. Suppose there is a rock in one cave that everyone agrees is duck shaped as they go in. But on the way out, no one recognizes it as the "duck rock." Making marks in the mud is acceptable if no other method is available. If you find such marks and markers, verify that they are correct and add them to your own inventory of clues.

Remember: never change or alter someone else's marks. Although some cavers build stone mounds to mark the way, it is argued that this is an artificially created pile of stones and defaces the cave. Hardware stores usually sell a bright orange tape you see around construction sites used for survey marks. A roll is about 30 feet long and can last a long time. Tear off a short piece and place under a rock or stick it to the wall with mud. *Be sure to pick these up on the way out.*

Experts say you become a great cave guide once you have gone through the experience of "I think we are in the wrong place." After you have been lost just once, you develop a talent for keeping up with the way out.

Some of your visual clues might include bedrock layers and direction of stream flow (was it going in or out of the cave?). Wind flow is not wholly reliable as it can change direction after you enter the cave. Remember, if you are caught by the unexpected, you were unprepared.

Studying cave maps will provide some benefit. Carry copies in a waterproof food storage bag. Remember, however, these maps are not made to conform to any national rules. Guidelines are published by the National Speleological Society but their use is not mandatory. The individual cave cartographer may draw passages the way he wants. Another problem with using cave maps is the scale. For instance, Mammoth Cave, Kentucky, is mapped to more than 395 miles with 12 entrances. Davis Cave No. 2 in Missouri ends at 1,100 feet. If each cave map is printed on 8½"× 11" paper, you can see details in the Davis Cave such as stream width and breakdown height. With the Mammoth Cave map on the same size paper, the only detail you could see would be the parking lot at the ranger station. The scale-to-size ratio of a cave map has much to do with its value. Study the list of map symbols and their uses.

## VERTICAL CAVING

In the interest of safely pursuing this activity, cavers have developed ascending and descending (rappelling) equipment and techniques specifically for vertical caving. Practice these skills under the close super-vision of a vertical caving instructor.

## THE EQUIPMENT

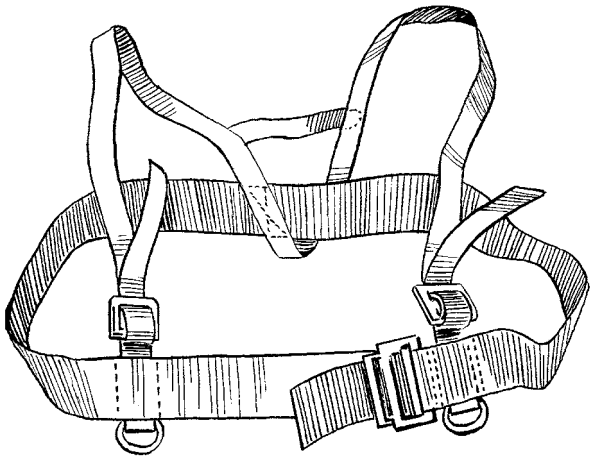
There should be enough gear for each participant to have a complete set, including seat and chest harnesses and ascending and descending equipment.

Use a commercially manufactured seat harness, a caving helmet with chinstrap, and gloves with leather palms.

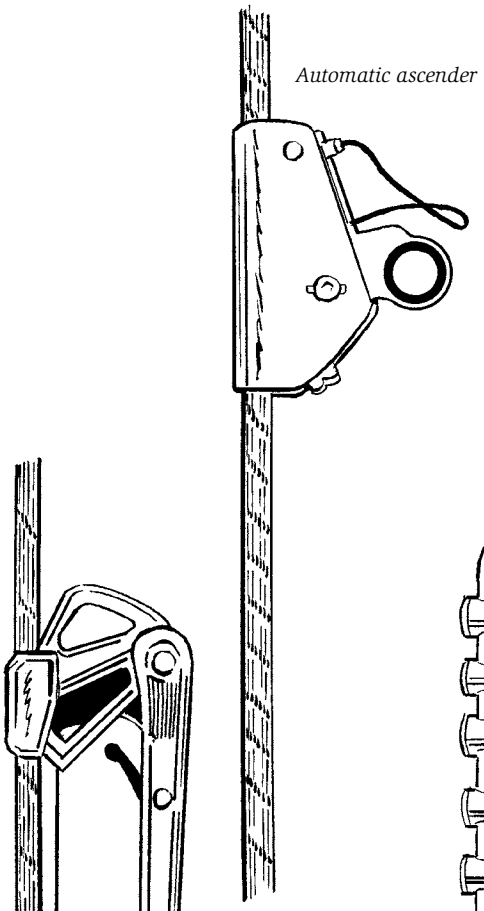
Each participant should carry a sharp pocketknife to cut hair or clothing that may become caught in the descending device. Remove all loose jewelry and keep a first-aid kit nearby.

The only rope suitable for vertical caving is a static kernmantle rope constructed of a braided nylon sheath woven over the parallel continuous nylon fibers of the inner core. The rope must be in good condition. For caving activities, 11mm rope is sufficient.

Descending devices shall be a figure eight with ears, or rappel racks with six bars. Locking carabiners or two nonlocking carabiners with gates in the opposite position should be used at anchor points and to secure the descending device to the seat harness.

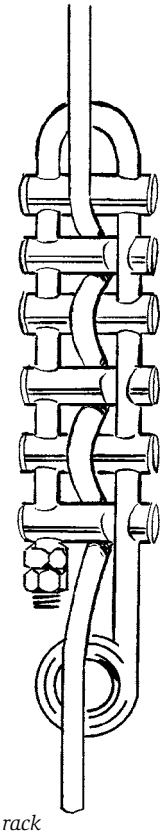


*Chest harness*

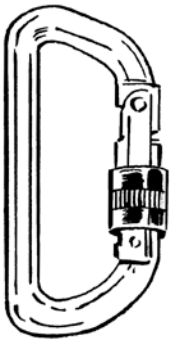


*Automatic ascender*

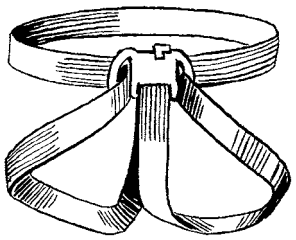
*Hand-operated ascender*



*Rappel rack*

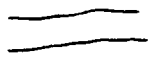


*Carabiner*

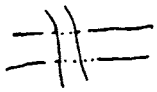


*Seat harness*

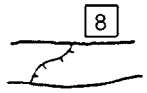
*National Speleological Society standard map symbols.*



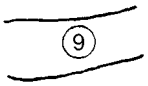
SURVEYED PASSAGE



UNDERLYING (DOTTED) PASSAGE

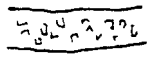



VERTICAL DROP IN PASSAGE WITH DEPTH

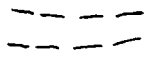



PASSAGE CEILING HEIGHT

LARGE BREAKDOWN



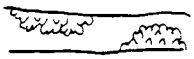
SMALL BREAKDOWN



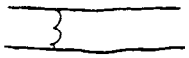
SKETCHED PASSAGE

DOWN SLOPING PASSAGE

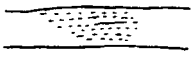
STREAM AND POOL



FLOWSTONE



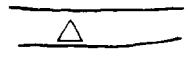
RIMSTONE DAM



CLAY

SAND

BEDROCK PILLAR IN PASSAGE



SURVEY STATION

CROSS SECTION

## COMMERCIAL CAVES IN THE UNITED STATES

**Alabama**
Cathedral Caverns
DeSoto Caverns
Rickwood Caverns
Russell Cave
Sequoyah Caverns

**Arizona**
Arizona-Sonora (artificial cave)
Colossal Cave
Grand Canyon Caverns

**Arkansas**
Blanchard Springs Caverns
Buffalo National River
Civil War Cave
Cosmic Cavern
Devil's Den
Hurricane River Cave
Mystic Caverns Onyx Cave
Rock House Cave
War Eagle Cavern
Wonderland Cave

**Colorado**
Cave of the Winds
Vapor Caves

**Connecticut**
Old New-Gate Prison and Copper Mine (artificial cave)

**Florida**
Falling Waters
Florida Caverns
Florida Museum of Natural History (artificial cave)
Walt Disney World Resort (artificial cave)

**Hawaii**
Thurston Lava Tube (Hawaii)
Waianapanapa Cave (Maui)

**Idaho**
Craters of Moon National Monument
Idaho's Mammoth Cave
Minnetonka Cave
Shoshone Indian Ice Cave

**Illinois**
Cave-in-Rock State Park
Mississippi Palisades State Park

**Indiana**
Bluespring Caverns
Cave River Valley Park
Leeky Creek Cave (artificial cave)
Marengo Cave
Porter's Cave and Camp
Spring Mill State Park
Squire Boone Caverns and Village
Wolf Cave
Wyandotte Caves

**Iowa**
Crystal Lake Cave
Horse Thief Cave
Maquoketa Caves State Park
Spook Cave

**Kentucky**
Carter Cave State Park
Crystal Onyx Cave
Jesse James Cave
Kentucky Diamond Caverns
Mammoth Cave National Park
Mammoth Onyx Cave

**Maryland**
Crystal Grottos Caverns

**Michigan**
Bear Cave
Mackinac Island State Park

**Minnesota**
Mystery Cave
Niagara Cave

**Missouri**
Bluff Dweller's Cave and Museum
Bridal Cave
Cameron Cave
Cave Springs Onyx Cavern
Crystal Cave
Crystal Caverns
Fantastic Caverns
Fantasy World Caverns
Fisher Cave
Honey Branch Cave
Indian Burial Cave
Jacob's Cave
Mark Twain Cave
Marvel Cave
Meramec Caverns
Onondaga Cave State Park
Onyx Mountain Caverns
Ozark Caverns
Ozark Underground Laboratory
Ozark Wonder Cave
Rock Bridge Memorial State Park
Round Spring Cave
Talking Rocks Cavern
Truitt's Cave

**Montana**
Big Ice Cave
Lewis and Clark Caverns
Pictograph Caves

**Nebraska**
John Brown's Cave
Robber's Cave

**Nevada**
Lehman Caves
New Hampshire
America's Stonehenge (artificial cave)
Lost River Gorge
Polar Caves

**New Mexico**
Carlsbad Caverns
Fort Stanton Cave
Ice Caves

**New York**
Howe Caverns
Ice Caves Mountain
Natural Stone Bridge and Caves
Secret Caverns

**North Carolina**
Boone's Cave
Chimney Rock Park
Farlow's Cave (artificial cave)
Grand Father Mountain
Linville Caverns
Reed Gold Mine (artificial cave)

**Ohio**
Cincinnati Museum (artificial cave)
Crystal Cave
Hocking Hills State Park
Indian Trail Caverns
Nelson Ledge Park
Ohio Caverns
Olentangy Indian Caverns
Perry's Cave
Seneca Caverns
Seven Caves
Zane Caverns

**Oklahoma**
Alabaster Caverns State Park

**Oregon**
Lava River Cave
Oregon Caves
Sea Lion Caves

**Pennsylvania**
Coral Caverns
Crystal Cave
Indian Caverns
Indian Echo Caverns
Laurel Caverns
Lincoln Caverns
Lost River Caverns
Penn's Cave
Woodward Cave and Campground

**Puerto Rico**
Cueva del Indio
La Cueva Camuy
Parque de las Cavernas del Rio Camuy

**South Carolina**
Stumphouse Tunnel Park (artificial cave)

**South Dakota**
Beautiful Rushmore Cave
Black Hills Cavern
Crystal Cave Park
Jewel Cave National Monument
Sitting Bull Crystal Caverns
Stagebarn Crystal Caverns
Wind Cave National Park
Wonderland Cave

**Tennessee**
Bell Witch Cave
Bristol Caverns
Cherokee Caverns
Cudjo's Cave
Cumberland Caverns
Cunbar Cave State Natural Area
Forbidden Caverns
Indian Cave Village
Jewel Cave
Lost Sea
Motlow Cave
Raccoon Mountain Caverns
Ruby Fall (Lookout Mountain Caverns)
Ruskin Cave
Tuckaleechee Caverns
Wonder Cave

**Texas**
Cascade Caverns
Cave Without a Name
Caverns of Sonora
Inner Space Cavern
Longhorn Cavern State Park
Natural Bridge Caverns
Wonder World

**Utah**
Timpanogos Cave National Monument

**Virginia**
Caverns at Natural Bridge Village
Dixie Caverns
Endless Caverns
Grand Caverns
Luray Caverns
Massanutten Caverns
Shenandoah Caverns
Skyline Caverns

**Washington**
Ape Cave
Gardner Cave
West Virginia
Lost World Caverns
Organ Cave
Seneca Caverns
Smoke Hole Cavern

**Wisconsin**
Badger Mine and Museum (artificial cave)
Cave of the Mounds
Crystal Cave
Eagle Cave
Kickapoo Indian Caverns

## CAVE CONSERVATION

As you begin to explore caves, you may see evidence of explorers before you—bits of trash, spent carbide, or spray-painted arrows on the walls. Think about how long this trash may have been in the cave and how much longer it will stay there unless it is removed. You probably have seen pictures of the cave art left by prehistoric people. This art was left on the walls thousands of years ago and serves to illustrate the difference between art and vandalism. The spray paint and the primitive pigments have both forever altered the natural beauty of the cave.

As you travel, try to stay on the regular route or trail. To walk along the steep face of a mud bank, just because no one else has, is bad for conservation and is a possible safety hazard. When you are standing on the edge of a pit, do not throw stones to the bottom. The rocks may kill some cave life or shatter formations.

Cave exploring organizations have developed policies that cover the exploration and accurate mapping of caves. Policies cover the scientific study of cave minerals, geology, hydrology, and biology. The policies usually forbid the collection or sale of speleothems and cave animals.

Because a cave has a constant environment, it becomes an excellent anthropological and paleontological study site. Much of our knowledge about early humans and the American Indians comes from the study of artifacts left near cave entrances. Many such artifacts are buried under the floor of the cave and are not visible to most cavers. Federal and most state laws forbid the private collection of artifacts, speleothems, and cave fauna. If you do come across some material, it might be the remains of a saltpeter mining operation. Usually made of wood, these remains will probably fall apart at a touch.

Conservation of caves, as well as the surrounding land, is something with which every Scout can get involved. Conservation is more than not breaking speleothems or killing cave life; it involves the careful removal of trash and graffiti.

A good rule of thumb is: Whatever you take in, you carry out, along with something someone else left. In other words, leave the area better than you found it. This can apply to the entrance area as well as the trail to the cave. An excellent service project for team members might be to make yourselves available to a local grotto for cleanup projects, formation repair, graffiti removal, a cave-gating project, or a bat count.

## CAVE LIFE

You probably have seen a futuristic space travel adventure in which the spaceship crew has a standing order not to harm or allow harm to befall any life form they encounter. Cavers need to remember this order as they encounter cave life forms. This means plants, animals, molds, and fungi.

Often organic material is brought into caves by high water. This material (dead leaves, twigs, and such) becomes food for cave molds and fungi. Medical science is beginning to study cave molds for new antibiotics. Look carefully at this cave life form, but don't touch. Some animals that must live in caves graze on this fungus, whose colors range from bluish and greenish tints to white.

Closely observe the flora and fauna on the way to the cave. Then see if you can find any different plants at the cave entrance. If you can, you might have discovered a new plant species. Because the entrance area is usually unchanged since it opened, plants long thought to be extinct may actually be alive around some caves. Remember to observe but don't kill.

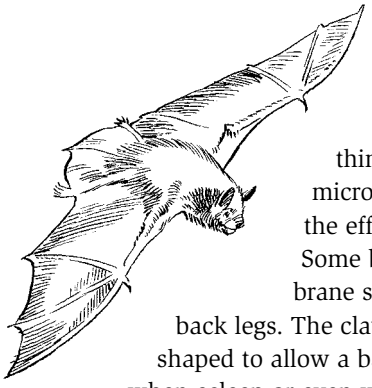
### TROGLOXENES

Once you start into the cave you will see the type of cave life referred to as *trogloxenes*. These are animals that may use caves to live in and around, but they do not have to live in a cave to survive. Spiders, cave crickets, and bats belong to this group.

**Cave crickets.** Cave crickets look like ordinary crickets except their bodies are short and round and their antennae are extra long. If you have been in a dark, damp place like a basement, you may have already seen cave crickets.

**Spiders.** Spiders also may be found around cave entrances. Harvestman spiders (also known as daddy longlegs) have been known to drop on cave explorers' necks and surprise them as they enter a cave.

**Bats.** While bats may be found in many caves, they are not in every cave. They also may be found roosting in trees, attics, old barns, and under bridges. Bats belong to the scientific order of *Chiroptera,* meaning, literally, hand-wing. If you examine a bat's wing, you can see that it has a short upper arm and long forearm. The wing also has four fingers. Each finger has three joints. Like your own hand, the wing has a thumb. The wing is covered by a very thin skin or fur. The skin is so



thin researchers often use a microscope on the wing to see the effects of blood medicines. Some bats have a tail membrane stretched between the back legs. The claws on the rear feet are shaped to allow a bat to hang upside down when asleep or even when dead.

If you can imagine having "hand-wings," then you could "swim" through air instead of water. This fingertip control gives bats unparalleled flying ability, which they need when catching insects. A bat can spin, flip, slip, and dip as it catches insects in its wing or tail membrane; it then pops the insect into its mouth. Bats have been observed catching 300 insects per hour; in one night's feeding, a bat could catch 2,400 mosquitoes. It's just the kind of bug catcher you need at summer camp!

Bats are highly social animals and they prefer to live in large groups called *colonies.* Since they have only one offspring per year, they are vulnerable to extinction.

It is interesting to note that "blind as a bat" is not a true statement. Not only do bats have eyes, they actually have exceptional night vision. It may have been their strange flight pattern that led people to believe bats are blind mammals. Bats that eat fruit or nectar have a very good sense of smell as well as excellent eyesight. And bats that eat insects have exceptional hearing. After emitting ultrasonic "clicks," bats use the returning sound waves to identify prey by size, location, and sometimes even species.

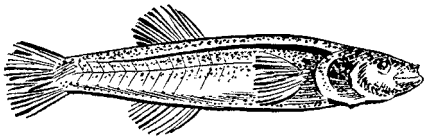
Another false statement is that bats are mean and vicious and like to attack people's hair. In all your outdoor experience, have you ever seen a naturally mean or vicious animal? Unless the animal is teased, cornered, or sick, it usually will not attack. This is true for bats; in fact, bats are more timid than mice.

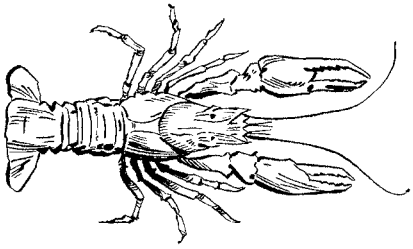
Bats can carry rabies, but so can dogs, cats, cows, and horses. Raccoons and foxes have the highest percentage of rabies infection in mammals and bats have the lowest. Given how timid bats are, it is not surprising that only about 10 people in all of North America have been infected by bats with rabies in the past 40 years.

Bats who make their home in caves often need to rest in peace, without interruption or disturbance. When this occurs, the cave will have a "Closed" sign posted. Obey this sign. Some bats use caves to raise their young; if disturbed, the mother may drop her young and abandon them. Hibernating bats have enough energy stored to sleep until spring when the food supply returns. But if they have to wake up because of your disturbance, they may die before spring. Bats, like all animals, fill an important biological niche and deserve our understanding and help, not destruction from fear and ignorance.

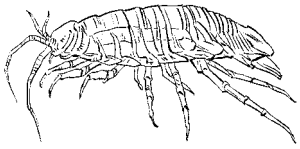
**Other Animals.** Bears, snakes, and other animals also do not need caves to live in, but may use the cave entrance as shelter from the sun during the hottest part of the day.

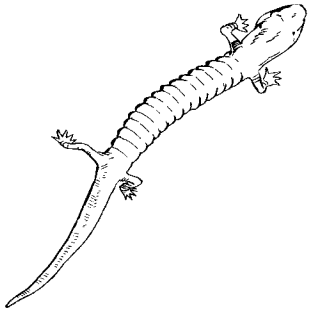
### TROGLOPHILES





*Troglophiles* are the next category of cave life. Troglophiles are animals that must live in dark, damp places to survive. Their home may be under rocks as well as in caves. Salamanders, crayfish, and some insects are classified as troglophiles.





### TROGLOBITES

*Troglobites* are animals that cannot compete for food and live outside of a cave. They resemble only a form of their relatives above ground. This group includes the blind crawfish, blind fish, blind salamanders, etc. Troglobites are usually identified by having no pigment, no sight system, and a lower metabolic rate. These animals are extremely rare and finding some will be a real thrill for you. However, do not disturb the animal. Look at it briefly and then move on, taking extra care to watch your step. And remember its location on the way out.

## RESOURCES

### BOOKS


*Adventure Is Underground,* by William R. Halliday. Harper and Row, 1959, New York.

*America's Neighborhood Bats,* by Merlin D. Tuttle. University of Texas Press, Austin.

*American Caves and Caving,* by W. R. Halliday.

*Cavers, Caves, and Caving,* by B. Sloane, editor.

*The Caves Beyond,* by J. Lawrence Jr. and R. W. Brucker.

*Caving: The Sierra Club Guide to Spelunking,* by Lane Larson and Peggy Larson. Sierra Club, 1982.

*Caving Basics,* 2nd edition, National Speleological Society, 1987.

*Depths of the Earth,* by W. R. Halliday.

*Exploring Caves,* by D. McClurg.

*On Rope,* National Speleological Society.

*Single Rope Techniques: A Guide for Vertical Cavers,* by N. R. Montgomery.

*Trapped,* by R. K. Murry and R. W. Brucker.

*Underground Worlds,* Time-Life Books.

### OTHER PUBLICATIONS

*Caving Information Series,* National Speleological Society.

*Commercial Cave List,* American Caving Association.

*The National Speleological Society News.*

The National Speleological Society's Annual Cave Rescue Issue

### SCOUTING LITERATURE

*Fieldbook,* No. 3300

*First Aid* merit badge pamphlet, No. 33301A

*Topping Out: A BSA Climbing/Rappelling Manual,* No. 3207

### ORGANIZATIONS

National Speleological Society
2813 Cave Avenue
Huntsville, AL 35810-4413

### BOOKDEALERS

American Cave Conservation Association
P.O. Box 409
Attn: Publication
Horse Cave, KY 42749

Cave Books
4700 Amberwood Drive
Dayton, OH 45424

National Speleological Society Bookstore
2813 Cave Avenue
Huntsville, AL 35810-4413

Speleobooks
P.O. Box 10
Schoharie, NY 12157-0010

Books can also be purchased at local bookstores and most specialty stores that sell caving supplies.

### EQUIPMENT

#### EAST OF THE MISSISSIPPI RIVER

The Speleoshoppe
P.O. Box 297-N4
Fairdale, KY 40118-0197

Blue Water Ltd.
209 Lovvorn Road
Carrollton, GA 30117

Pigeon Mountain Industries
P.O. Box 803
La Fayette, GA 30728

J. E. Weinel Inc.
P.O. Box 213
Valencia, PA 16059

Adventure 92
3661 Annelle Road
Murfreesboro, TN 37130

Custom Cave Gear
P.O. Box 7351
Charlottesville, VA 22906

L&S Sporting Goods
P.O. Box 176
Philippi, WV 25416

Bob and Bob
P.O. Box 441
Lewisburg, WV 24901

Inner Mountain Outfitters
102 Travis Circle
Seaford, VA 23696-2412

#### WEST OF THE MISSISSIPPI RIVER

CMC Rescue Inc.
P.O. Drawer 6870
Santa Barbara, CA 93160-6870

Gibbs Products
2608 East 3820 South
Salt Lake City, UT 84111


### ACKNOWLEDGMENTS

The Boy Scouts of America expresses its appreciation to the National Speleological Society Youth Group Liaison Committee. Special thanks goes to A. Bryant Betsill Jr., Jack S. Hissong, and Edward C. Kehs Jr. for their work in preparing this program feature.

## CROSS-COUNTRY SKIING CONTENTS

# CROSS-COUNTRY SKIING

## BACKGROUND

Winter means different things in different parts of the country. Always keep one thing in mind: Winter can be very unforgiving. You can't "wing it" like you often can in summer when weather conditions don't normally demand the same kind of precise planning and execution.

The big difference? The cold, of course. If you're not properly prepared, cold can stop you even faster than its opposite weather conditions (i.e., desert heat and a relentless, burning sun). Cold can chisel away at mental stamina, which can magnify negative effects on physical endurance. There is less room for error when it's cold, wet, or freezing cold—or all three.

Winter requires additional groundwork, above and beyond simply dressing warmly. Some types of preparation may be obvious; other elements may be more subtle. This Varsity Scout program feature blends several activities to provide a challenging but enjoyable experience, whether it's a preparing a racecourse or conducting a competitive event. Some might even consider it wise to consider a dry run, or dress rehearsal, just to ensure everyone's familiarity and skill level. You don't want to start cross-country skiing without knowing whether you're really ready to handle it.

Mastering the skills necessary to deal with the challenge of winter also helps provide a confidence boost that can help you deal with other challenges in life, away from the snow, away from the cold and discomfort—and distinct pleasures—of winter.

Learn the skills, enjoy the experience. Have fun.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from the program adviser.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Monitor the team advancement chart regularly.
- Conduct a Skiing merit badge clinic.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure activity.
- Plan a cross-country ski trip.

### PERSONAL DEVELOPMENT

- Have an expert teach the team winter survival skills.
- Participate in a conditioning program in preparation for a cross-country event.

### SERVICE

Conduct a winter clothing drive.

### SPECIAL PROGRAMS AND EVENTS

- Attend a cross-country ski event.
- Visit an outdoor outfitter.

## TYPES OF SKIING

There are two basic types of skiing: alpine and nordic. Alpine, which is the term applied to all downhill skiing, gets its name from the Alps, where it originated. Nordic skiing—i.e., cross-country skiing (sometimes called ski touring or X-C) and jumping—gets its name from northern Europe (especially the Scandinavian countries of Norway and Sweden), with its surplus of rolling countryside. (Although Norway and Sweden have some impressive mountains, too.)

Any other kind of skiing is strictly a spinoff from the alpine or nordic versions. For instance:

- The *biathlon* is cross-country skiing combined with a competition in rifle marksmanship (.22-caliber rifles on a 50-meter target range).
- *Telemark skiing* is a mix of both alpine and nordic skiing, using cross-country skis and a special technique on alpine slopes.
- *Backcountry skiing* (which includes mountaineering and may be called bushwhacking) adapts cross-country skiing to untracked terrain off the beaten path.
- *Speed skiing* is alpine skiing in a straight line, with no turns, at more than 130 miles an hour.
- *Snowboarding,* one of the fastest-growing segments of the sport, is a blend of surfboarding techniques on an alpine hill.

There are two main differences between alpine and cross-country skiing: equipment and technique. Alpine skis, boots, and bindings are heavier and more durable. The skis usually have metal edges to withstand all the "carving" of turns, and the boots are heavy to provide rigid support during high-speed turns. The bindings are carefully engineered devices designed to anchor a skier's boots to the ski for greater control.

Cross-country skis, by comparison, are far more lightweight (and are actually measured in ounces). They have the metal edges usually found only on backcountry skis for durability in the deep powder or rugged terrain, away from the prepared tracks found at cross-country centers. Cross-country ski bindings hold the toe of the lightweight, lower-cut boots in place but the skier's heel is free, allowing a skier to shuffle more easily across rolling terrain or up a trail.

Jumping skis are the heaviest (weighing up to eight pounds) and the longest (over 8 feet in length), but they use a cross-country type of binding, allowing "free-heel" skiing. For obvious reasons, ski orienteering, which is a highly popular sport throughout Scandinavia but almost unknown in this country, is conducted on cross-country skis.

### OVERVIEW OF CROSS-COUNTRY SKIING

While cross-country skiing hasn't always been a sport it has been one of the world's oldest activities. Historically, it was used for transportation and hunting.

A petroglyph (rock carving) in Norway showing a man on a ski has been dated at about 5,000 B.C., an indication that people were skiing at least 7,000 years ago. Scientists also have uncovered a sled runner about 10 feet long in a bog in Finland and dated it at about 7,000 B.C. Historians feel if sleds were in use, it's logical to believe skis also might have been used, so people may have been skiing as far back as 9,000 years ago. Only in the last century, though, has cross-country skiing become recreational (and competitive).

There are two types of cross-country skiing, the *classic* technique (also known as *diagonal stride*) and *freestyle* (also known as *skating*). In the classic version, the skis stay in prepared tracks (and sometimes, as in backcountry skiing, the skis even set the tracks as the skier breaks through the untracked snow). By comparison, skating, as the name implies, is more like speed skating, with no tracks. The skier kicks off to the side with each stride to propel himself, instead of the constantly straight-ahead movements used in the diagonal stride method.

Which technique is better? That's a question only the individual skier can answer. Some skiers prefer diagonal stride, while others enjoy skating when the snow has been packed. The important thing is they both work well; skating, however, is the faster technique.

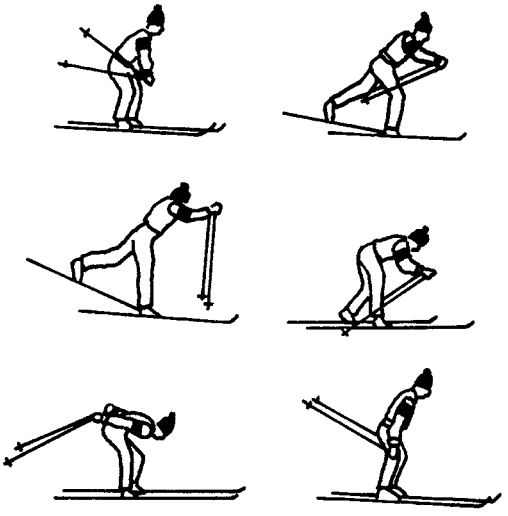
Backcountry skiing requires the use of both styles since it's nearly impossible to skate through untracked snow, even if it's quite feathery powder.

## CROSS-COUNTRY SKIING TECHNIQUES

Now that you're on skis, it's time to think about the two basic cross-country techniques for moving: diagonal stride (or classic technique) and skating.

Most simply put, diagonal stride is skiing as if you're running, all of your energy concentrating on arms and legs (and skis) going front-back, front-back. You're leaning a little more forward than in running, but you're propelled by pushing off one ski and using your pole for greater propulsion. The diagonal part of the stride is illustrated at "full extension" when a skier's opposite hand and ski (e.g., left hand forward and right ski kicking back) form a diagonal line.

In skating, on the other hand, you ski like a speed skater, often crouched lower than in classic style and with your legs alternately kicking off to the side, gaining thrust as you dig that inside edge into the snow and push forward.



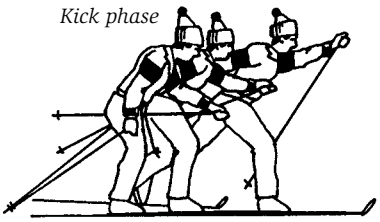
*Double-poling*

Double-poling is an alternative technique, faster than simply striding but not as fast as skating. And it can be used while skating or skiing classic style, in tracks or out. The skier—with shoulders "squared-up" (perpendicular) to the skis—plants both poles in front of him, outside the skis and forward of his feet. The skier angles the poles slightly backward as they're planted in the snow and then pushes down, almost as if he's falling on top of the poles. With knees slightly bent, he bends from the waist, as if on a hinge. Pushing down, compressing, the skier is propelled over the snow as he thrusts backward. This method is used for flat or gently rolling (undulating) terrain but isn't very practical for moving uphill.

## DIAGONAL STRIDE—THE TRADITIONAL STYLE

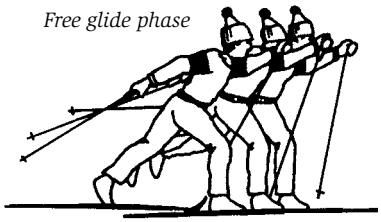
Diagonal stride is the technique most skiers use when they begin cross-country skiing. It is defined in three phases: the kick phase, the free glide phase, and the poling phase. You start by merely walking on skis and as you increase your pace, you find you're skiing, gliding over the snow. The key is to shift your weight from one ski to the other with each stride. Shifting your weight makes your stride more efficient than merely maintaining a walking tempo because by making that commitment—by making that weight shift—you apply pressure down on the ski and begin to push off, which leads to a lengthier glide. Keeping your weight evenly balanced between skis limits your ability to push forward, which limits your ability to glide. Sure, you can do it; it just isn't as efficient and you won't get the same length of glide as you will springing from one ski to the next, lengthening your stride and lengthening your arm movement. As your arm swings forward, it pulls your body forward with it.

*Kick phase*



The kick phase begins when the legs come together and ends when the foot lifts off the snow.

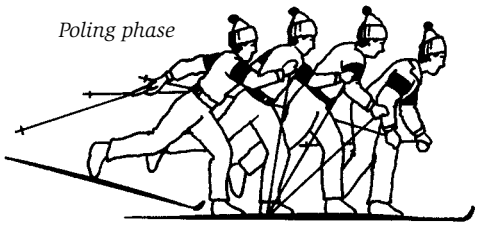
*Free glide phase*



The free glide phase begins at liftoff and ends when the pole is planted.

While runners may keep their arms in close to their body, ski runners need to use their arms. Arm use, in fact, helps set the tone while skiing. Drop your arms and you'll find, except for great effort, you can do little more than shuffle. But get those arms swinging fully from front to back, in sync with the opposite leg, and you'll find what stride and glide really mean to cross-country skiing. Forward arm movement is vital to progress on skis.

*Poling phase*



The poling phase begins at the pole plant and ends when the legs come back together.

## SKATING—FASTER AND FASTER

For centuries, hunters in Scandinavia used two different length skis in what has become known as the skating technique. The longer ski was used for gliding while the shorter ski was used for pushing off to the side to propel the hunter-skier. The short ski was virtually the sole means of propulsion; the hunter was carrying a bow and arrow, spear, or, gun so there was no way to use ski poles, leaving the short ski for thrust.

Into the early 1980s, the technique was used solely by ultra-distance skiers, that is, people who raced more than 50 kilometers in Norway, Sweden, and Finland. Distance races are usually held on mostly flat or rolling terrain, and the technique was used because it was faster than the diagonal stride. But only distance racers used it until American Bill Koch, the 1976 Olympic medalist who had used the technique as a kid growing up in Vermont, showed it could be used to win shorter races. He won four World Cup races during the 1981–82 season en route to becoming the only American to win the World Cup cross-country title.

By the next season, the technique was being used by most World Cup skiers. Within a couple of years, the World Cup schedule was evenly split between classic and freestyle races. And the technique grew rapidly in popularity among recreational skiers in the mid-'80s.

Koch popularized the style, known in Europe as the Siitonen Step, named after a Finnish policeman, Pauli Siitonen, who used it to become one of the premier ultra-distance skiers in Scandinavia. The marathon skate, so named because the way a skier kicked off to the side copied a speed skater's stride, started as a one-step technique: one ski in the prepared tracks, one ski outside, pushing off. Quickly, though, racers found that getting completely out of the tracks and skating with both skis enabled them to go even faster.

One thing that skating does is eliminate the confusion over kick waxes. Skating is all glide wax, from the tip of your skis to the tails. Even uphills can be skated, and where you can't skate, you can herringbone to the top.

Skating is a mix of double-poling and gliding. Remembering to keep your heels close together (but not rubbing), angle a ski to the side (pretend you are in the middle of an imaginary clock and angle your ski to the one o'clock position). Then shift your weight onto that ski, pushing it to the outside as you're gliding, and rolling the ski on its inside edge to provide push. Then shift your weight to the other ski, rolling to the inside edge as you push off, and shift back to the first ski.

While you're shifting and gliding, plant both poles simultaneously for greater thrust. Remember, plant the poles outside the skis, slightly ahead of where your feet

are; poles planted between the skis inevitably will result in a face-plant in the snow.

Remember, too, to keep your hips over the gliding ski. If you don't, a lag is created that will slow everything and keep you off-balance.

There are reports of old-time Scandinavian hunters whose constant practice of skating was easily detected in their unusual gait. Apparently, they walked with a herky-jerky motion that allegedly was created from the relentless pushing-off on the short ski that created an imbalance in their hips. Also, there have been racers, perhaps most notably 1992 Olympic triple gold medalist Vegard Ulvang of Norway, who have had hip or muscle problems because of the strain of pushing off. Those cases, however, are but a small percentage of the vast number of ski-skaters, clearly indicating skating isn't as physically hazardous as early critics of the technique claimed.

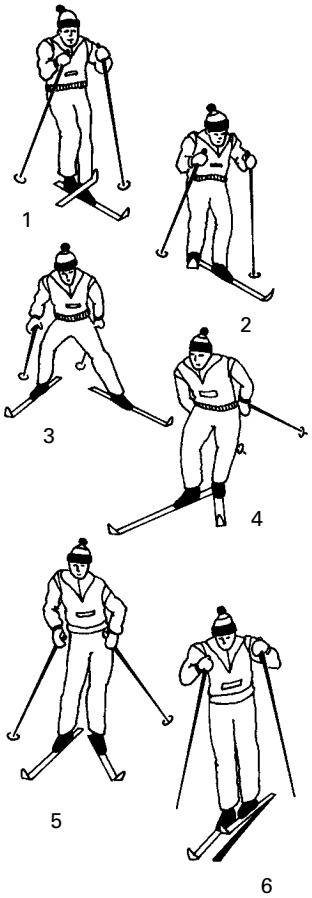
### SKATING STYLES (TO V OR NOT TO V)

There are three basic skating techniques: the marathon skate, V-1, and V-2.

#### MARATHON SKATE

Bill Koch and Pauli Siitonen used the marathon skate style. In this method, one ski is "ridden" in the prepared track while the other is used to push off to the side. Shift your weight to the pushing-off ski, then recover as you glide along on the ski in the track. To make it easier, lift the heel of your ski in the track as you shift your weight back to push off to the side. If one leg gets tired after a while, change sides.

*Marathon skate*




#### V-1

In the V-1 method, the skis are placed in a V. You then begin by double-poling to one side while you're riding one of the skis. For example, you lean over—"commit"—and double-pole on the left for power as you come up over the left ski (your hands are thrusting behind you at this point). Recover with a weight shift back to the right ski, and re-pole as you shift again to the left ski. It's a double-pole in which you're slightly off-center, but if you didn't lean to one side or the other, you'd wind-up placing your poles in the middle of the V, which normally tends to reduce forward motion.

#### V-2

This method is similar to the V-1 method in that the skis are placed in a V and you will use the double-pole technique. In this case, however, you will double-pole with each stride. It's a rapid-fire technique; everything is at a higher tempo than the V-1. Your feet are closer together at the start, and your poles should hit the snow just before the gliding ski. You don't follow through as much (it's a shorter poling motion) and you need quick-step balance to maintain the accelerated pace as you quickly shift weight and almost bound from one ski to the other. It's tiring, but racers find it can give them a short burst at a crucial part in a race.

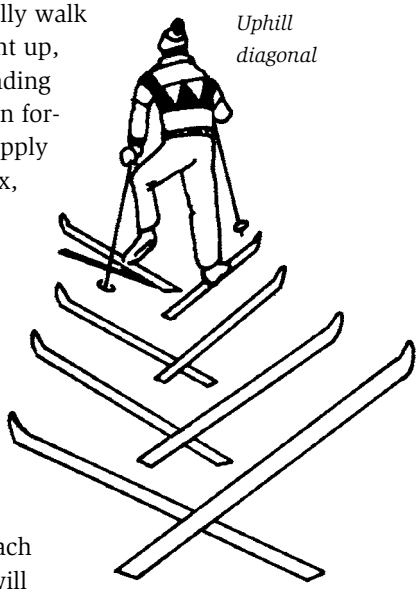
## HILLS—WHAT GOES UP . . .

There are two ways to ski hills: up and down. Uphills usually are easier for the beginner because there isn't the fear generated by downhills of too much speed followed by the inevitable nasty fall. Keep one thing in mind: Don't go up any hill you don't want to ski back down.

#### UPHILLS

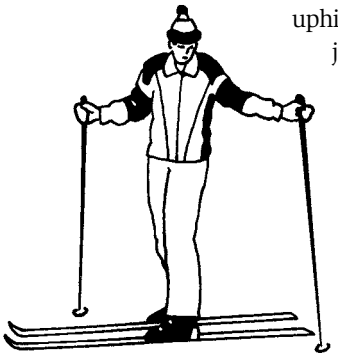
Just as you don't normally walk up a hill standing straight up, you don't ski uphill standing upright. You want to lean forward over your skis to apply traction to your kick wax, and—making certain to keep your hands ahead of you and your arms constantly moving—pick up your pace a bit to punch your way up the track with a light jog. Keep your head up and remember to keep your arms moving; as each arm moves forward, it will pull your body with it.

*Uphill diagonal*



You'll quickly find that skiing uphill requires better conditioning than simply skiing a snow-covered golf course or the gently undulating terrain at the foot of a mountain. If you have to, slow to a walk until you regain your breath or the climb eases.

Walking up a hill often can seem to take forever, and it seems even longer if you're having wax problems and you find yourself slipping back because your kick wax isn't giving any kick. And if you've waxed for skating, you won't have any kick wax, anyway. In either case, poor wax or no wax, go to the herringbone—tips apart and ski tails close together; the farther apart you put the tips, the better your edge control. Bend slightly forward and quickly raise one ski ahead and then the other. Move uphill at a brisk pace, even at a light jog, with your skis like a V; bending your knees inward helps produce a better edge on the inside of your ski for traction.



1

2

3

*Uphill traverse*

## DOWNHILLS

This is where many skiers put not only their talent but also their courage on the line. There can be a "need for speed," but you also want to know there's a "need to heed." In other words, don't ignore the potential for trouble, for a bad spill, and for creating problems for others behind you on the trail. But mastering downhills throws open the door to far greater fun in cross-country skiing.

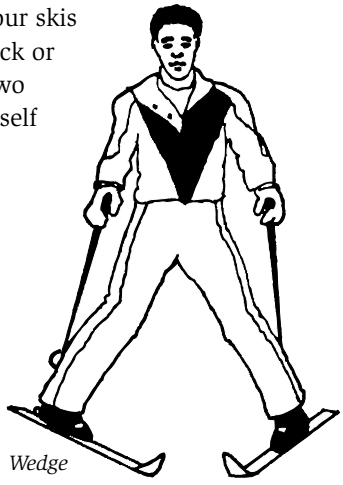
Just as you don't go uphill standing straight up, you certainly don't want to tackle a downhill standing completely upright. Crouching reduces your center of gravity, gives better balance, and provides better stability and better control of your skis.

As you start into a downhill, however mighty or modest, you want to remember a few basics:

- Keep your weight centered (balanced) over both feet.
- Bend your knees.
- Keep your hands low and in front of you, as if you're holding onto a bicycle handlebar.
- Lift your hands and your body normally straightens, too.
- Keep your skis hip-width apart for good balance.

### WEDGE AND SIDESTEPPING

Besides stepping out of your skis and walking down the track or simply falling, there are two ways to slow or stop yourself on a downhill slope. Take one ski (or both skis) out of the tracks and form a wedge; roll your knees closer together to lift the outside of the ski, forcing the inside edge onto the snow to slow you. The closer you bring your knee, and the harder you push down, the more pressure you create on the inside ski edge to brake your descent. By keeping your hands out front and holding that phantom handlebar, you also can steer yourself through turns or curves.



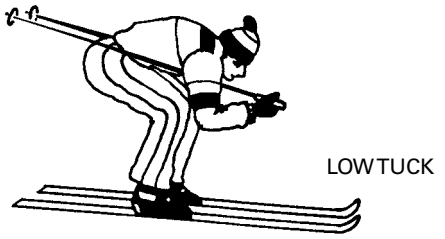
*Wedge*

Or you can sidestep. Turn your skis across the trail and slowly make your way down the trail. Roll your ankles toward the hill and your upper body away from it to edge, helping you step down sideways. Use your poles for balance and they also can be used to slow your descent.

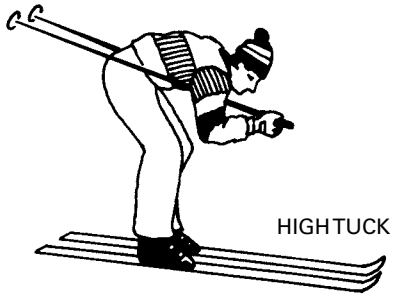
*Sidestep*

**TUCKING**

To improve their speed while going downhill, skiers also can tuck their bodies. Bring your feet closer together and crouch lower; instead of holding your hands out, bring your hands together in front of your face with the palms turned up and your poles under each arm, held against your side.



LOW TUCK



HIGH TUCK

RESTING TUCK

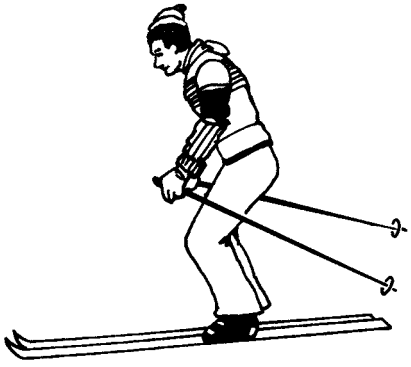
## TURNS

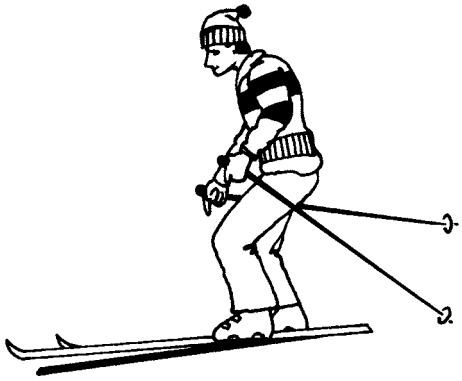
Skiing obviously doesn't always involve straightaways. You have to know how to make a few turns, even if it's only to turn around and go back to where you started. And turns can be tricky.

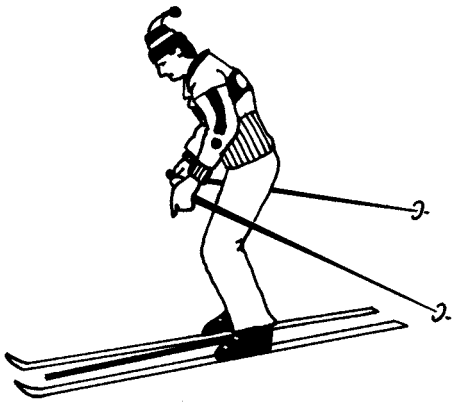
*Step turns* are just what the name implies: You step in the direction you want to go, including doing a "180" (making a U-turn) and heading in the opposite direction. A "180" can be done (by beginners and 99.99 percent of recreational skiers) only while standing still. If you're skiing, step turns require a rapid series of small incremental steps in the direction you want to go.

While skiing, slow down and start to shift your weight in the direction you want to go while lifting the tip of one ski and starting to point that way. Then glide on that inside ski and lift the outside ski, bringing it close to your other ski. When you drop that outside ski, roll your weight back onto it and repeat the process, lifting the tip of the inside ski and turning it more in the new direction as you shift your weight once more to the inside. You'll start step turns with small steps but once you learn how it's done, you'll see the steps become bigger and the turns become shorter, using a smaller radius.

*Skate turns* are used to help maintain speed. They're similar to skating except that instead of coming back to center and continuing straight ahead, you keep turning in whichever direction you want to go. Because of the speed involved, it can be a little more difficult to master.







*Step turn*

## EQUIPMENT

### SKIS

There are a wide variety of cross-country skis in waxless or waxable models. The waxless models are extremely popular with new skiers who don't want—or need—to master the demons of kick and glide waxes; waxable models are available for classic skiing or skating, but the reality is that "classic" skis certainly can be used for skating as well. If you plan on—or find yourself—doing mostly skating, though, it would be smarter to gets skis designed for that technique.

### BOOTS

Cross-country boots are more lightweight than their alpine counterparts and don't go as high up the calf. The growth of skating since the early 1980s has brought a similar growth in the skating boot for greater ankle support and durability. While any alpine boot can fit into any alpine binding, cross-country boot binding systems are more one-to-one complementary. (For example, Salomon and its so-called Salomon Nordic System, which is used by more than a half-dozen other bootmakers, doesn't fit a Rossignol New Nordic Norm binding, and neither of them fit the old 75-millimeter, three-pin system that is still in use.) It's basic, and most salespeople will keep you straight, but just keep in mind that you need to buy a boot that coincides with whatever binding system you have.

### POLES

Before skating, there was only one style of poles. Now, though, skating requires longer poles than classic skiing, so think about what you're going to be doing and about what style of skis you'll be using. Yes, you can skate with the shorter classic poles and you can diagonal stride with skating poles, but neither is as much fun as it would be using the right equipment.

### CLOTHING—LESS IS MORE

Newcomers usually don't realize how little they need to wear in skiing cross-country and they often overdress. Cross-country helps generate a lot more body heat than alpine (i.e., let-gravity-take-over) skiing. Because you're using your arms and legs so much more during cross-country skiing, you can build body heat quickly. Make sure you're not dressed as if you're alpine skiing.

If you go for a run with snow on the ground, chances are you'll dress a little differently than for summer or even autumn runs. Think of cross-country skiing in the same way; pretend you're going winter running.

Layer your clothes—wear lightweight clothing in layers and make sure it's clothing that allows plenty of freedom of movement. One suggestion if you haven't bought a one-piece, cross-country outfit: Start with polypropylene underwear, then loose-fitting pants and sweatshirt over a turtleneck. The polypropylene helps keep you dry by "wicking away" perspiration from your skin to the next layer of clothing.

You don't want to be toasty warm when you start; pretty soon you'll be firing up that body boiler and then you could become too hot. It may be best to be cool, perhaps even slightly chilly, when you get started. Depending on the weather, you might wear a vest, a windbreaker, or a shell, and a hat and lightweight gloves, which are always—always—in order. That way, if the sun comes out and it gets warm, you can peel off the vest, jacket, or shell and still remain comfortable.

### ACCESSORIES

Lightweight gloves and a headband or lightweight hat are musts. Again, you're usually generating a lot of body warmth, so you don't want the heavy knit cap or gloves that alpine skiers traditionally wear. Still, you'll want something on your head—even a headband—because studies have shown that 70 percent or more of a person's body heat escapes through a person's uncovered head. Make sure any gloves are reinforced between the thumb and index finger to help offset all the wear and tear of poling.

Depending on where you're headed and how long you'll be out, you may want a small backpack to carry some kind of beverage and perhaps a small snack or lunch, dry hat or woolen socks, and maybe even another sweater or windbreaker. Remember, nothing keeps you as warm as wool. If it's springtime, you can get away with cotton or polyester socks, but in midwinter, bring an extra pair of woolen socks. And in spring, the small backpack will give you a place to stash your vest, gloves, and sweatshirt as you peel them off.

Pay attention to your extremities—hands, feet, ears, cheeks, chin, and nose. If your hands get cold, stop and "windmill" your arms, forcing blood into the fingers. In cold weather, you can't check your ears and face too often to avoid frostbite.

## WAXABLE AND WAXLESS SKIS

There's no black magic or voodoo involved in waxing properly for cross-country skiing, but that doesn't mean it's a snap, either. In fact, waxing may be more responsible than anything else for driving more people out of the sport, mainly because waxing can be such a hassle.

It probably would be easier to write a book about waxing (because you can devote considerable space to discussing all the variables) but let's try to touch on a few basics here.

The development of waxless skis in the early '80s opened the sport to millions of people who simply didn't want to have to figure out which waxes to use for kick and which for glide, especially on a day with changing conditions. Though even if they got that right, they didn't want to have to make sure they waxed their skis correctly, that they didn't apply too little (or too much) in the delicate application process. They wanted to simply put on their skis and go. It's hard to argue with that logic.

Waxless skis usually are used by newcomers or vacationers who don't want to bring their cross-country skis with them to a resort, so they rent some at the touring center. A plastic fish-scale design on the bottom of each ski provides the grip of kick wax for going up a hill. On the other hand, the design inhibits some of the ski's glide, slowing the skier, which explains why those who regularly ski cross-country normally move up from waxless to waxable.

### WAXING

In waxing, the kick (or grip) wax goes under the binding—the so-called wax pocket that runs from the back of the heel to perhaps a foot in front of the binding (that's where you'll be applying pressure when skiing). The glide wax goes on the tips and tails of the ski.

Depending on conditions, a skier may need to apply a second or even a third type of kick wax. Binder wax goes onto the ski base and helps bind kick wax to the ski, which may be the only way to retain waxes under some tricky conditions.

When you're skiing, the kick wax enables microscopic irregularities in the snow to penetrate the wax so there is a good "bite" when you put weight on that ski, thus giving it some kick as you move forward. But when a ski is in motion—gliding on a microscopic, thin layer of water between the ski and the snow surface—those irregularities can't dig into the ski.

In subfreezing conditions, it's usually pretty easy to wax because the snow surface isn't changing too much. But at other times, because you're dealing with microscopic, infinitesimal particles and continually changing snow, waxing can be tricky. Put on too much kick wax and you collect snow on the bottom of the ski, which impedes your skiing; apply too little, though, and you slip all over the place because there's no grip.

Racers tell stories of having so much kick wax they could climb a tree; the flip side of that, though, is that they had no glide, so they'd have had to climb—not ski—down. Proper wax application is a constant balancing act between putting on too much or too little.

Kick wax gives grip to what is, for a split-second, a motionless ski. Essentially, the ski is sitting there in the track; when you step down on it, you're actually beginning the process of motion because your next move is to push it backward to thrust yourself forward.

Waxes are hard or soft; klister is the softest of the soft, a sticky substance that's like a petroleum jelly but which also provides excellent glide under the right application and conditions. A hard wax is used in colder conditions when the snow is dry; soft wax is used for warmer or warming conditions. In warm weather, which tends to round the edges of snowflakes, hard wax won't allow those microscopic particles to penetrate to provide grip.

### WAXES AND SNOW CONDITIONS

Since chances are good you'll be more familiar with snow conditions than with the various characteristics of different waxes, let's look at the proper application of wax, according to snow conditions. There's a basic rule to consider: The warmer or wetter the snow, the softer the wax; the colder or drier the snow, the harder the wax.

Waxes, which are effective in a broad range of temperatures and conditions, come in colored containers keyed to the conditions: blue and green, for instance, for colder weather, red or purple for warmer conditions. The colors give you a starting point; you decide how much and what you'll need.

There are two basic types of snow: the "real thing" and refrozen snow. Everything fits into one of these two main categories. You'll want hard waxes for fresh snow, "the real thing," and klister for refrozen conditions. And make certain the ski is dry before you attempt to apply any wax.

Klister, which comes in tubes, helps to provide grip and to keep dirt off the ski base. When you're waxing with klister, be prepared for tricky conditions. Warm the tube lightly (you'll never get cold klister out of the tube), then apply a horizontal line of klister down each side of the center groove and spread it with either the plastic spreader that normally comes with klister or the heel of one of your palms. (Realize, of course, you'll need some heavy-duty handcleaner if you apply the sticky stuff with your hand.)

Hard wax comes in small containers that allow you to apply it like a crayon before you "cork it," that is, use a synthetic or natural cork to smooth it onto the ski.

## "REAL" SNOW

There are three main subclasses in this category: fresh snow, zero-degree snow, and old or "dead" snow. Let's take a closer look.

### FRESH SNOW

Fresh snow is snow that hasn't been refrozen. In other words, the temperature hasn't warmed up and then gone below freezing since this snow fell, so it retains most of its original form. With this kind of snow, you can look at a thermometer and wax according to the formula on your wax containers.

There are three basic ways to wax for fresh snow:

- If it squeaks when you walk on it, use green hard wax.
- If it's fluffy "champagne" powder, use extra blue or blue wax.
- If it hasn't refrozen, use the thermometer for guidance, according to the formula on the wax container.

### ZERO-DEGREE SNOW

Named by the Europeans, who use the Celsius scale with zero degrees as its freezing point, zero-degree snow can be difficult to judge. The slightest variation in either direction can make things change dramatically—a degree warmer can bring more sloppiness and softening, while a degree colder can refreeze the snow. That creates conditions that most skiers don't enjoy because the waxing can be so perplexing. It may be best to start with yellow klister.

Zero-degree snow poses a handful of problems even for waxing experts, so don't be discouraged when (not if but when) you run into problems. Just keep experimenting until you find something that works, and try to make a mental note so that you can start with that wax the next time you encounter the same conditions.

### OLD OR "DEAD" SNOW

When snow first falls, it is made up of six-sided flakes. As someone skis over these flakes or as they're groomed by machine, however, the edges get knocked off. Old snow has crystals that are barely snowflakes any more; they've lost their points and are little more than icy ball bearings. You probably won't be able to make a snowball because the snow crystals are so rounded that they don't stick to one another. Under these conditions, use the extra blue or purple wax.

## REFROZEN SNOW

Powdery, fresh fallen snow (sometimes called *champagne snow* because it's so light) usually is dry. That's because the water in the snow crystals is still frozen. But when they're newly fallen, snowflakes also have their jagged edges, which could penetrate too far into a soft wax and slow the ski; a hard wax allows penetration but not saturation.

Over time, though, the weather inevitably warms. If it drops below freezing at night, though, the snow goes through a melt-and-refreeze cycle that forces it to clump together. As those jagged edges soften, everything takes on some icy characteristics.

There are three main kinds of refrozen snow: ice, granular, and wet. Here's a closer look at each kind and the types of klister you'll want for them.

### ICE

Ice is ice. Use blue or purple klister for your skis.

### GRANULAR

This kind makes a "crunch, crunch" sound as you walk on it. In spring, as the weather gets warmer, traffic can turn ice to granular snow. Use purple or red klister.

### WET

This kind makes a "slop, slop" sound. Perhaps it's been raining. Perhaps the weather has turned very warm (such as on a beautiful spring day), and water is running along the tracks because everything's melting. It's sloppy. And you'll want red and silver klister.

| WAXING TIPS |
| --- |
| Since waxing is such a vital ingredient to fun when you're cross-country skiing, take time to remember a few important items. |
| **Dry, Then Apply.** Make sure any ski base is clean and dry before you apply any wax. |
| **Warm Over Cold.** It's possible to layer a warmer wax over a cold one, but it's impossible to layer cold over warm because the colder wax on top rubs off when it touches the snow. If you used warm wax last time out, make certain you clean it off before applying a colder wax. |
| **Smooth and Even.** Wax application is a delicate balance between too much and too little. Waxing smoothly and evenly means there are no bumps or pockets where dirt can accumulate and eventually slow you down. And be aware that two or three thin layers of the same wax, properly applied, are better than one thick layer. |
| **Go With the Flow, Tip to Tail.** Apply wax (and cork it in) in one direction, tip to tail, from the front of the ski to the back. |
| **TLC: Thicker, Longer, Change.** If you're having problems with the wax you picked, try TLC: apply it thicker and longer. If that doesn't work, change to another wax. |

## CROSS-COUNTRY SKIING PRACTICE

Practice sessions should be a standard part of the cross-country activity participation. They can be part of the regular team meeting or can be held at a separate meeting. These sessions develop the Scouts both physically and mentally.

Many opportunities will occur to blend the sport of cross-country skiing with the game of life. Smart Coaches and captains use these opportunities to strengthen the individual Scout as well as the Varsity Scout team.

Practice sessions have four parts:

1. **Warm-up and conditioning exercises.** Simple warm-up exercises, on and off the snow, allow for loosening of the muscles and help in avoiding injuries. Vary the pace and type of exercise. Questions should be asked to stimulate thinking about proper eating habits and the importance of exercise throughout life. This portion of the meeting should take about 10 minutes.
2. **Skills development drills.** Teaching the fundamentals of cross-country skiing may be necessary as a part of this meeting. Plan simple drills to reinforce the points.

   Skiers should work as individuals and in small groups so that no one feels bored or slighted. This instruction should be brief to keep things moving and to save time for other fun activities.
3. **Team talk.** Make this a regular, normal part of practice. Use it for education and personal development. Team members should be encouraged to talk about such things as rules of the sport, principles of team play, team tactics, and concepts of fair play.

   These rules, principles, tactics, and concepts apply to their everyday life as well as the sport of cross-country skiing.
4. **Practice.** The warm-ups, skills development, and team talk should lead to the practice game. Team members enjoy this part of the meeting the most. Tie into the game what was just learned during the drills and team talk segments.

## WARM-UP AND CONDITIONING EXERCISES

Healthy young skiers are always ready to ski and rarely look forward to any preliminary exercises. The best way to train for cross-country skiing is to cross-country ski. But if conditions aren't right or you are meeting indoors, exercises are the best way to stay in shape. It is important to avoid making the warm-up drudgery. Interpret its importance in helping get team members ready for strenuous exercise.

The warm-up exercises used and the attitude about them will strongly influence the Scouts' lifetime attitudes about exercise.

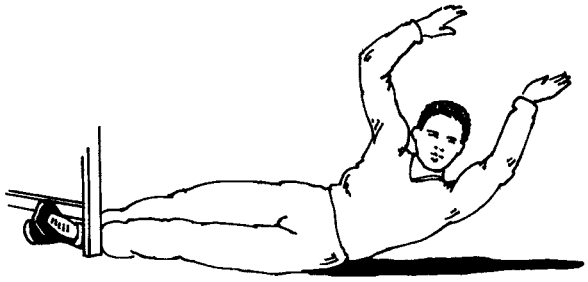
Select new exercises for each practice, and also repeat some that have been done before.

To begin, team members position themselves in a circle, in double lines, or in a semicircle facing the leader. Let members take turns choosing and leading exercises with the members.

Remember: Demonstrate the exercise first. Tell why the exercise is important. Have team members do the exercise slowly together. Then exercise at regular speed.

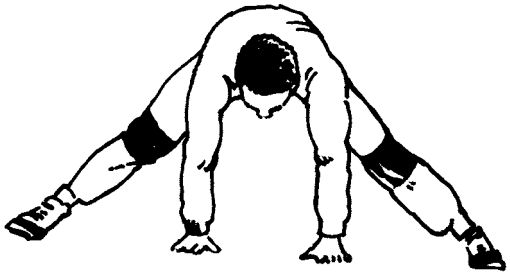
## STRETCHING EXERCISES

- **Lazy comma.** Lie on your side with your arms overhead. Hook your feet under a couch or bed (or have someone hold them) and slowly raise your body. Count to three. Repeat four times on each side.



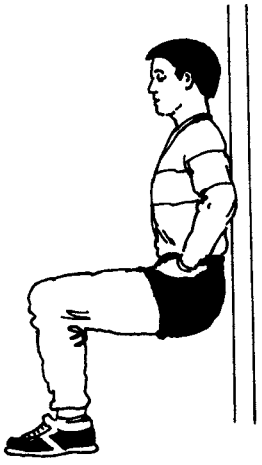
*Lazy comma*

- **Front split.** Lie on your stomach. Do a pushup and hold your arms stiff. Then throw your feet forward and out so that they land on the same line on the floor as your hands. Jump back to prone position. Repeat five times.



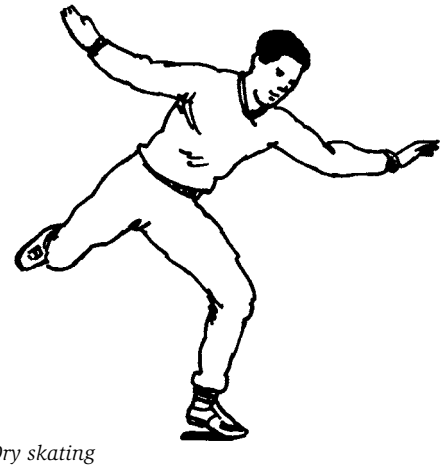
*Front split*

- **Phantom chair.** Stand with your back to a wall with your feet 18 inches out from the base of the wall. Sink down to a sitting position, hold for 15 seconds, then rest and try again. When you can count to 30, try it on one leg.



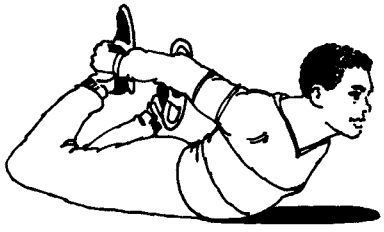
*Phantom chair*

- **Dry skating.** (Imitates the position used in leg-pushing traverse and in normal skating.) From a standing start, leap forward, spreading your arms. Land on your toes and then jump to your other foot. Repeat 12 times.



*Dry skating*

- **Rock and roll.** Lie down on your stomach and bend your knees until you can reach back and grab each instep with a hand. Once you have hold of your feet, pull with your arms, arch back, and raise your head. Rock forward and back three times, rest for a moment, then rock three more times.



*Rock and roll*

## STRENGTH

- **Pullups.** Using an overhand grip on a horizontal bar, raise your body until your chin is above the bar. Lower your body slowly.
- **Situps.** Lie on the floor. Pull your feet back, raising your knees. Place your hands on your shoulders or behind your neck. Raise your body until your nose touches your knees.
- **Pushups (modified).** Assume a hands-and-knees position on the floor. Bend your arms and lower your trunk until your chin touches the floor.
- **Isometrics.** Ball squeeze—squeeze a tennis ball in each hand. Hold for eight to 10 seconds. Repeat.

### CARDIOVASCULAR

These activities will benefit the heart, lungs, and circulatory system: walking, jogging, cycling, swimming, canoeing, and rowing.

## ORGANIZING A TOUR RACE

You can organize a variety of races, depending on where you live and what type of facilities are available.

### THE COURSE

In cities, try recreation areas, golf courses, bike paths, race tracks, and unplowed back roads for your racecourse. In the country, any suitable terrain will do. Make sure to obtain the proper permissions.

Courses can use a loop (ending at the starting point) or go from one location to another. The most popular races are between 10 and 15 kilometers (1 km = .62 miles) in length. Select the trail site before snow is on the ground so that any necessary clearing can be done. Also measure the length of the course. An ideal course would be equal parts uphill, downhill, and level areas. Some clearing or shoveling may be needed to get the course ready for the race.

#### PREPARING THE COURSE

The course can be prepared with a snowmobile and sled. The path should be packed 5 to 6 feet wide, with the tracks 2 to 4 inches deep, with about 6 inches between the two inside edges of the skis. For large groups of skiers, prepare two sets of parallel tracks.

One of the best ways to prepare a course is to tow a skier behind a vehicle. Prepare the course shortly before the race so that it won't freeze. If it warms up after you've set the track, it may be best to reschedule the competition.

Once you have prepared the course, set markers every kilometer or mile and make a detailed map of the course.

### TYPES OF RACES AND SCORING

Races can be determined by individual times or relay teams. Group scoring also can be used (adding everyone's time, adding the top five or 10 times, etc.).

Numbered paper bibs are given to all competitors shortly before the competition begins. Start and finish times are recorded by bib number.

Mass start races are the easiest to time. Everyone starts at the same time with a chronometer, or master timepiece, recording the start time. Have a backup watch. Record each racer's finish time with the chronometer.

### OFFICIALS

You will need a race director, a race secretary, time keepers, and a finish judge.

- The *race director* is in charge of the race and coordinates all other officials.
- The *race secretary* is in charge of all the paperwork—assigning bib numbers and publishing the results.
- The *time keepers* record the finishing times.
- The *finish judge* records the bib numbers of the competitors as they cross the finish line.

You may need other personnel depending on the size of the competition.

### RULES

The rules for competitive cross-country skiing are few and simple.

1. Follow the marked course.
2. Give way (step aside) if you are overtaken, on the first request.
3. Finish the course on at least one ski under your own propulsion.
4. Comply with the directions of race officials.

## CROSS-COUNTRY SKIING ETIQUETTE

More and more skiers are turning to ski touring centers in search of well-marked trails and tracks that are already set. Chances are you will be meeting skiers on the trail. Cross-country skiing will be more enjoyable for you and them if you follow certain rules.

1. **Stay on the trails.** Trails are laid out for the skiers' safety and convenience. Leaving the trail may cause you to encounter unknown hazards and become lost.
2. **Pass on the flat.** A faster skier should indicate his desire to pass by calling, "Track." The slower skier should yield by stepping out of the track to the right where possible.
3. **Don't pass on a hill.** Try not to pass on a downhill. Save it for the flat where the slower skier can maneuver more easily.
4. **Yield the right-of-way.** The skier going downhill has the right-of-way since he is moving faster and may have less control. Do not descend a hill until the trail is clear.

5. **Ski in the correct direction.** If the trail is one-way, be sure to ski in the proper direction. If a trail has two sets of tracks, ski the set of tracks on the right side.

6. **Don't obstruct the trail.** Move off the trail as quickly as possible after a fall. This will prevent collisions and allow other skiers to pass. Fill sitz-marks (depressions in the snow caused by falling) before proceeding.

7. **Check in and out at ski centers.** Ski area personnel often spend time searching for skiers who failed to sign out upon returning.

8. **Do not ski alone.** Longer tours should not be attempted alone. Solo skiing on trails that are not patrolled should not be attempted. Always ski with a buddy.

9. **Know the trail conditions.** Obtain information on trail conditions by reading posted conditions and studying the trail map.

10. **Fill in sitzmarks.** A hole in a downhill track can be hazardous to other skiers. Once these freeze they are difficult to fill.

11. **Do not walk in tracks.** This ruins skiing for everyone. If necessary, walk to the side of the trail.

12. **Leave dogs at home.** Dogs leave paw marks and feces on the trail. Dogs also can be a hazard by getting in the way of skiers and chasing wildlife.

13. **Pay area usage fees.** If you wish to use well-groomed and maintained trails, be willing to pay for them.

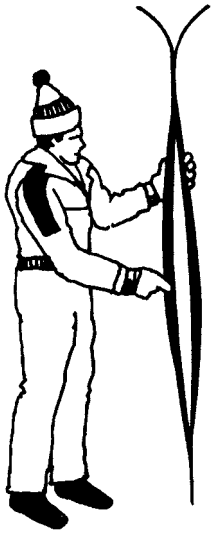
14. **Do not trespass.** Ski only on established trails at ski centers. Wandering from these trails may endanger the existence of the present trail system. Secure permission before skiing on private property.

15. **Respect private property.** Do not cut fencing. Leave gates the way they were found, open or closed. Keep away from private buildings.

16. **Respect your environment.** When cross-country skiing, leave nothing behind you except your ski tracks. Litter, initials carved in trees, etc., will only detract from the next person's enjoyment of that scene. Leave the wilderness as wilderness and it will be there for people to enjoy forever.

## CROSS-COUNTRY SKIING TERMS

**Camber pocket.** *Camber* refers to the force necessary at mid-ski to flatten that ski on the snow. The *pocket* is that section of the ski where you put "kick" wax for grip. *Kick wax,* or grip wax, gives the skier traction. The pocket is that stretch from the back of the heel to 12 to 18 inches ahead of the toe-plate, depending on how much force you exert in flattening that ski. It's also known as the *wax zone.*



*Camber Pocket*

**Camber stiffness.** While the tip and tail of a ski sit on the snow, the middle of ski should be slightly above the snow, touching the surface only when a skier bears down to provide propulsion for gliding. Since strength and power in pushing forward on skis vary from skier to skier, stiffness also will vary. Two skiers may have the same model and the same length of ski, but unless they have nearly identical bodies and nearly identical techniques, they'll probably have different cambers. Recreational skis have a softer camber than racing skis.

**Classic technique.** For years, this was known as *diagonal stride* skiing. However, when skating became popular as a racing technique in the 1980s, the term "classic" was applied to the traditional way of skiing and the name "freestyle" was invented to indicate a race in which a skier was free to use either style, diagonal stride or skating.

**Diagonal stride.** Skiing with both skis moving straight ahead (as opposed to the sideways motion in skating). Usually done in prepared, machine-set tracks, but in the backcountry, the diagonal stride method is used to set tracks by simply skiing through the snow.

**Double-pole.** Double-poling is a technique in which the skier bends at the waist, hinge-like, and pushes off with both poles simultaneously. The technique can be faster than the diagonal stride but it's not as quick as skating on groomed trails.

**Fall line.** If you take a pebble and drop it on a hilltop, the route that the pebble takes in bouncing and falling to the bottom of the hill is called the *fall line.* It's not necessarily the fastest route from top to bottom; it follows the terrain and, when you're skiing, the fall line will continue to travel downward. When you traverse a slope, you're in and out of the fall line, skiing back and forth across it.

**Flat ski.** Usually used as "riding a flat ski" as opposed to "being on edge." As it implies, it simply means being on top of your skis as they glide; "on edge" has to do with making turns or traversing, which requires you to tip the ski however slightly onto one edge to allow you to swing around, however little or much.

**Freestyle.** Technically, *freestyle* is the term used for races in which racers are free to use whichever technique, such as classic (diagonal stride) or skating, they want. Normally, though, when someone says freestyle, they usually refer to skating.

**Herringbone.** The V-style of skiing uphill. In this method, the tips of your skis point to the outside while the ski tails are close together (and the pattern in the snow looks like a herringbone). Bend your knees forward and walk up the hill, shifting your weight from one ski to the other. Herringboning works best when you keep leaning slightly forward; if you lean back, you'll be out of balance and won't be able to get the proper ski or pole placement to move forward easily. As you improve with the technique, you can increase your speed jogging up the hill.

**Sidestepping.** Short of taking off your skis, this is the safest technique for ascending or descending steep, icy, or otherwise menacing terrain on skis. Set your skis across the fall line so that you're not sliding forward or backward; roll your knees and ankles in toward the hill while your upper body leans away from the hill (and over your feet) as a counterweight. Now, slowly step up or down. Keeping your ankles or knees bent toward the hill will provide greater security because the skis will roll "on edge," providing some bite into the snow; if you lean into the hill, that edge flattens and you'll lose the bite, and you'll probably wind up sliding down.

**Waxless skis.** Cross-country skis that, as the name implies, don't need glide or kick wax. You trade the convenience of not waxing your skis for quickness and speed. They make fine skis for recreational skiers, especially beginners.

**Wedge.** This slowing or stopping technique on hills used to be called the *snowplow.* Since the early 1980s, alpine and cross-country ski instructors have called it the *wedge* (as in "wedge of pie"). Regardless of what it's called, the wedge is perhaps the best way to stop (and that includes squatting down and falling). Push the tails of your skis out; that brings your tips close together. Now, bend your knees forward, which forces pressure on the inside edge of your ski; and keep your back straight. The more you crouch or bring your knees together and apply heel pressure, the more the ski will go "on edge," slowing until you stop. In prepared tracks, you can take just one ski out of the track, slide the tail out and bend forward, creating a modified wedge.

## CYCLING CONTENTS

# CYCLING

## BACKGROUND

Cycling can be fun and challenging for everyone. By adding the element of camping, you can add to the adventure and provide an unforgettable experience. Planning a cycling tour takes some skills that you learned earlier in your Scouting program. You will need to prepare yourself physically and mentally to meet the challenge of the open road.

You and your team will have an opportunity to see many things in your region of the country that many people don't take the time to observe—''real America'' in the communities off the beaten path. You don't have to know everything about bicycles. All you need is the desire and enthusiasm to ride and camp.

Your tour can take place at any time and you can go anywhere. You can secure cycling maps with suggested routes. You will find a list of resources and ideas in this program feature that you can follow to help you plan and execute this adventure. You can take these planned activities and enhance them in any way or follow them just as they are. Good luck on your adventure!

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a merit badge clinic for Cycling.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

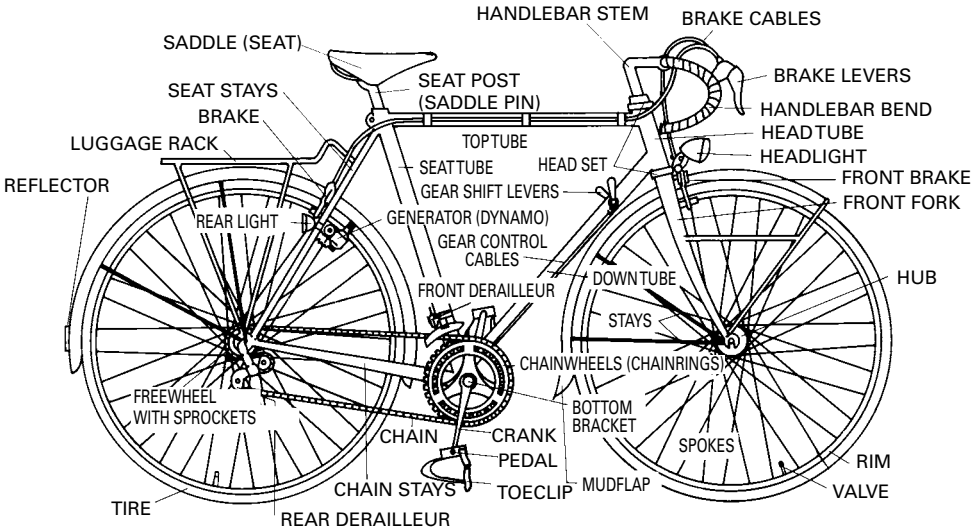
- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida Sea Base, etc.).
- Conduct a cycling activity.

### PERSONAL DEVELOPMENT

- Visit a state, country, or city law enforcement facility. Learn about laws that apply to cycling. Also learn about career opportunities in law enforcement.
- Take part in a physical fitness program to begin getting in shape for your cycling tour.

### SERVICE

- Participate in "Safety City," a safety program with games, quizzes, and computer presentations. After the team has conducted this program for its members, plan a presentation for your community. For more information, write to the National Highway Traffic Safety Administration, 400 Seventh Street SW, Washington, DC 20590.




*Parts of the Touring Bike*

**Note:** This program feature highlights some of the equipment, techniques, and planning ideas for cycling trips. You will need to research and plan what you want to do for your trip. Everyone will want to do things a little differently. The items that are included in this program feature are only ideas and suggestions.

- Adopt a highway. Many states have programs where a group can select a section of highway to care for. Contact your state highway department for more information.

### SPECIAL PROGRAMS AND EVENTS

- Invite Varsity Scout parents to discuss their professions with the team.
- Attend an ethnic group special event such as a dinner, dance, or festival. Arrive by bicycle and share your tour plans with the group.

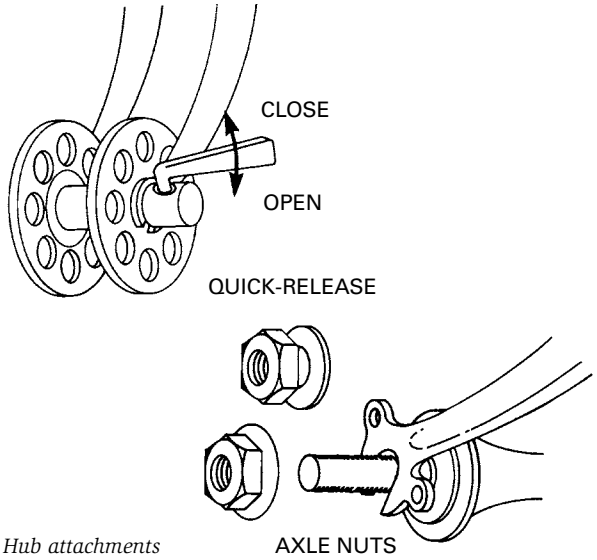
## THE BICYCLE

### HUBS

The flange is the part of the hub to which the spokes are attached. Variations in the flange size create different riding characteristics of the wheel. The flange size, spoking pattern, and the spoke length are important variables in the way the wheel handles. The low-flange, four-cross and high-flange, and three-cross are all suitable for touring bikes.

Sealed bearing hubs are difficult to maintain, although they require less maintenance than the unsealed hubs. All hubs will eventually get dirty, but sealed ones will stay clean longer. Sealed bearing hubs normally have to be sent to the factory for cleaning and repairs.

A quick-release hub has a hollow axle that contains a skewer and a clamp to hold the wheel in the frame dropouts. The alternative is a hub with a solid axle, which has a nut that secures the wheel to the frame. With the quick-release hub, the wheel can quickly be taken off for changing a flat or loading the bike into a car, but bike theft is also easier.

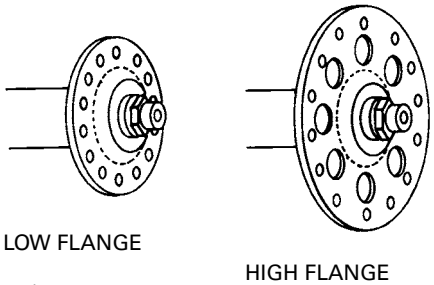



*Hub attachments*

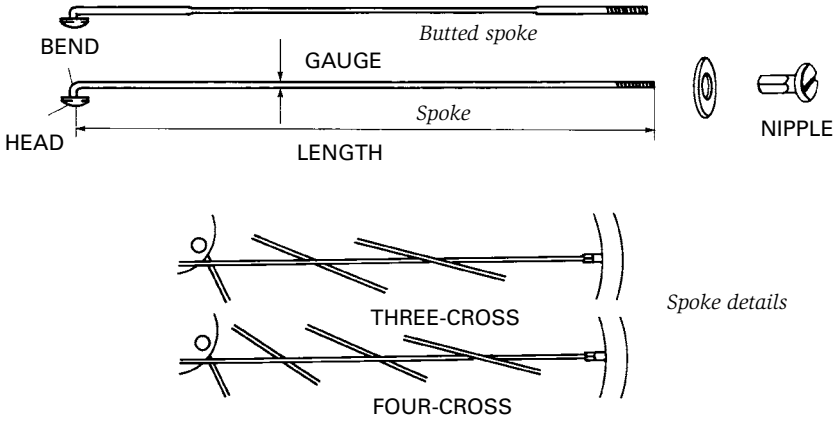
### SPOKES

Spokes are made in different lengths, thicknesses, materials, and shapes. Fourteen-gauge spokes are a good choice for large riders or heavy loads. Thinner spokes have higher gauge numbers. The longer the spoke and the more crosses it makes to the rim, the more shock absorbent, stronger, and heavier the wheel. The shorter spoke makes for a more responsive and lighter wheel.

Most hubs and rims have 36 holes. The number of spokes affects the strength and the weight of the wheel. The most important factor in determining wheel strength is a quality wheel building that results in a true round wheel with even tension on all spokes.




*Hub types*

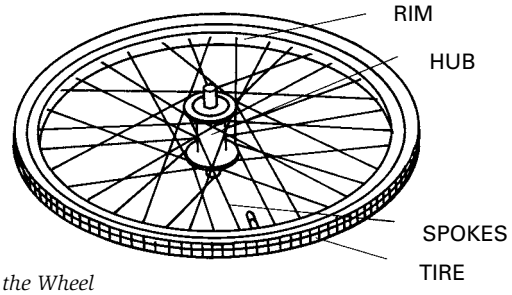



*Spoke details*

## RIMS

The weight of a rim and tire is extremely important. When the rim is moving, its weight rotates at a distance from the hub, on the circumference of the wheel. A rotating wheel on an accelerating or decelerating bike has both circular momentum and forward momentum. A good ratio to consider is that every pound on the rim is worth about 2½ pounds on the frame when you are starting or stopping. The heavier your wheels, the more energy is required to set those wheels in motion. Therefore, light alloy rims are more appropriate for your tours, except when carrying heavy loads or traveling over bad roads.

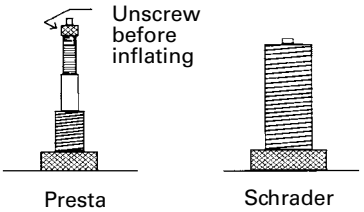
Rims are designed to have either wired-on tires or tubular tires. Wired-on tires need a channel in the rim. This tire is held on to the rim with a wire bead in the tire and by tire pressure. The tubular rim and tire combination is lighter than the wired-on one.




*Parts of the Wheel*

## TIRES

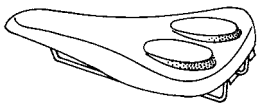
The basic rule in selecting tires is to get the lightest tire that will carry your load. Wired-on tires are cheaper, easier to repair, and more readily available around the country. They are usually wider and provide better traction. Lightweight wired-on tires that are as narrow as tubulars are available, but the standard size for touring is the 27" by 1¼". For a properly divided load with 40 percent of the weight up front, a wider and heavier tire is not needed. The narrower tire is more likely to become flat on gravel or poor roads.



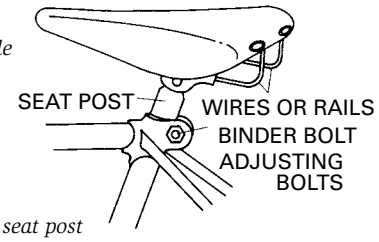

*Valve types*

Tubes have two styles of valves, the Schrader and Presta. A Presta valve weighs less, and a tube with a Presta valve is easier to pump up. You will need an adapter for your pump if you have both kinds of valves. The Schrader valve is the same type of valve that is used in car tires.

It is important to keep tires inflated to their maximum pressure. The pressure in the rear tire could be increased by 10 pounds, if necessary, when carrying heavier loads.



*Nylon-based padded saddle*




*Leather saddle and seat post*

## SADDLES

The saddle is one of the most important parts of your bike. The slim shape of the saddle is necessary in order to allow the thighs to move freely when pedaling. Saddles are designed to hold the rider's weight on the bone structure, not the buttocks. A wider saddle would cause chafing.

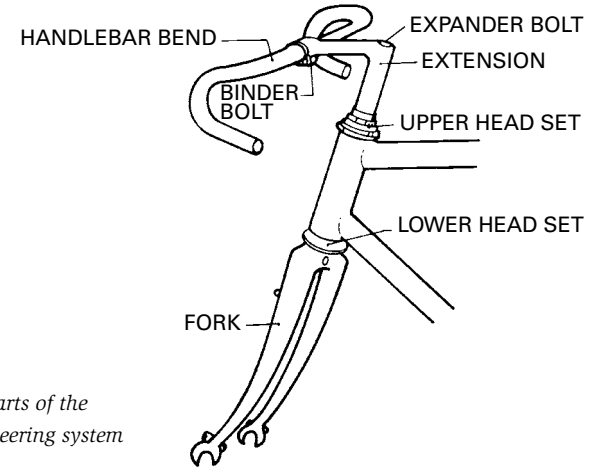
Finding a comfortable saddle may be difficult. Leather saddles offer some ''give,'' as well as support. Leather breathes, and will keep sweat from pooling. It takes a great deal of time to break in a leather saddle, but it will eventually conform to your body. The trend has been toward nylon seats with padding.

## HANDLEBARS

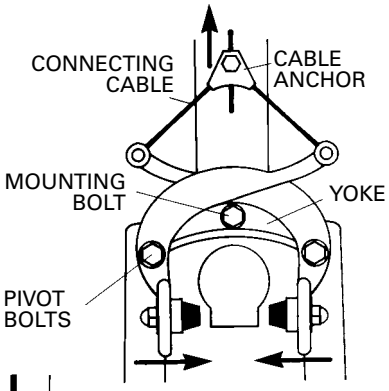
Flat handlebars can be used for touring depending on your route and your personal desires, but dropped bars will provide you with more benefits.

- You can use a variety of hand positions.
- Your weight is more evenly distributed.
- Your arms will absorb more shock.
- You will decrease the wind resistance.
- it's better for your posture to lean forward.

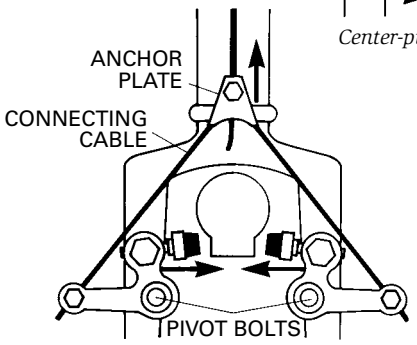
Padding on the bars lessens the road shock to the fingers. The handlebar stem should not be extended out of the head of the tube past a line marked on the stem, otherwise you and your bike run the risk of damage.




*Parts of the steering system*




*Center-pull brake*



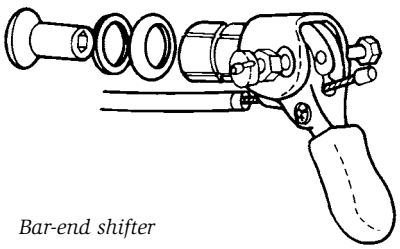

*Cantilever brake*

## BRAKES

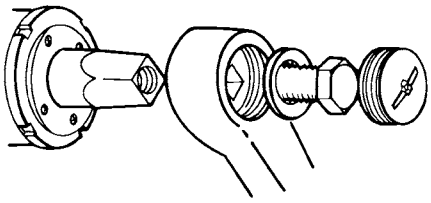
Center-pull brakes are standard on most bikes. They are slightly heavier and may not stop as quickly as side pull brakes. Cantilever brakes are the lightest and most effective. Brake levers should be positioned on the handlebars so that you can reach them easily from both the bottom and the top. Remember, when brake pads heat up, it takes longer to stop.

## SHIFTERS

The bar-end shifters are the most popular type for tour cyclists. It is not necessary to remove your hands from the handlebars when shifting. This is a definite advantage when riding uphill and having to double-shift. Shifters on the down tube are harder to get to, but tend to be more efficient. You should move the levers with your hands, not your fingertips, so that you can feel the shifting.



*Bar-end shifter*



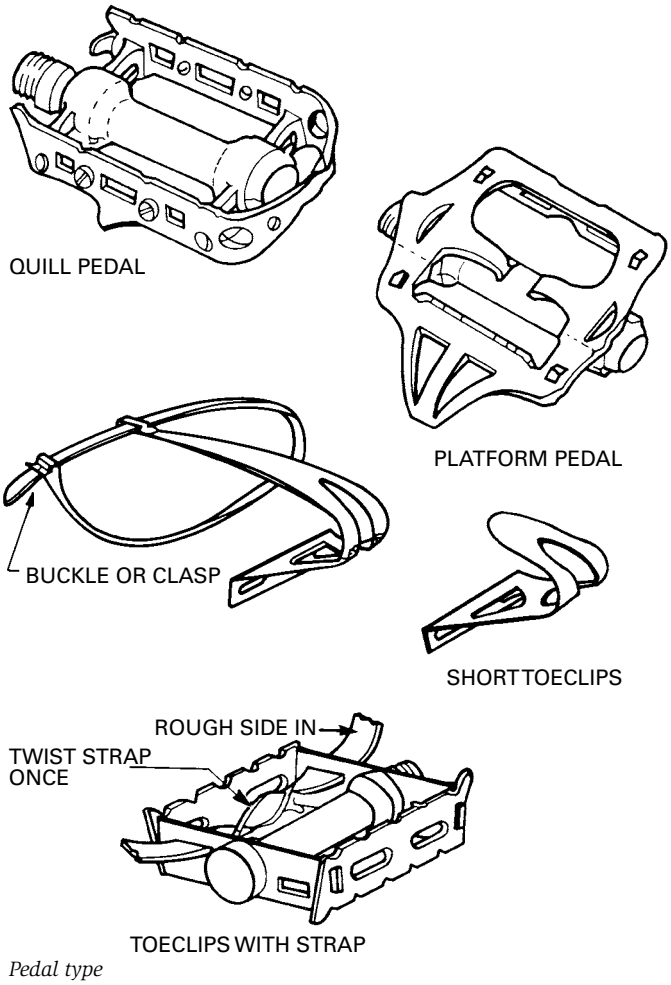
*Cotterless crank attachment*

## CRANKSETS

Aluminum alloy, cotterless cranksets are the standard on good touring bikes. The swagged style, with crank and pins in two pieces, is less expensive yet very reliable. The better quality chain rings are forged. The inexpensive ones are stamped and soft, and wear out quickly.

## PEDALS

Your pedals should have adjustable bearings and accommodate toeclips and straps. Toeclips come in three sizes. Just make sure they are not too short or long. Pull straps tight, particularly if pedaling in uncleated shoes.




*Pedal type*

## BICYCLE MAINTENANCE

### TOOLS

The number of tools you carry on your tour depends upon your knowledge, the availability of assistance, length of tour, and severity of the terrain on which you will be riding. This is a suggested list of items that should more than meet your needs for 10-speed touring:

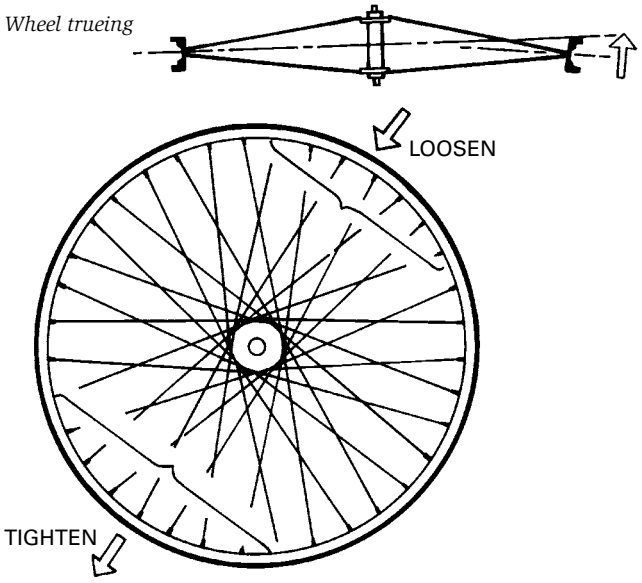
- Two levers, tube, patch kit, piece of tubular tire or duct tape, metal valve cap tightener (for wired-on tire repair)
- Screwdriver, ⅛" blade
- Chain remover tool that fits your bike
- Allen wrenches that fit your bike
- Small wrenches, or a ''Y'' wrench with 8mm, 9mm, and 10mm sockets, or sockets that fit your bike
- Extra spokes and nipples, 3 to 12, and a spoke wrench
- Freewheel remover and 8" adjustable wrench
- Lubricant
- A few nuts and bolts, especially for racks and fenders
- Needlenose pliers
- Strong twine to use as a ''third hand'' when adjusting brakes
- Shift and brake cables
- Cleaning rag
- Brake blocks

### TRUEING A WHEEL

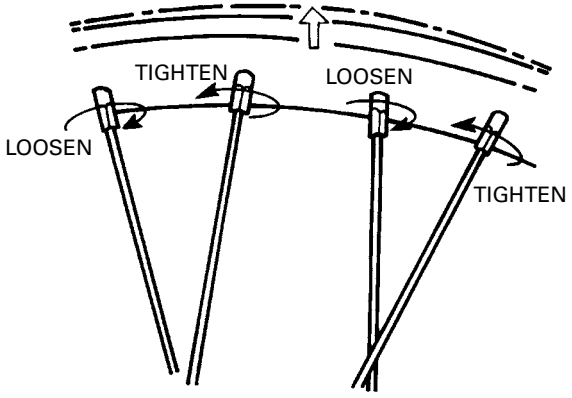
A bulge in the rim of the wheel indicates that the wheel is not balanced. It is then necessary to follow the steps listed below for *trueing* a wheel.

- Determine the length of the bulge in the rim as it passes between brake blocks.
- Hold onto the spoke at one end of the bulge and place the spoke wrench on the spoke at the other end of the bulge.
- Looking down at the wheel, if the bulge is to the left, tighten spokes that go to the right side of the flange and loosen the spokes that go to the left. If the bulge is to the right, tighten the spokes that go to the left of the flange and loosen the ones that go to the right.
- The rim will gradually move over and the bulge will disappear.

*Wheel trueing*




*Correcting radial distortion*




*Correcting lateral deflection*

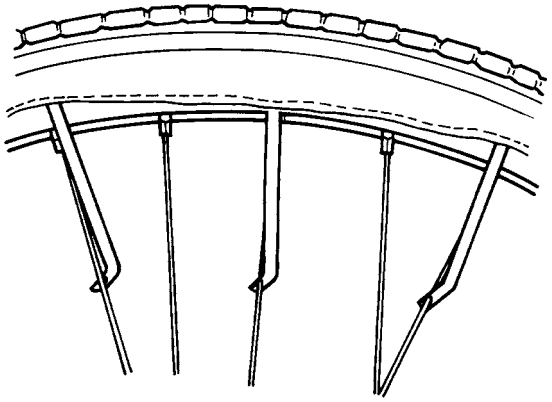
- Tighten by turning clockwise, looking down at the wheel, a quarter turn at a time. A one-eighth turn should be made if the bulge is slight, and at the beginning and end of the bulge where it tapers.

### CHANGING A TIRE

To change a tire on your bike, follow the steps listed below.

- Remove wheel from bike.
- Let out remaining air.
- Insert tire lever under tire bead opposite valve hole.
- Insert another tire lever about 2 inches to one side of the first.
- Release the first lever and insert again about 2 inches on the other side of the second lever.

- Release the second lever and carefully pull the lever toward you, sliding bead out of rim all the way around.
- Pull tube out, starting at the opposite valve hole.
- Pull the valve out of the hole and set the tube aside where it won't get dirty.
- Pull off the other bead from the rim, putting tire and tube on rim.
- Place one bead of the tire on the rim.
- Put enough air into the tube to make it round.
- Put the valve through the valve hole in rim strip and rim.
- Tuck the tube into the tire all the way around.
- Move tire and tube assembly over and above rim.
- Push valve up into the tire so the second tire bead can sit on the rim.
- With both hands, push the bead onto the rim, working around the rim, away from the valve.
- When you get near the end, and it gets difficult to push the bead in, let some air out of the tube.
- After tire is back, inflate the tire to full pressure.



*Use of tire levers*

### FIXING A TUBE

After having a flat, first check your tire to see if anything has punctured the tire. You can fix a flat tube on the wheel. If you can't find out what caused the flat, check the valve.

- Remove the tube and tire.
- Locate the puncture by pumping the tube and listening for a hissing sound.
- When you find the hole, use a piece of sandpaper to roughen the area around the hole.
- Clean the area thoroughly, removing grease, dirt, etc.
- Put glue around the puncture and let it dry until tacky.
- Burnish the patch down on the glue with a tire lever.
- If you don't know what caused the flat, run your fingers all over the inside of the tire to check for foreign objects.
- Make sure the valve is snug on the new or repaired tube.

### REPLACING A SPOKE

Spokes can break from improper tension; if you break a spoke, do the following:

- If the spoke broke at the elbow, unscrew the old spoke from the nipple.
- Try to screw the new spoke into the old nipple.
- If it fits, unscrew it, thread it through the hub flange, lace it properly, and screw the nipple down.
- If it doesn't fit, remove the wheel, tire, and tube, remove the old nipple, and replace with new nipple and spoke.
- Lace new spoke properly.
- Tighten the spoke to the same tension as the other spokes.

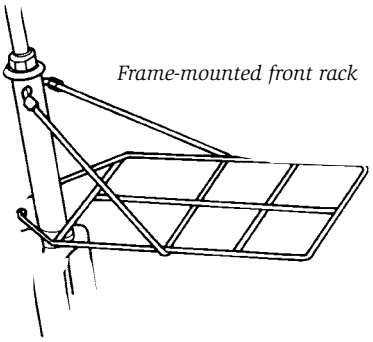
## ACCESSORIES

### TRAILERS

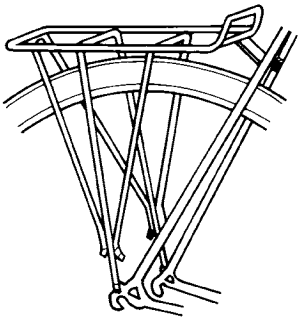
Pulling a lot of weight in a trailer is easier than carrying the weight on top of your bike. Light trailers weigh 20 to 30 pounds and cost upwards of $200. Rolling and wind resistance are increased, but for some types of touring, a trailer may save you in carrying equipment.

### RACKS AND PACKS

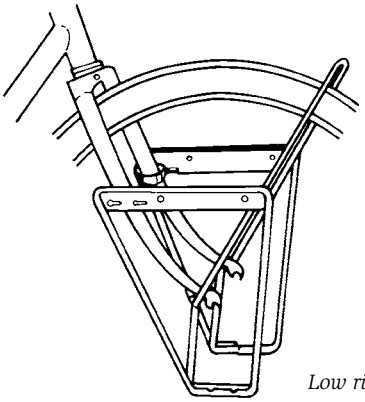
**Racks—**Stability is of primary importance in carrying your equipment. You must be careful on how your weight is distributed. Racks can help stabilize your load. You must note how the rack is designed and how it will attach to your bike. Measure the rack to make sure your bags and the rack are compatible.



*Frame-mounted front rack*

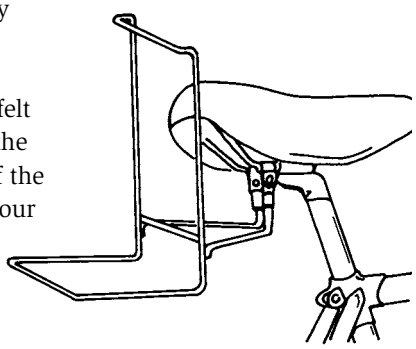


*Rear rack*



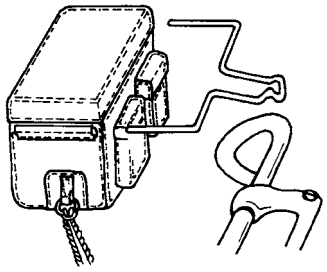
*Low rider front rack*

**Seat bags—**Usually the first place you add weight on the bike is where it is felt the least, close to the center of gravity of the bike, just behind your saddle. If you have a bag that is small and can be fastened securely to the bike, there should be no difficulty. Bulky items will bounce and sway.

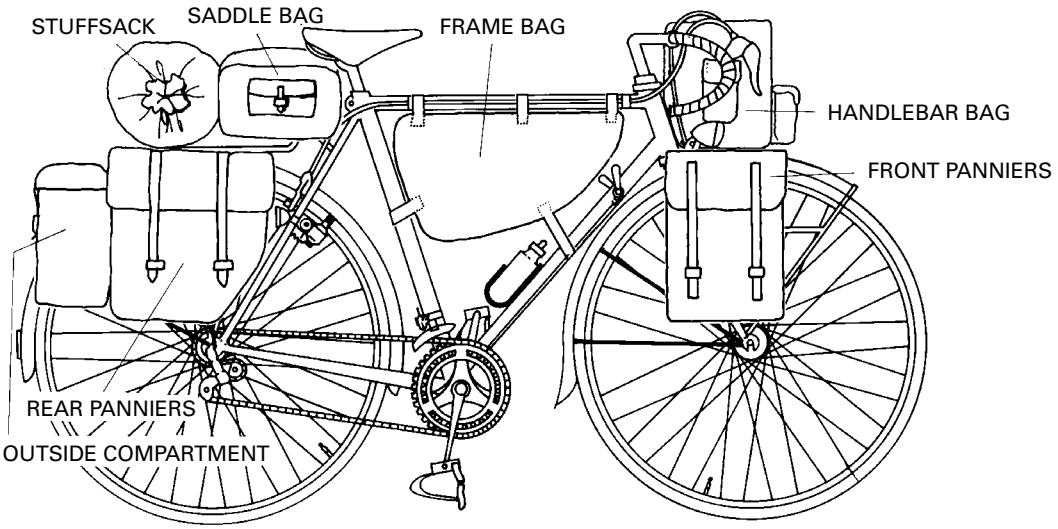


*Saddle bag support*

**Handlebar bags—**This is the least desirable place to carry a bag. It is convenient, but interferes with the operation of your bike. Steering and handling are compromised. Limit the weight to 10 pounds and make sure that the bag does not touch the front tire.

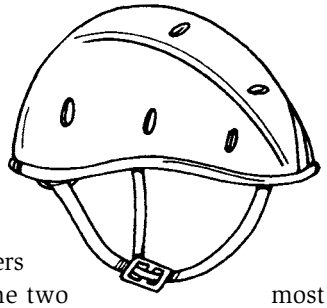


*Handlebar bag*



**Panniers—**This is the French word for bags; it refers to the rack-mounted bags that hang down on both sides of the bike. To insure safety, look for stability in the panniers as well as the racks. Look at the quality of construction, weather resistance, sealed seams, pocket accessibility, and weight.

### HELMETS



*Safety helmet*

Wearing a hard-shell helmet is strongly advised. It protects you against death and disability. The level of protection the helmet offers and its ventilation are the two most important features to consider.

Cycling builds up heat, which escapes through the top of your head, so your helmet needs to be equipped with air vents. Regardless of the type of weather you are riding in, wear a bandana under your helmet to protect you from the foam pads on your forehead. This will also keep you warmer in cool weather rides.

Whatever helmet you get, make sure it has firm fasteners, is lightweight, and doesn't restrict vision or head movement.

### MIRRORS

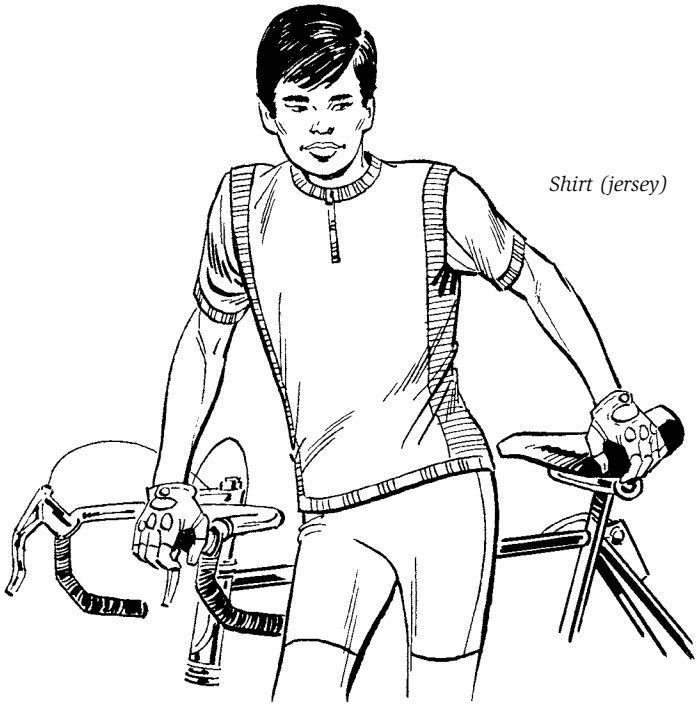
Rearview mirrors that attach to the helmet, your wrist, or your own glasses enable you to know what is happening behind you without having to turn around. However, they are not a substitute for looking when you have to maneuver in traffic.

## CLOTHING

### SHIRTS AND SHORTS

Special jerseys are made for cycling, but they are not necessary for touring. The garment you wear should be close fitting, yet unrestrictive; warm, yet breathable; and long enough to cover the lower back when riding with your hands on the drops of the handlebars.

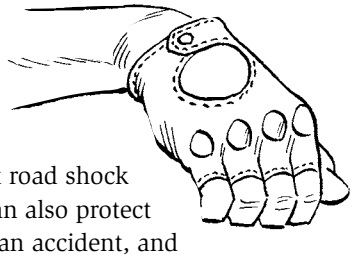
Cycling shorts are unique. The best quality shorts are made of wool and have a chamois lining in the crotch. The chamois prevents abrasion better than any other fabric. The long cut of the shorts prevents chafing on the inside of your thigh. Do not wear cut-off jeans with thick seams. You're asking for trouble. You can make your own cycling shorts at home.



*Shirt (jersey)*

*Bicycle clothing*

### GLOVES



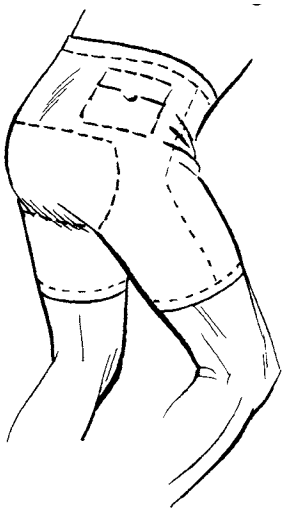
*Glove*

Cycling gloves have padded leather palms, mesh backs, and no fingers. The padding helps prevent road shock and numb fingers. They can also protect you from cuts if you have an accident, and keep you warmer in cool weather.

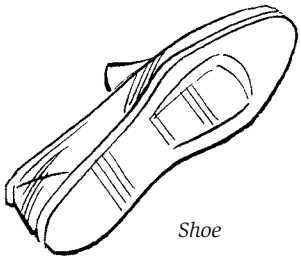
### SHOES

Cycling shoes have rigid soles that inhibit flex of the feet on the pedal, allowing your feet to put maximum push on the pedal. They are perforated, low cut, and lightweight. Buy them tight because they stretch with wear. A few types of running shoes have enough stiffness and fit well enough to be usable for cycling.

Cleated shoes are more rigid and durable than the sneaker type. The purpose of cleats is to hold the foot firmly to the pedal so that no energy is lost in flex or sideways movement. With a stiff-soled and cleated shoe, the energy of the pedal stroke is concentrated at the ball of the foot. Cleats make pulling on the upstroke easier, which contributes to a smoother cadence by distributing the effort among more muscles.



*Shorts*



*Shoe*

## DRESSING FOR COLD WEATHER

Your body heats the air around it, and that air needs to stay around it. Something must impede that heated air from moving away from the body. Fur, animal skin, newspapers, and plastic can all do this. The most effective way of keeping warm is layers of clothing. The layer next to your skin should wick the water away to the outer layers and also insulate the body. The outer layer should be water repellent, but not waterproof, so it lets the vapor escape, but prevents moisture from getting in.

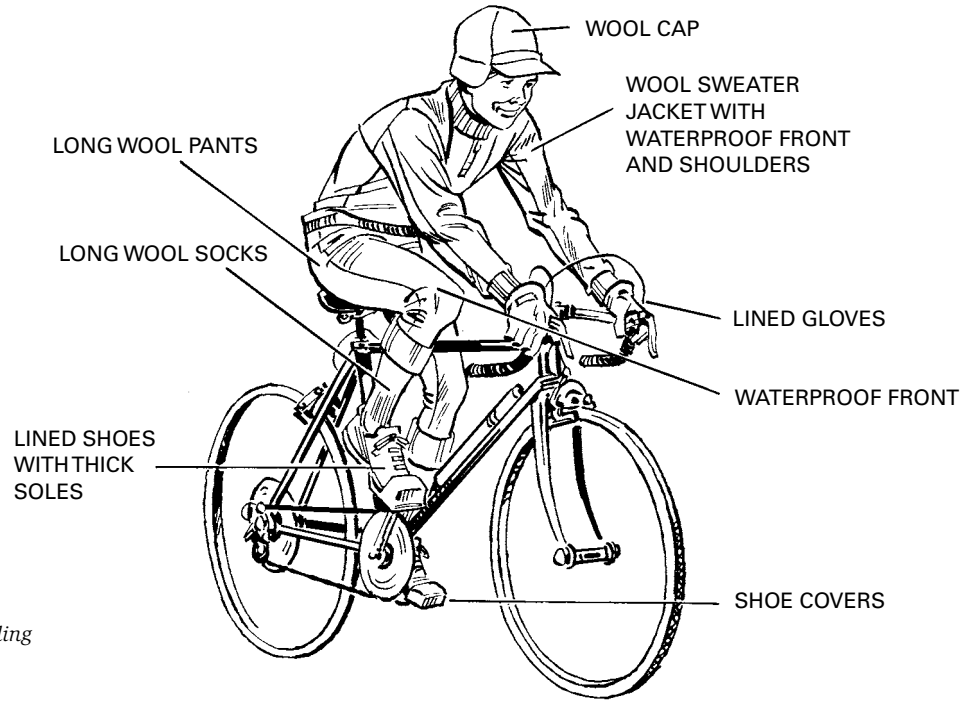
## DRESSING FOR HOT WEATHER

Cotton is your best bet for the heat. A highly absorbent long-sleeved cotton shirt, damp with sweat, can act as a coolant when you ride. Loose clothes increase the cooling effect, and light-colored clothes reflect the sun. You may feel cool riding shirtless, but the sun can still burn you severely. Cover up from head to toe with sunscreens and protect your eyes with a visor and dark glasses.

## RAINWEAR

A protective rain jacket should be long enough to cover your lower back when you are riding. The jacket should be drawn close to you to cut down on wind resistance. The rain gear should fit snugly but not restrict movement, and it should be brightly colored so that you can easily be seen.

*Rain clothing*




*Cold-weather cycling*

## FOOD TO CARRY

High-energy foods that can be carried compactly and with minimum weight are what you need while cycling. Whether you bring a stove or not, bring 35mm film canisters to carry spices and herbs that will improve the taste of food along your route. Items like chili powder, garlic powder, cinnamon, nutmeg, cloves, and poultry seasonings are good. Also carry some plastic bags of hot cocoa mix, tea, vegetable broth, brewer's yeast, and sesame seasoning. Brewer's yeast is high in B vitamins, and it tastes good on soups and salads. Carry raw ingredients in strong plastic bags. You may want to mix some recipes for pancakes or cookies ahead of time.

### SEEDS

Sesame seeds are an excellent source of calcium and are also a source of zinc, potassium, and phosphorous. Careful toasting improves their flavor. It is better to grind them than to eat them whole. Chia seeds are very sustaining and provide a concentrated source of energy that is high in protein. Add these to oatmeal and other grains. Sunflower seeds are also high in minerals. Toasting or cooking improves their flavor, but they taste good raw, too.

### DRIED FRUIT

Dried fruit is a source of quick energy. If possible, purchase unsulphured kinds of dried fruit. Figs are high in magnesium and protein. Raisins are high in iron and carbohydrates.

### FLOURS

Try flours such as rice, corn, soy, and rye, as a change from wheat. They have different cooking and handling characteristics and can be directly substituted for wheat in most recipes.

### GRAINS

Whole grains and whole-grain products are the very best sources of carbohydrates. Millet is the lightest and the fastest cooking of any unprocessed whole grain. Also try rice, rolled oats, and farina.

### WATER

You can ride a long distance on your stored fat, but without water you won't get far. When it's cold and damp, you will have to force yourself to drink. You can sweat a lot in cool temperatures. Always keep one bottle of water filled and have another with you to fill for dry stretches. On a lengthy trip, your intake could be 6 to 8 quarts of liquid a day.

## RESOURCES

### CYCLING EXERCISES

**Quadricep strengthening—**Sit on a table with your feet resting on a chair or stool that is about 10 inches below the edge of the table. Beginning with a 5-pound weight fastened to your ankle, straighten your knee and hold for 10 seconds; then rest for 10 seconds. Do this 10 times in three sets per leg. Increase the weight as you master the current level.

**Hamstring—**Place a 5-pound weight on your ankle, stand on the opposite foot, and lift the weighted ankle, moving your knee to a 90-degree angle; hold for 10 seconds, and relax for 10 seconds. Do this 10 times in two sets per leg.

**Situps—**Bent-knee style strengthens the lower back.

**Caution:** Deep-knee bends should be avoided. Full-knee flexing damages the knee.

## ORGANIZATIONS

Adventure Cycling Association
P.O. Box 8308
Missoula, MT 59807

Bicycle Manufacturers Association
1055 Thomas Jefferson Street NW, Suite 316
Washington, DC 20007

League of American Bicyclists
1612 K Street NW, Suite 401
Washington, DC 20006

U.S. Cycling Federation, c/o USOC
One Olympic Plaza
Colorado Springs, CO 80909

## BOOKS

*Backcountry Bikepacking,* by William Sanders. Stackpole, 1983.

*Bicycle Touring,* Bicycling magazine staff. Rodale Press, 1985.

*The Bicycle Touring Book,* by Tim and Glenda Wilhelm. Rodale Press, 1980.

*Bike Tripping,* by Tom Cuthbertson. Ten Speed Press, 1984.

*DeLong's Guide to Bicycles and Bicycling: The Art and Science,* by Fred Delong. Chilton, 1978.

*Living on Two Wheels,* by Dennis Coello. Ross Books, 1983.

*Richard's New Bicycle Book,* by Richard Ballantine. Ballantine Books, 1987.

## PERIODICALS

*Bicycling.* Rodale Press, 33 East Minor Street, Emmaus, PA 18048

*Adventure Cyclists Magazine.* Adventure Cycling Association, P.O. Box 8303, Missoula, MT 59807.

## DISCOVERING AMERICA CONTENTS

# DISCOVERING AMERICA

## BACKGROUND

The possibilities for exciting Varsity Scout programs are endless. Varsity Scout activities can be as varied and numerous as your imagination and resources allow. Discovering America will guide you in selecting an appropriate activity, developing a complete activity plan, and planning an ultimate adventure that you will remember for a lifetime.

Coeducational activities are encouraged. Young women may not register as team members, but may be guests and participate in some of the Varsity Scout events. They cannot take part in the advancement program.

As you near completion of your Varsity Scout activities, you should select what you want to pursue as your next ultimate adventure. This will give you time to begin gathering the necessary resources.

In this program feature, we will first explore the activities from which you may choose. In addition to those discussed in this program feature, your team members may also have some valuable suggestions. The options are endless. Because of the dangers involved, some activities are prohibited. We will give you those guidelines.

After reviewing program ideas, we will go through the planning process. All of the steps necessary in developing a complete and comprehensive activity plan will be discussed. We will then look at planning your ultimate adventure. Now, let's begin Discovering America.

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from the program adviser.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure activity.
- Plan a travel adventure to another country, or to another area of the United States.

### PERSONAL DEVELOPMENT

- Conduct a study of the area in which you plan to travel: economic, language, culture, geography, etc.
- Invite a person from that area to come speak to your Varsity Scout team.

### SERVICE

Plan a service project at the destination of the adventure trip.

### SPECIAL PROGRAMS AND EVENTS

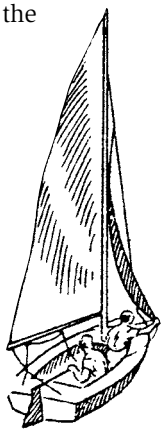
Have a travel consultant conduct a series of talks on potential travel destinations.

## SELECTING AN ACTIVITY

The first step for the Varsity Scout team is to get together and select an activity. Team members should make suggestions and develop a list. The suggested activities should then be discussed by the entire team. Questions to consider:

1. Are skilled adult instructors available?
2. Is the activity challenging, but not too physically demanding for members?
3. Can the entire team develop the skills needed in three months?
4. What is the cost of the materials and equipment you need? How will you finance this activity?

These and other concerns raised during the discussion should be resolved before the activity is selected. It may be necessary to assign team members to investigate each of these details and report their findings to the group at a later meeting. After all concerns have been addressed, take a vote to determine the activity and let the majority vote rule.

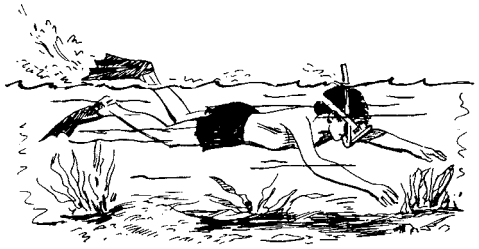


### APPROVED ACTIVITIES

#### OUTDOOR ADVENTURES

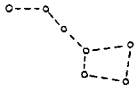
- Backpacking
- Canoeing
- Whitewater rafting and kayaking
- Horseback riding
- Sailing
- Cross-country skiing

- Mountain hiking
- Rappelling
- Caving
- Wilderness search and rescue
- Mountain bicycling
- Fishing
- Winter camping
- Scuba diving/snorkeling
- Wilderness survival
- Windsurfing



**SPECIAL OUTDOOR ACTIVITIES**

- Astronomy
- Conservation
- Forestry
- Nature photography
- Trail building



**HOBBY ADVENTURES**

- Computers
- Drama/theater
- Ham radio
- Indian dancing
- Magic
- Marching/drill teams
- Model rockets

- Music (instrumental and vocal)
- Nature
- Photography
- Radio-controlled models
- Underwater
- Video (make a commercial or movie, develop training films)
- Woodcarving (including totem pole making)

**WORLD-OF-WORK ACTIVITIES**

Invite a series of career speakers.

The interview process:

- Filling out applications
- How to interview (eye contact, body language, information to share, etc.)
- Most frequently asked questions
- Interview role playing and critiques
- Grooming tips; how to dress
- Interview follow-up

How to keep a job:

- What employers expect of employees (time management, attendance, loyalty, honesty, friendliness, etc.)
- Conflict resolution
- Goal setting
- Need for continuing education

Starting a small business:

- Sell seasonal products (i.e., Hanukkah, Christmas, and Easter items, school needs, summer activity to provide jobs for team members, etc.).
- Learn small business operations (i.e., accounting, sales, marketing, advertising, inventory, personnel, equipment needs, legal considerations).

The modern workplace:

- New careers
- Emerging industries
- Skills needed
- The workplace (equipment, impact of computers, communications, corporate structure, etc.)

Team members may have other good ideas. Be creative.

### UNAPPROVED ACTIVITIES

Because of legal considerations and potential danger to participants, the following activities have been declared unauthorized and restricted by the Boy Scouts of America.

#### FOOTBALL

Varsity school teams and interscholastic or club football competition and activities

#### MOTORIZED SPEED EVENTS AND DEMOLITION DERBIES

Motorized speed events with a potential hazard for participants, including motorcycle and boat races, drag racing, demolition derbies, and related events

#### RODEO EVENTS

Participation in amateur or professional rodeo events and council/district sponsorship of rodeos

#### ALL-TERRAIN VEHICLES

Motorized recreational cycles with three or four large, soft tires, designed for off-road use on a variety of terrains

#### AVIATION

- Hang gliding
- Microlite and ultralight flying
- Experimental aircraft flying
- Parachuting
- Hot-air ballooning
- Power aircraft in-flight training (Orientation flights are permissible; Flying Permit Application, No. 10-118, must be approved by the local council in advance.)

#### BOXING AND MARTIAL ARTS

- Boxing
- Karate
- Related martial arts (not judo)

## PLANNING THE WEEKLY MEETINGS

Immediately after the activity topic is decided, the program manager must recruit the instructors needed to assist in skill instruction and program planning. They will work with the team for the duration of the activity. If you cannot find one person who is available for the entire program, recruit two instructors to share the duties.

The suggested length of an activity is 12 weeks. Some more involved programs may take longer; others may take less time. The team should take as much time as needed to gain the physical skills and knowledge required to become proficient in the activity and participate in the ultimate adventure. The ultimate adventure is the culmination of activities from previous weeks.

The team should make a list of the skills and knowledge required to become competent in the chosen subject.

- Physical conditioning requirements
- Areas of subject knowledge needed
- Equipment knowledge and skills (ropes, machines, boats)
- Techniques to be developed such as rappelling, paddling, developing film, etc.

Your instructor knows the time requirements and the level at which each of these areas need be developed.

Make copies of the activity plan form at the end of this program feature. The form divides the team meetings into four parts:

1. **Opening ceremony.** This ceremony is conducted with the entire team if held at a Scout meeting. At meetings independent of the team, develop your own ceremony using *Troop Program Resources* as a resource.
2. **Skills instruction.** This portion of the plan allows you to work on development of those specific skills related to your subject area.
3. **Special activity.** During the special activity, you can review plans for outings and the ultimate adventure. You also include games related to your activity that test your skills.
4. **Closing ceremony.** This ceremony helps wrap up the get-together and signals the end of the meeting. *Troop Program Resources* has a number of closing ceremonies to choose from. The meeting should last approximately 90 minutes.

With assistance from the program manager and program adviser, determine the length of the program and begin to fill in the activity plans. Use the required skills and knowledge list compiled by the team. A few helpful hints are listed below:

- Start physical conditioning early and gradually.
- Schedule basic skills and topics first. Pace instruction so that all skills and knowledge required will be developed in the allotted time. The next skill taught should build upon the previous skills learned.

- Include weekend field trips related to the subject. These field trips are planned in the special activity portion of the meeting. Fill out and submit tour permits at the council service center.
- Schedule advancement opportunities during the special activity portion of the meeting.
- Include ultimate adventure planning during the special activity portion of the meeting.
- When the activity plans are completed, assign the various meeting items to team members and leaders.
- Be sure to consider special equipment needs for each meeting. Note them in the space provided on the forms. Assign someone to be responsible for getting them to the meeting.

The Varsity Scout activity plans are designed to develop skills that are necessary to achieve the ultimate adventure. It is important that each team member be comfortable with these skills before moving on to the next outline. By following these guidelines, your Varsity Scout team should develop a successful activity plan.

### THE ULTIMATE ADVENTURE

Each Varsity Scout activity is based on a series of activities that lead up to an ultimate adventure. Now that you have decided on the activity area, the team must develop an ultimate adventure.

An ultimate adventure may be a weekend outing or may last an entire week. The length of the adventure will be determined by the type of activity, the availability of adult leadership, and the cost of the adventure. It may be done locally or it might require a trip of hundreds of miles.

The team may decide to use the resources of one of the BSA high-adventure bases (Philmont Scout Ranch, Florida Sea Base, Northern Tier, or Adirondack Adventure Area). The national park system can also provide various natural environments in which most outdoor adventures can be conducted.

In planning your ultimate adventure, consider places of fun and interest on the way. You can arrange tours or stopovers at local points of interest (for example: monuments, natural wonders, sporting events, and beaches).

An ultimate adventure may be organizing an advertised exhibit (photography), or putting on a performance (such as an Indian dance or theatrical entertainment).

Visiting places or events associated with your activity can be a rewarding ultimate adventure. For example, a team involved with model rockets might plan a trip to a space shuttle launching. A filmmaking team could visit a motion picture studio or production site. Those involved in astronomy might want to visit a major observatory.

The ultimate adventure should be fun, provide a new challenge, and at the same time, increase your own skill and knowledge. It should be a test of the skills you have developed. This means that the activities should serve as practice sessions for the real ultimate adventure.

## PLANNING THE ULTIMATE ADVENTURE

The success of your ultimate adventure depends on proper planning. In this section, we will review the planning steps involved. The Ultimate Adventure Planning Checklist and the Sample Trip Planning Sheet found in the resources section of this program feature will help you organize your plans. The program adviser will assign the various action items to individual team members to perform.

The first step is to decide what your ultimate adventure will be. Determine where you will go. The type of adventure will be your guide. Choose a place that will provide most if not all of your activity needs. A location that has other nearby attractions, such as historical sites or tourist attractions, will provide additional activity options.

Investigate your transportation options. Will you go by plane, bus, or automobile? Call various transportation companies and get price quotes. Frequently, if you purchase tickets early you can get a substantial discount. Decide which mode of transportation you will use. If you decide on automobiles, start recruiting volunteer drivers immediately. Special arrangements may be needed; the sooner they know dates and times the better chance that they will be able to assist you.

Now that you know where you are going and what you will be doing, develop a complete budget. Include in your budget meals, transportation, lodging, items needed to be purchased, admission or user fees, and a small emergency fund. The team may decide to divide the cost among themselves, or hold a fund-raiser. Discuss fund-raising ideas with unit leadership. If you develop a fund-raiser, submit a Unit Money-Earning Application to the local council service center for approval. Set a deadline for turning in money.

Make a complete schedule of your ultimate adventure activities. Start with your departure. Try to account for every hour. Not only will this help you think through the various parts of the adventure, but it will also let your leaders and parents know where they can contact you in case of an emergency. Try to secure phone numbers at activity locations or places nearby.

At this point, share the ultimate adventure plans, schedule, and budget with the Coach and team committee for approval. The plan may be approved as is, or it may require some modification. Once approved, be sure to submit a tour permit to your local council service center. Distribute this schedule to team members, team leaders, and parents.

On the ultimate adventure at least two adults, one age 21 or older, must be present. Determine who they will be and recruit them now. Your program adviser and coach may be able to fill this role; parents are also possibilities. Recruit them as soon as possible (three months before the event, if possible) so that they can make arrangements to accompany you. If you invite girls to participate you will also need a female leader age 21 or older.

Make a list of any equipment needed for the adventure. Determine where you will get it. If you must borrow equipment, obtain permission from the owners as early as possible.

If your team has accident insurance, which the Boy Scouts of America recommends, team members will be covered in case of an injury or sickness. If girls are invited, be sure to arrange insurance for them as well. It can be obtained through your local council service center. Be sure to include the insurance cost in your budget.

Progress on the ultimate adventure plans should be reviewed during the activity portion of your meetings. It is the program adviser's responsibility, in working with the assistant Scoutmaster, to follow up on all assignments so that any problems or changes can be handled immediately. This will ensure that the adventure will stay on schedule. Review the entire plan with your team a month before your adventure and get progress reports; review the plan again one week before your activity. Be sure everything is going as planned and make any last-minute changes.

Following these planning procedures will allow you to develop an ultimate adventure with few problems and lots of memorable experiences.

## RESOURCES

Your public library will have books and magazines related to most of the activities mentioned in this program feature. The activity instructors you recruit will also have ideas on appropriate books and other resources to use. The books listed below are suggestions to get you started.

### OUTDOOR ADVENTURES


*Adventure of Caving,* by David R. McClurg. D & J Press, 1983.

*Astronomy: The Cosmic Journey,* by W. K. Hartman. Wadsworth, 1982.

*Backcountry Ski Camping,* by Alan Bagg. Contemporary Books, 1978.

*Bicycle Camping,* by Diana Armstrong. Doubleday, 1981.

*Climbing: A Guide to Mountaineering,* by Raymond Bridge. Scribners, 1977.

*The Complete Beginner's Guide to Mountain Climbing,* by Howard Smith. Doubleday, 1977.

*The Complete Wilderness Paddler,* by James W. Davidson and John Rugge. Knopf, 1976.

*Cross-Country Skiing Today,* by John Caldwell. Stephen Greene Press, 1977.

*Cyclist's Guide to Overnight Stops,* by Seymore Leaving. Ballentine, 1982.

*Fly Fishing,* by David Lee. Prentice-Hall, 1982.

*Hazards in Mountaineering,* by Wilhelm Paulcke and Helmuler. Oxford, 1973.

*The Hiker's Bible,* by Robert Elmen. Doubleday, 1982.

*The Joy of Snorkeling,* by Steve Blount and Herb Taylor. Collier, 1984.

*The Kayaking Book,* by Eric Evans and Jay Evans. Stephen Greene Press, 1988.

*The New Science of Skin and Scuba Diving,* sixth edition, Robert Smith, editor. New Century, 1985.

*The New Solar System,* by J. Beatty, B. O'Leary, and A. Chaikin. Sky Publishing, 1981.

*Outdoors Emergency Manual,* by Anthony J. Acerrano. Winchester Press, 1976.

*River Camping,* by Verne Huser. 1981.

*Sports Illustrated Boardsailing,* by Major Hall. Time Inc., 1988.

*The Swim Book,* by James Wagerwood. Bantam, 1980.

*Venturing Underground (Caving),* by Ben Lyon. E.P. Publishing Limited, 1983.


### HOBBY ADVENTURES


*Amphoto Guide to Backpacking Photography,* Amphoto, 1981.

*Complete Beginner's Guide to Photography,* by George Laycock. Doubleday, 1977.

*The Complete Illustrated Book of Close-Up Magic,* by Walter B. Gibson. Doubleday, 1980.

*The Home Video Maker's Handbook,* by Ian Graham. St. Martin's Press, 1986.

*Home Video Movies,* by Tony Galluzzo. Computer Publications, 1987.

*How to Be a Ham (Radio Operator),* third edition, by W. Edmound Hood. Tab Books, 1986.

*How to Do Wood Carving,* by John L. Lacey. Arco, 1977.

*The Outdoor Photographer's Handbook,* by Kern Oberrecht. Winchester Press, 1979.

*Sculpturing Totem Poles,* by Walt Way. Almar Press, 1984.

### WORLD-OF-WORK ADVENTURES

*Occupation Outlook Handbook (biannual).* U.S. Department of Labor.

*Ready, Aim, You're Hired (How to Job Interview),* by Paul Hellman. AMACON, 1986.

*Sweaty Palms: The Neglected Art of Being Interviewed,* by H. Anthony Medley. Ten Speed Press, 1984.

*Work in the New Economy: Careers and Job Seeking into the 21st Century,* by Robert Wegmann, Robert Chapman, and Miriam Johnson. American Association of Counseling and Development, 5999 Stevenson Avenue, Alexandria, VA 22304; 703-823-9800, 1989.

### SCOUTING LITERATURE

*Boy Scout Handbook,* No. 33105

*Fieldbook,* No. 33104

*Troop Program Resources,* No. 33588

*Varsity Team Program Features, Volume I,* No. 34837

*Varsity Team Program Features, Volume II,* No. 34838

*Varsity Team Program Features, Volume III,* No. 34839

### OTHER RESOURCES

Libraries

Specialty stores

Local hobbyists and professionals

## ULTIMATE ADVENTURE PLANNING CHECKLIST

(Assign a person for every task.)

1. ____ Shortly after an activity area has been chosen, the ultimate adventure should be selected.
2. ____ Decide on the ultimate adventure dates and location.
3. ____ Determine the transportation needs. If drivers need to be recruited, do so immediately after approval. If public transportation will be used, start inquiries.
4. ____ Make a detailed budget of expenses. Include meals, transportation, lodging, and equipment. Determine how the team will finance this ultimate adventure. Will the team need a fund-raiser? Set a date to have the money secured.
5. ____ Make a schedule of daily adventure activities. Start with a departure time (or starting time, if the adventure is a local event) and account for all time. List phone numbers of places you can be reached during the trip, if possible.
6. ____ Have the ultimate adventure plan and budget approved by the Coach and team committee. After the plan has been approved, distribute the schedule to the team, adult volunteers, guests, and parents.
7. ____ Secure adult leadership for the ultimate adventure. There must be at least two adults. One leader must be at least 21 years old. If girls are invited, there must also be a female leader age 21 or older.
8. ____ Submit the tour permit to the BSA local council service center.
9. ____ Determine and list equipment needs. Secure the equipment.
10. ____ If girls are involved, secure accident and health insurance from the BSA local council service center.
11. ____ A month before the adventure, review the progress of the entire plan with the team. Contact all involved to confirm their commitment. Will team members have their skills ready?
12. ____ The week before the ultimate adventure, review the entire plan.

    - ☐ Are the transportation arrangements firm?
    - ☐ Is adult leadership still committed?
    - ☐ Has all equipment been secured? Is the equipment in proper working condition?
    - ☐ Have all finances been secured?
    - ☐ If staying in a rented lodging, have reservations been confirmed?
    - ☐ Have permissions been granted for use of public and private facilities and land?
    - ☐ Have all participants learned their skills, and are they in good physical condition?

    Ask these and all other pertinent questions.

13. ____ Enjoy your ultimate adventure.
14. ____ Plan to share your experiences and pictures with your troop and parents when you return.
15. ____ Thank the adult volunteers and everyone else who has helped. As a token of appreciation, you might present these individuals with an appreciation certificate or other recognition item.

## FISHING CONTENTS

# FISHING

## BACKGROUND

If you are a fisherman, this will give you the opportunity to instruct other team members who are less experienced. You will have an opportunity to try some new techniques, do various types of fishing, and have several campouts in preparation for the ultimate adventure. This is an opportunity for you to fine-tune some skills and pit yourself against an adversary you may never have seen: the fish.

You can fish in a serious way or simply lie back and let the bait do the work for you. You can make fishing an art, especially with fly-fishing, or a science, by inventing new types of lures or ways to attract the ''big ones.'' The ultimate adventure is designed to give you a challenging experience.

There will be a series of preparations for the ultimate adventure, which can be during a long weekend or a school vacation week. Take your time preparing for the ultimate adventure, and make sure you master each skill level. This would be a good program for involving the whole family, or one or both of your parents, if they enjoy fishing. Good luck and good fishing!

## PROGRAM FIELDS OF EMPHASIS

The following ideas will help you plan a well-rounded program. Program managers carry out these ideas with help from a team committee member.

### ADVANCEMENT

- Review each Varsity Scout's advancement status.
- Conduct a merit badge clinic for the *Fishing* or *Motorboating* merit badge, or both.
- Monitor the team advancement chart regularly.

### HIGH ADVENTURE/SPORTS

- Program manager outlines or updates the team's annual special high-adventure event (Philmont, Florida Sea Base, etc.).
- Conduct a fishing activity.

### PERSONAL DEVELOPMENT

- Invite a BSA Aquatics Instructor to certify team members in the Snorkeling, BSA, program. Use these skills on one of your fishing trips.


- Invite presidents of civic clubs in the community to make presentations on the need for strong leadership within the community.

### SERVICE

- Contact a conservation agency and volunteer to work on one of their projects.
- Offer assistance to the voters' league in getting out the vote or working the polls.
- Clean up a local waterway.

**SPECIAL PROGRAMS AND EVENTS**

- Contact the Bass Anglers Sportsman Society, P.O. Box 17116, Montgomery, AL 36141-0116, to assist the team with the fishing feature.
- Plan team activities for National Hunting and Fishing Day. Contact NHFD at 11 Mile Hill Road, Newtown, CT 06470-2359, for more information.

## LOCATING FISH

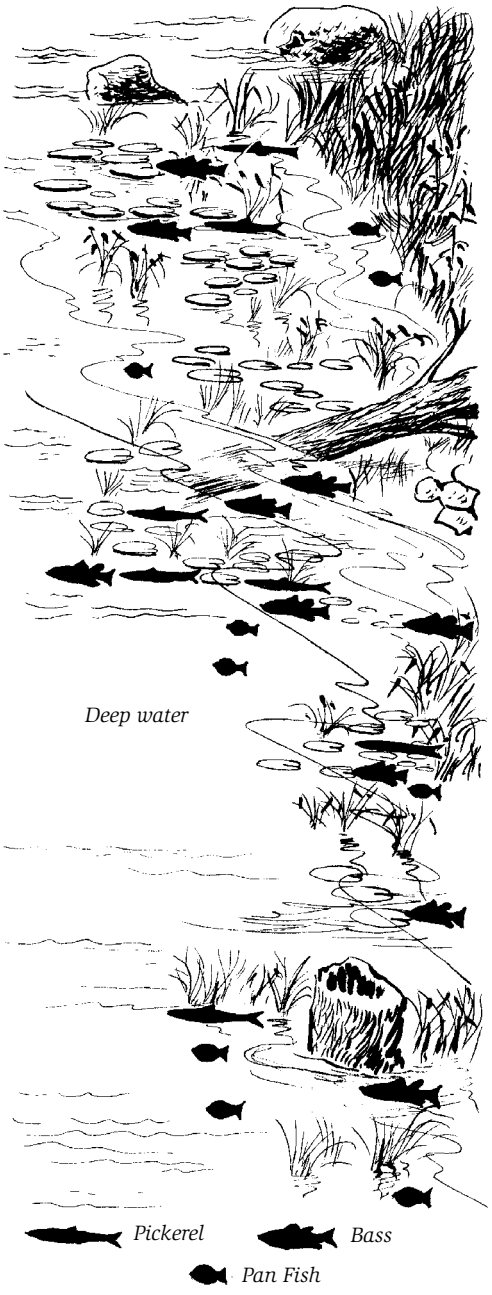
Some fishermen, even though they have patience and determination, can fish day after day without catching anything. On the other hand, there are some who seem to have a secret method because they never come home empty-handed. Actually, there is no secret. Experienced anglers know where to find fish. They find fish because they know there is a food supply nearby and can spot places where fish are most likely to be hiding or resting. Learn to locate these areas offering both food and security, and you'll catch fish, too.

If you can, get a topographic map of the lake or stream you plan to fish in. It will provide you with basic information concerning depth and the contour of the bottom. Then, ask questions. Talk to the person who rents boats or sells tackle. Local conservation agents and fishermen you meet on the water will be able to tell you the best times to fish and the kinds of natural baits or artificial lures that have been most productive.

You will also want to know about the water itself: Where are the sunken logs and rocks, the holes, and weed beds? Where do streams flow into the main body of water? As you get answers to these questions, start to add the information to your map. As you fish the area, you'll be able to add personal observations.

Most fish activity will be found along fringe areas—around weed beds, stumps, logs, and rocks. In a stream, fish lie in front of or behind these obstructions to get away from the current and wait for food that is swept into the backwaters. In a lake, such obstructions are good hiding places for both fish and their food supply. Quiet pools in midstream or places where a stream empties into a larger body of water are likely locations for fish, since their food tends to collect in slack water. However, the nearby flowing water is comfortable for many species.

Most fish migrate according to food supplies, fluctuating oxygen levels, and changing seasons and water temperature. In the spring, fish will congregate in shallow water to feed and spawn. When the water warms up during the hot summer months, they will move in to the cooler depths, returning to feed in the shallows only in the early morning and late evening hours. As the water cools again in the fall, they'll be found feeding in the shallows, only to go back to deep water again during the cold winter months.




The water temperature plays a critical role in the feeding habits of most fish. Largemouth bass, for instance, are most active when the water is 65 to 75 degrees; smallmouth bass, on the other hand, seem to prefer their water about 5 degrees cooler. Trout generally enjoy colder water temperatures. When fishing for lake trout, the rule is to fish deep, where the water temperature drops to about 40 or 50 degrees.

The key point to remember is that fish like to be near a supply of food; they also want to be able to rest and hide safely. Find places that offer these to the species you're after, and you'll find fish.

Remember that the fun of fishing is in catching the fish. If you are not planning a fish fry, release the fish after you catch it. Many anglers clip the barbs off of their hooks to make it easier to remove the hook from the fish. Once you have removed the hook from the fish, gently lower the fish into the water and move the fish about to run water across its gills to help revive it. Then release the fish.

Be aware of your state's fish and game laws. Each state puts a limit on the number of game fish of each species that may be taken by an angler at one time. States also regulate the methods by which fish may be taken. Seasons also are set so that game fish can lay their eggs without interference.

## TACKLE

A fishing outfit consists of a rod, reel, line, and terminal tackle (hooks, lures, sinkers, and swivels). When each of these parts matches the weight and size capacities of the others, your outfit will work beautifully: The total outfit is then said to be balanced. In other words, your combination of tackle will do the best job for you under the conditions or types of fishing for which you balance it.

If you are new to the sport, you'll be amazed at the many kinds of tackle available and the unlimited number of combinations that can be made to suit your personal fishing equipment needs. If you are not sure, ask someone who knows all about tackle when selecting the different parts of your outfit. Each piece should be chosen with care to make sure it will balance with your other tackle. If you do this, your outfit will work just like you want it to for your type of fishing. Tackle that fits you and does the job always adds to the enjoyment of fishing.

### FISHING RODS

The majority of fishing rods (not poles) today are made from fiberglass. Although there are many different rod designs intended to perform in a variety of ways and for different situations, all rods do four vital things for the fisherman. In addition to throwing the bait during the cast and serving as a mount for the reel, a fishing rod acts as a lever in setting the hook and playing a fish. It also serves as a cushion to protect the line from excess strain by flexing evenly to absorb various shocks and stresses while hooking, fighting, or landing a fish.

There are two basic fiberglass rod constructions: the tubular-glass (fiberglass) rod and the solid-glass rod. Each has its good points, although the tubular-glass rods of today are the most popular. The reason for this is that they are lightweight yet very strong. Also, they are unaffected by temperature changes, which means they will not warp. And, in addition, a great many actions and tapers can be engineered into a tubular-glass rod.

Probably the biggest advantage of the solid-glass fishing rod is that it is easier for manufacturers to make and costs less. Unfortunately, many of the tapers and actions which anglers would like to use cannot be produced in the solid-glass rod, which is heavier without additional strength than the same type rod made of tubular fiberglass. This is important to the lure fishermen who will be casting and retrieving all day long—they want a rod that handles easily and will not cause them to become tired after working a lure for an hour or two.

Rods are made in either one piece or in two or more sections for easier transport and storage. For this reason, you should consider the ferrules next. Their purpose is to join the sections of a rod together to fit snugly. When the rod is taken apart, the ferrules should come apart with a pop, which tells you they have a smooth, almost airtight fit. One of the greatest enemies of a ferrule is dirt. Ferrules should be checked, cleaned, and lightly greased now and then to keep them from sticking.

There are many types of rod guides and tip-tops available to work in a specific way with different types of reels and fishing situations. When you cast lures or natural bait, they function as a guide to the line as it comes from the reel. During the retrieve, their purpose is to keep the line close to the rod, causing the rod to bend uniformly and absorb the strain of a fighting fish. The important qualities of rod guides are that they must be smooth and very hard to protect the line and prevent line wear.

Windings and trims are used to attach guides and tip-tops to rods. Other than that, they are purely decorative and help blend the line of the ferrules to the rod. Better rods use different colored, fine-thread windings, while others use paint for a two-color effect.

### ROD HANDLES

After you have decided on your method of fishing, the handle is a major part that should be considered in selecting a fishing rod.

The material most often used for the fore grip and butt sections is cork, and even though all cork has pores, you can choose a better quality by selecting the one with smaller pores. By looking at the quality of the

cork, you can usually judge the quality of the rod and the reliability of the manufacturer. For some special rods, wood is used; for others, a slip-proof, cushion-foam material is used. Whichever is used on the rod you would like to get, be sure it is smooth and feels comfortable in your hand.

The reel seats of most rods are made of chromed brass, chromed steel, and/or anodized aluminum. The important part of any reel seat, however, is the method used to hold the reel onto the rod. It should encompass a firm, secure locking device.

## FISHING LINES

The list of synthetic-material fishing lines includes monofilament, braided nylon, braided Dacron, nylon skidding line, wire line, and fly line (both sinking and floating).

The monofilament line is an absolute necessity on spinning and spin-casting reels because of its springiness and tendency to jump off the reel when cast. Besides having superior casting abilities, it is almost impossible to see in the water and accounts for a larger percentage of caught fish than any other type of line, making it popular among bait casters, surf casters, and trollers. The name ''monofilament'' gives a clue to its construction: ''mono'' meaning one, or single; and ''filament'' indicating a strand. The material used to make this line is heated and pushed out of a machine, much like toothpaste coming from the tube.

Braided lines are exactly what they imply: lengths of a particular material braided or woven together to make a single line of a certain strength. Braided nylon has a tendency to float, which is quite desirable to the angler fishing a surface or semisurface lure. Since the line floats with little resistance from water pressure, the lure will respond more quickly to every life-simulating twitch of the rod.

Braided Dacron, on the other hand, is very dense and heavy. It has the ability to get down deep when using deep-running plugs, jigs, and similar lures designed to make a presentation right in the fish's dining room.

The first wire lines were nothing more than plain copper wire. Today, however, the higher-priced lines are made of lead with a woven covering of nylon. This line sinks like lead, has the ability to overcome the buoyant tendency of deep water, and can take a trolled lure down to great depths, where the big ones usually are. The nylon sheath protects the soft lead from wear and tear, while making it possible to tie a strong knot in the line.

Modern fly line is produced with a center core of braided line which has a uniform strength from one end to the other and will not absorb water; a special finish is bonded to the center core to create a definite line weight and taper.

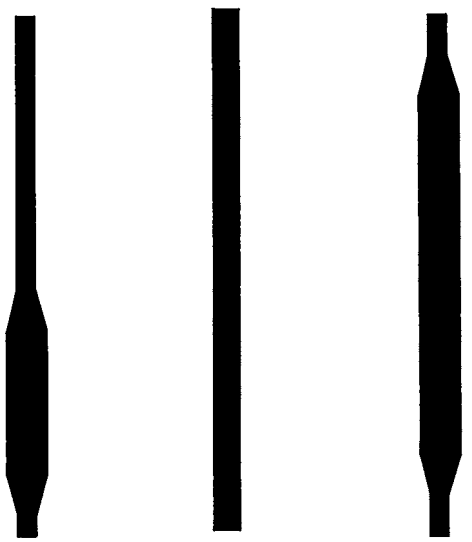
The level line has a uniform diameter through its entire length. This is the most common line in use and is ideal for the beginner. It is not meant for distance casting; rather, it enables the novice to learn control and permits a reasonably delicate cast.

The double taper is actually two fly lines in one. Most of its length is uniform except at each end, where it tapers to an identical smaller diameter. The heavier middle section aids distance casting, while the tapered ends allow a fly to drop gently onto the water. When one end has been used and begins to show signs of wear, the fisherman can simply reverse the line and begin fishing with a ''new'' line.

The weight forward is the perfect line for long casts and heavy-duty work in casting streamers (large flies), bugs, and poppers. It is constructed of a tapered heavy-bellied section up front, followed by a smaller diameter running line.

In addition to tapers, fly lines are also classified as either floating or sinking. The floating line is the primary weapon of most fly fishermen because it keeps the fly or bug on or near the surface. The sinking line is designed to carry the lure below the surface.

Choose the type, weight, and style of line you need for the kind of fishing you are doing.

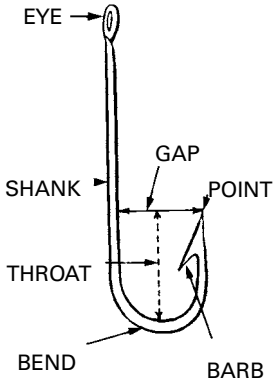


*Weight forward* *Level* *Double taper*

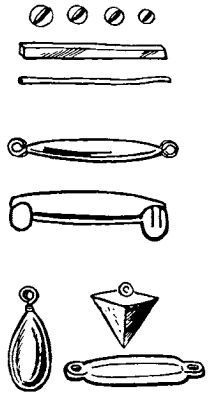
## ACCESSORIES

**Leaders** are connectors between the end of a line and the lure or natural bait. In some cases, when angling for sharp-toothed species like pike or muskie, a wire leader will help to keep you from losing excessive amounts of tackle and fish.

**Hooks** are available in many shapes, styles, and sizes. Be careful, though, not to choose one that is too large for the species of fish you are after. A fish can always swallow a hook that is too small, but a large one may scare it away. Always carry a hone or emery cloth and keep the points of your hooks in good shape. Many fish have been lost because of dull hooks.




*Parts of a hook*

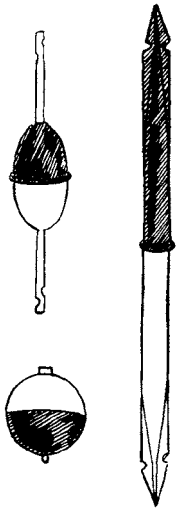


*Types of sinkers*

**Sinkers** are made in three basic styles for all-around freshwater fishing. Each style of sinker will serve the singular purpose of taking your bait down to a required depth. The bass-casting sinker is the popular style for bottom fishing, while the rubber-cored sinker is generally tied to your line when trolling. Use a split shot in any situation requiring a lightweight sink.

**Floats,** or **bobbers,** are attached to the line and used to keep the bait suspended at a predetermined level. They also serve as warnings to fishermen with whom fish are toying, or have already taken, the bait. Their coloring makes them easy to spot as they bob on the surface.

The most popular type of float is round and plastic and attached to the line with a spring-held snap. Another popular type of float has a hole running through its center. The line is run through the hole so that the fisherman can tie a knot above the float relative to the depth at which the bait is to be held. This type of float works great when your fish will be waiting 10 to 20 feet below the surface. When you want to cast, you can reel right up to the terminal end of the rig. Casting with a snap-on float would be impossible in this situation.



*Types of bobbers*

The **tackle box** should be large enough to hold whatever other items you will need to make your day's fishing successful. A set of small repair tools and lubricating oil may prove very helpful if you should have difficulty with your tackle. A hook disgorge is invaluable in removing a swallowed hook from a wriggling fish; insect repellent will protect you from annoying gnats and other pesky bugs. Carrying a set of foul weather gear will help you cope with those famous last words, ''Rain? Are you kidding? There's not a cloud in the sky!''

A **landing net** or **gaff** is a must if you are using light tackle or trying to land a good-sized fish from the water. With many fighters, you risk losing the fish as well as your tackle if you try to lift it without the aid of a net or gaff. Stream-wading fishermen—particularly trout anglers—generally carry their catches in a willow basket or canvas bag called a creel. To this waterlogged breed of angler, hip boots or waders are a must, especially when standing in swift-moving, ice-cold streams and rivers. Boat or bank fishermen use a stringer, which can be simply a cord or chain run through the fish's gill and out its mouth. This usually will not harm the fish, which can be kept alive in the water until you're ready to pack it in and go home.

## ARTIFICIAL LURES

Some time before recorded history, an industrious fisherman crudely carved a chunk of wood to resemble a natural bait. He was undoubtedly thrilled when it worked, and he landed the first artificially fooled fish. Since that time, anglers have been experimenting to find the perfect all-around lure that will excite fish and produce constant strikes. Artificial baits have been made from feathers, deer hair, wood, plastic, metal, and a wide variety of other materials.

Every time you visit your local tackle shop you are bound to see an artificial lure that you've never seen before. Some have been around for years, standing the test of time; others come and go because they fail the critical test of consistently producing strikes. Of the ones that do remain, there are literally thousands in the categories of fly patterns, plugs, spoons, jigs, plastic baits, and others. It is not necessary to own one of each.

Experienced anglers will have selected only a few standard lures that they feel will produce the best results. Most important, they have learned how to use the ones at their disposal in the most productive manner.

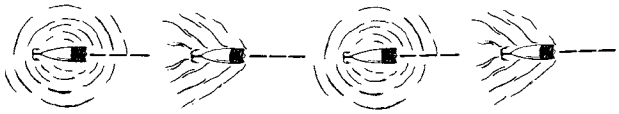
The selection of properly weighted lures is another important consideration in developing a well-balanced outfit. Always choose a lure that is made to be handled by a particular rod-and-reel combination. For example, spinning tackle is designed to handle lightweight lures, while medium- or heavy-weight lures perform best with spin-casting and bait-casting tackle.

During an average day of fishing with artificial lures, you will probably want to change lures from time to time. To make matters easier, a snap swivel should be tied to the line end. Swivels are inconspicuous and strong, and in the case of lures that spin when retrieved, they will keep your line from becoming twisted. Rarely will they affect the action of a lure.

**PLUGS**

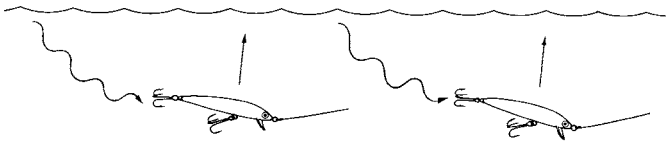
These artificial lures are designed to resemble a natural bait and can be made of wood, plastic, or foam rubber. They are designed to operate on the surface or at intermediate or bottom depths. Some will work at varying depths that are determined by the speed of your retrieve. The colors and design patterns available on plugs are literally innumerable.

A surface plug is fished by casting to a likely area and letting it sit for a while (usually until the ripples from the cast disappear). Then, give it a good twitch to bring out the action of the lure and let it sit some more. Be sure to reel in the slack line each time you do this.



*Surface Plugs*

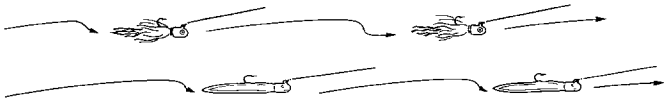
A subsurface plug has a small lip in front that causes it to dive and wiggle when reeled in. To work properly, it should be reeled in, letting it dive and wiggle, and then stopped, allowing it to rise to the surface. Let it rest for a few seconds and repeat the procedure.



*Deep-running plug*

A deep-running plug has an exaggerated lip on the front end. To work one properly, simply cast it out and reel it in rapidly, causing it to dive down deep.

A sinking plug will go straight to the bottom when it is cast. No matter how slow or fast you reel in, it will stay on or near the bottom.



*Jigs*

**JIGS**

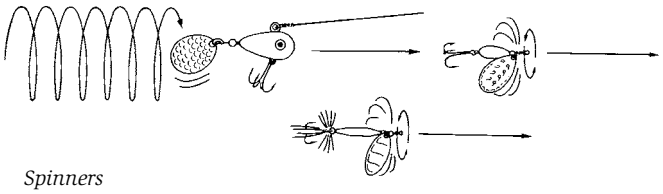
Also known as lead heads, these are simply hooks with a molded piece of lead near the hook's eye. They should be jerked through the water in a series of short movements. The advantage of jigs is in their ability to get way down deep.

*Spoons and wobblers*

**SPOONS AND WOBBLERS**

As the name suggests, spoons are shaped much like the bowl of an ordinary tablespoon with, of course, a hook attached. When trolled or retrieved, they have an enticing side-to-side sparkling action. The basic design of a wobbler is similar to the spoon's. The difference is that wobblers are usually painted in a wide variety of colors, whereas spoons are either silver, chromed, or gold-plated.

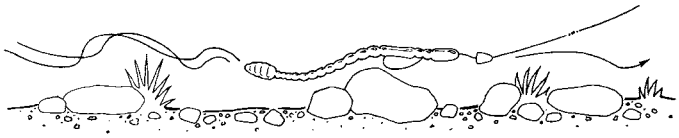
An erratic retrieve is usually the most productive method of fishing them. Give the lure a healthy pull, let it flutter toward the bottom, and then pull again. Each time, remember to reel in the slack line.



*Spinners*

**SPINNERS**

This artificial lure has a revolving blade attached to a center shaft through the lure. The attraction of a spinner is the swirling, flashing blade that draws the attention of the fish. In order for it to function properly, it must be drawn naturally through the water. Retrieve it for a short distance, let it flutter downward, and repeat the technique.



*Plastic worms*

**PLASTIC WORMS**

Probably the all-time deadliest big bass catcher so far is the plastic worm. The trick to fishing with the worm is essentially the same as with any other artificial lure. It is up to the fisherman to impart a tantalizing, lifelike action to the hunk of plastic on the end of the line. Some fishermen prefer to cast and reel, twitching the rod tip every now and then, causing the worm to undulate exotically. Others find that an extremely slow retrieve causing the worm to ''crawl'' across the bottom is an effective method.

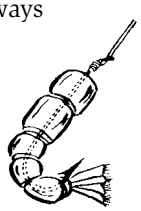
**NATURAL BAITS**

Generally speaking, you can use anything for bait that a fish will eat. Experienced fishermen, however, always insist on the freshest bait possible and usually prefer to obtain it near the spot they plan to fish. They find that it is best to offer fish what they want and to duplicate the natural food that is available at the moment.

*Earthworm*

*Night crawlers* are probably the most popular fishing worms, measuring 8 to 12 inches long when stretched out. You can find them at night on fairly wet ground if you walk carefully and quietly, using a flashlight to spot them. Golf courses, baseball fields, or even your front lawn are good places to hunt.

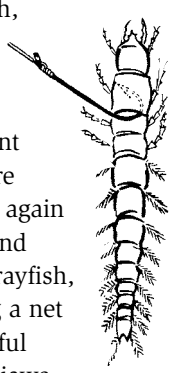
Ordinary *earthworms* are easier to get. Just dig them up in a garden area or find them under logs, rocks, and piles of weeds or grass. To be sure you always have a supply of worms, make a compost pile from grass clippings and leaves. Or keep a plot of ground soaked with greasy or soapy water.



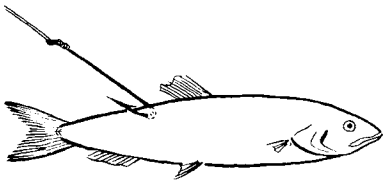
*Crayfish tail*

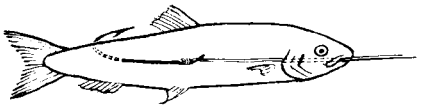
In many places, *crayfish* are rated as one of the best baits for big bass. Catch them by placing a small-mesh net across the riffles of a stream and then going upstream to overturn rocks and stones. Before hunting for crayfish, be sure it is a legal practice. Some states have a closed season on taking them.

Live *hellgrammites* are also excellent natural baits for bass. Because they are tough, they can be cast over and over again without coming off the hook. You'll find them in swift, rocky riffles. As with crayfish, hellgrammites can be caught by using a net set up downstream. However, be careful when you pick one up. The powerful jaws they use for holding onto rocks and logs in a swift current can inflict a nasty bite; clip the jaws off as well as the claspers on their tails.



*Hellgrammite*





*Minnow*

*Shiners* are favorite minnow baits with both fish and fishermen. Carefully hooked through the lips or behind the dorsal fin, they will stay alive on the hook for quite a while. Dead, they work well with bottom feeders such as catfish. They can be seined or dip-netted from many areas, but keep in mind that many states have laws to protect them during the spawning season. In addition, it may be illegal to fish with them in many states or areas, as is the case with carp and suckers.

## KNOTS FOR FISHING

Contrary to the thinking of many novice fishermen, a simple overhand knot will not do in most fishing situations. Although a knot may seem insignificant and hardly noticeable to the observer, it can be, and quite often is, the critical factor between success and failure.

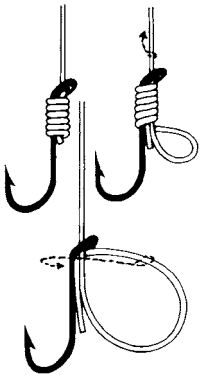
Before you start practicing your fishing knots, here are some helpful tips to keep in mind.

1. Clip off any damaged section of line before you tie a new knot; usually the last 2 feet.
2. Check the hook or lure eye for barbs or rough spots.
3. Use plenty of working line when tying a knot.
4. Tie your knot when the line is wet. This allows the knot to cinch up smoothly without kinking or weakening the line.
5. Tighten the knot with a steady, even motion.
6. Pull the knot tight.
7. Don't trim too close. Leave at least ⅛ inch of line at the knot.

The following knots have been selected because they are relatively simple to tie, reliable, and they provide good knot strength. With a little practice, you'll tie them with confidence.

### SNELLING A HOOK

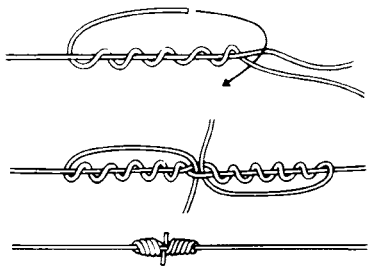
This is a neat and simple way of attaching a hook to monofilament for certain types of bait fishing. To make a double-gang hook rig, leave the free line end long and tie in a second hook behind the first. This is a popular way of hooking worms for trolling or drifting.



*Snelling a Hook*

### BLOOD OR BARREL KNOT

This is usually used to join two strands of monofilament together. Lap the ends of the lines or leaders several inches. Then twist one around the other, making at least five turns. Place the end between the strands and hold them together between thumb and forefinger. Wind the same number of turns (five) in the opposite direction, using the end of the other line. Then pull on the two ends to draw the turns closer together. When they have closed up snugly, pull tightly on the ends to make the knot as small as possible. Clip the ends.



*Blood or barrel knot*

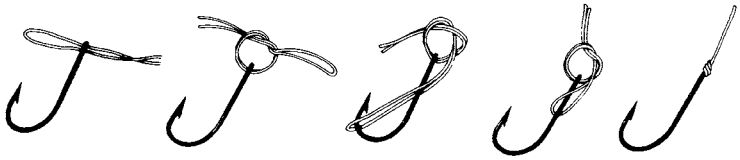
### IMPROVED CLINCH KNOT

*Improved clinch knot*

The basic knot for tying lures, hooks, swivels—any object having an eye—to a line. Run the end of the line through the eye, double the line back, and make five twists around the line, leaving a loop. Run the end of the line through the loop where the line joins the eye and then pass the line through the large loop. Partially close the knot and moisten it a little (not with saliva) before securing it against the eye.

### PALOMAR KNOT

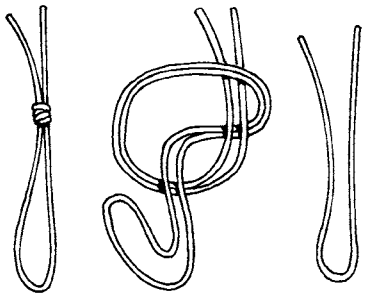
This is another basic knot that serves the same purpose as the improved clinch knot. Double the line to make a 3- to 4-inch loop, then pass the end of the loop through the eye. Hold the standing part between thumb and forefinger and tie a loose overhand knot in the double line with the other hand. Then pass the hook through the loop and pull on the doubled line to tighten the knot, guiding the loop over the top of the eyelet. Clip the tag end.



*Palomar knot*

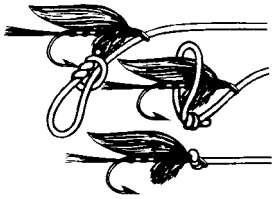
### SURGEON'S LOOP

This is an easy way to form a loop in the end of a line or leader. Double the end of the line and make a single overhand knot. Then pass the loop around and through the overhand knot again. Hold the loop in one hand and the standing part and tag end in the other hand. Moisten the knot (not with saliva) and pull to tighten. Clip off the tag end.



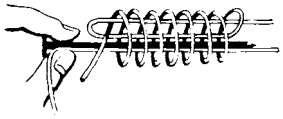
*Surgeon's loop*

**TURTLE KNOT**

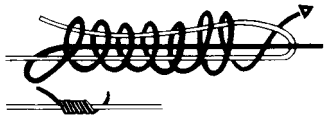


*Turtle knot*

This knot is popular with Atlantic salmon fishermen. The turtle knot makes a straight connection between the hook shank and leader. Begin by passing the end of the leader through the hook's eye from the front; then slide the fly up the leader so it will be out of the way. Make a slipknot in the end of the leader by bringing the free end around twice, like a double overhand knot. Draw the knot tight and pass the loop over the fly, as shown. Pull the leader and manipulate the loop so that it tightens around the back of the hook's eye and not in the eye or on the leader itself.



*Nail knot*



*Wire line to mono knot*

**NAIL KNOT**

This is a good way of tying monofilament to lead-core line or backing to a fly line. First, position the nail (or any similar object) along the lead core. Then lay a loop of monofilament on the nail. With the free end of mono-line, take five or six turns over that loop and the nail and lead core, as shown. Next, run the end of the mono through the loop. Tighten the knot by pulling on both lines, slip the nail out, and tighten the knot all the way. Clip the protruding ends short.

**WIRE LINE TO MONO KNOT**

Holding the wire line in your left hand, fold 4 inches of the end back over the standing part of the line. Run monofilament through the middle of the bend in the wire, passing it behind the wire and then over it. Make seven close turns around both lines. Pass the end of the mono over the center strand of monofilament and under the top strand of the wire, and then draw up snugly. Cutting the free end of the wire would leave a burr that can cut fingers. Instead, bend it back and forth. It will break close to the turns of the monofilament, leaving no burr.

**PUTTING LINE ON THE SPOOL**

*Putting line on spool*

Securing fishing line, monofilament or braided, is quick and easy with this method. Begin by tying a simple overhand knot at the end of the line, snipping the excess line close to the knot. Pass the line around the spool and form a loop beneath the line at A and B. Bring the free end over B and then down through the loop. The overhand knot prevents the loops from slipping through each other as the line is drawn tightly around the spool.

## BAIT CASTING

**REELS**

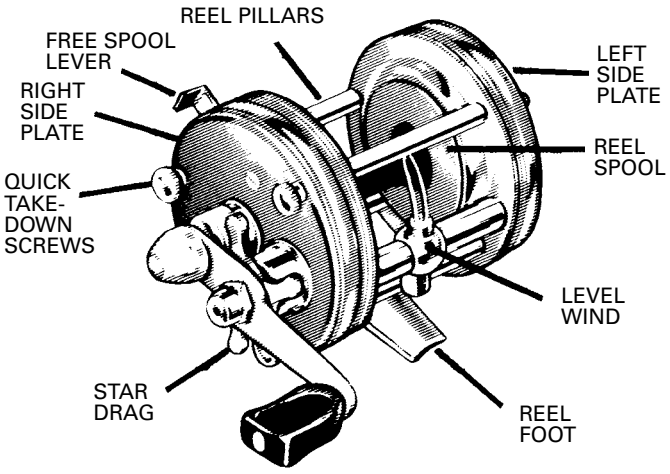
The operating principle of the bait-casting (conventional) reel has not changed since its development in the early 19th century. Modern improvements and machine skills, however, have made today's bait-casting reel far better than the earlier models. The term ''bait casting'' comes from early days when the reel was used to cast live minnows.

The revolving-spool reel, as the bait-casting reel has also been called, is somewhat more difficult to master than the fixed-spool (spinning) reel. Once the lure hits the water after a cast, line can come off the reel, for the spool continues to rotate unless it is controlled by the angler. Lacking practice in line control, the newcomer may spend more time unknotting backlashed line than fishing.

Nevertheless, many fishermen today prefer the bait casting outfit for a number of reasons. Bait-casting tackle tends to have the power and strength required for fishing in areas of heavy weed growth and underwater obstructions. In addition, once the casting technique is perfected, quite a few anglers insist that more accurate casts are possible with the old conventional-style reel than with any other type of tackle.

You can judge a good bait-casting reel by looking for these features:

- A comfortable and well-balanced handle
- An easily adjustable drag (which not all conventional reels have)
- An antibacklash system to help control each cast
- A free-spool system to disengage the gears for long casts
- A level wind for even line spooling on freshwater models
- Precision engineering for minimum space between spool and sides to prevent monofilament line from getting behind the spool
- Strong, corrosion-resistant material construction of side plates
- Quick takedown features that make changing line spools and maintenance easier




### BAIT-CASTING TECHNIQUE

As is true of all casting techniques, the key to good bait casting is timing, not power. When you first start to cast, forget about distance; apply your concentration to the perfection and control of the basic skills that follow.

Prepare for the cast by holding the rod grip firmly with the handles of the reel on top. The rod butt should be in a straight line with your forearm. Rest your thumb on the edge of the reel spool with some pressure directly on the spool itself.

Before each cast, press the free spool release button while continuing to keep the line from unwinding. (Once the cast is completed, a turn of the handle will give you line control again.)

You are now ready to attempt your first cast. Bring the rod up in line with your aiming eye. The rod butt should continue to be parallel with your forearm and should point directly at your elbow.

The casting action with this type of tackle should be the same as the smooth continuous 10 o'clock–1 o'clock–10 o'clock method described in the ''Spinning'' section. As the rod returns to the 10 o'clock position, release some of the thumb pressure on the reel spool. As the bait nears the target, apply pressure gently and ''set'' the bait down on the water. For additional control of the reel's spool rotation, consult the manufacturer's instructions for brake adjustments.

## SPINNING

The technique of spin fishing, or spinning, was developed in Europe before World War II. The spool (the line-storage area) of a spinning reel does not turn when an artificial lure or natural bait is cast. Instead, line is pulled from the spool only by the forward momentum of the lure's weight while the line spool remains stationary. Thus, there are no moving parts during the cast, and the line is relatively free from resistance as it travels away from the reel. This meant longer, more effortless casts; and, in addition, it was less possible to develop a backlash or tangle of line with the spinning reel because line would stop coming off the spool at the same time the lure hit the water. With other methods, the line spool would continue to turn when releasing line, but there was no place for it to go once the lure was in the water, and it would cause the line to loosen, tangle, and knot up.

Many anglers think that a spinning outfit is by far the most versatile combination of fishing equipment they own because it performs equally well with a variety of natural-bait and artificial-lure sizes. To the beginner, spinning is the easiest type of tackle on which to learn the fundamental techniques of fishing.

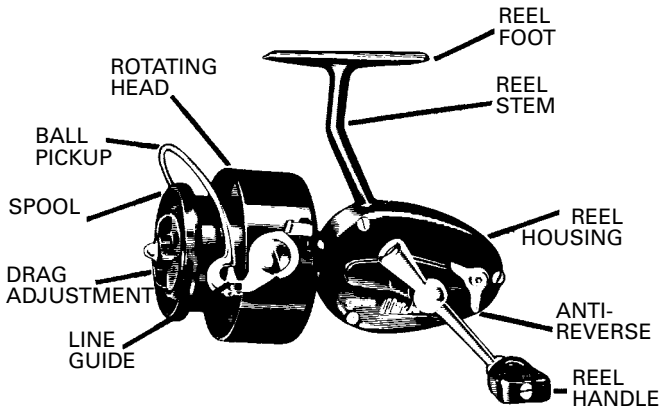
### SPINNING REELS

All spinning reels operate on the same basic principle.

The *spool* is the line-storage area of any reel. During the cast the spool of a spinning reel does not move at all; in fact, as opposed to spools on other types of reels, it never rotates during casting or retrieving. When you cast, line is pulled off the stationary spool by the weight of the lure.

To retrieve line, you turn the *handle,* which causes the line to wind around the spool by means of the *rotating head,* which revolves around the spool, and the *line guide,*

which guides line onto the spool. We said earlier that the spool never revolves during casting or retrieving, and it doesn't. However, it does move in and out during the retrieve, which causes the line to be distributed evenly onto the spool. The only time the spool itself rotates is when a fish pulls and activates the *drag*. The drag adjusts to offer resistance while a fighting fish pulls line from the reel; it helps to keep tackle from being strained unnecessarily and the line from being broken.




*Spinning or open-face reels*

The features you should look for in selecting a good spinning reel follow.

- A corrosion-resistant reel housing
- Easily accessible lubricating parts
- A handle that folds for protection
- A grip that is comfortable
- An anti-reverse that prevents the handle from turning backward (this allows anglers a free hand to land their fish)
- A line guide made of a smooth, hard material (preferably tungsten carbide)
- A gear system that operates smoothly with an even in-and-out movement from the spool (for even line winding)

## SPINNING TECHNIQUE

This is fun and also rather simple if you think about what you are doing when starting out. Once you have your outfit together, practice casting a bit before going out to your local fishing hole. To start, attach a weight or casting plug (without hooks) to the line end and let it hang about 6 inches from the tip-top. Then hold the rod firmly in your casting hand, with either one or two fingers in front of the reel stem—whichever is more comfortable—and rest your thumb on top of the rod.

When casting weights of ⅜ ounce or less with balanced tackle for such weights, use the *spool casting* method: Place the index finger of your casting hand under the reel's bail and against the edge of the reel spool. Open the bail fully and the line will slip to where your index finger is, thereby preventing it from falling off the spool any further. Now you are ready to cast.

When casting weights of ½ ounce to 2 ounces with balanced tackle for such weights, use the *thumb casting* method. With your casting hand holding the rod, take the line with your free hand and place it tightly across the rod's foregrip and hold it there with the thumb of your casting hand. Now open the bail fully and you are ready to cast.

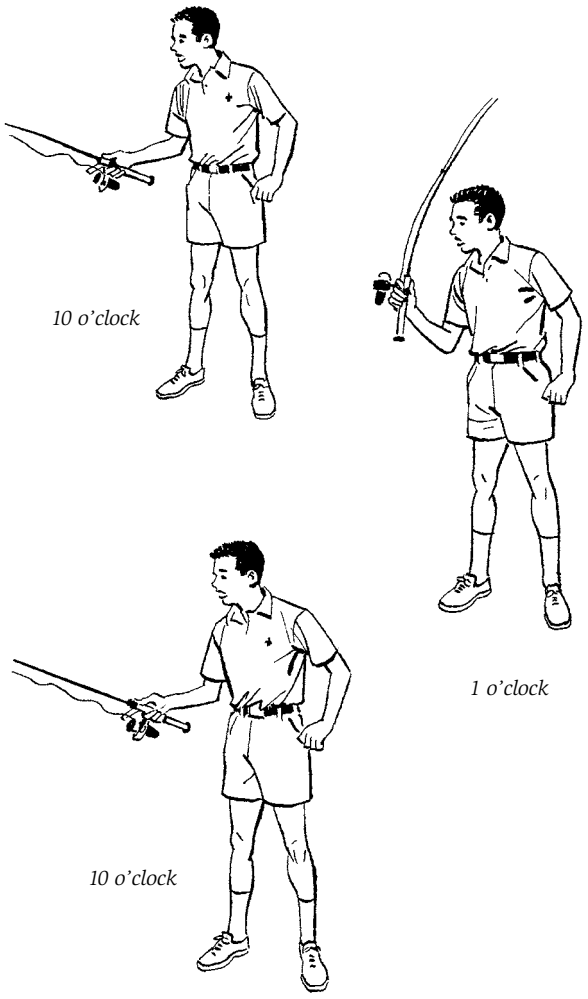
When casting weights in excess of 2 ounces with balanced tackle for such weights, use the *index finger casting* method: With the casting hand holding the rod, point your index finger down toward the line. Then hook the line with the end of your index finger just enough so that you can hold it away from the bail and above the spool. Now open the bail and you are ready to cast. (Note: If using 12-pound test or lighter line, exercise caution, as thin lines could break or cut into your index finger on a hard power cast.)

Prepare to cast by holding the outfit firmly, but don't strangle the rod—just relax. As you continue to hold the line, reach down with the thumb and index finger of your free hand and move the bail across the face of the reel until it clicks into the open position. That's it! You're all ready for your first cast. Don't squeeze the line with your finger; use just enough pressure to keep the line from falling off the reel spool.

Before you make your first cast, picture yourself standing sideways to the center of a clock. Using the rod as the hour hand, point the tip at 10 o'clock. The cast should follow in one smooth, continuous motion bringing the rod tip from 10 o'clock to 1 o'clock—let the rod do all the work. You simply control the power that has been built into it. Practice this suggested action a little before letting go of the line. Use your forearm in a chopping action to make the casting motion, and you'll be able to feel all the power developed by the rod as it returns to the starting position.

When the rod is returned to the 10 o'clock position, the line should be released immediately from your fingertip. With practice, you'll soon learn exactly when to release the line for a perfect cast. However, don't be discouraged with your first attempts. If you remember two basic rules for spin casting you'll be able to cast correctly in no time:

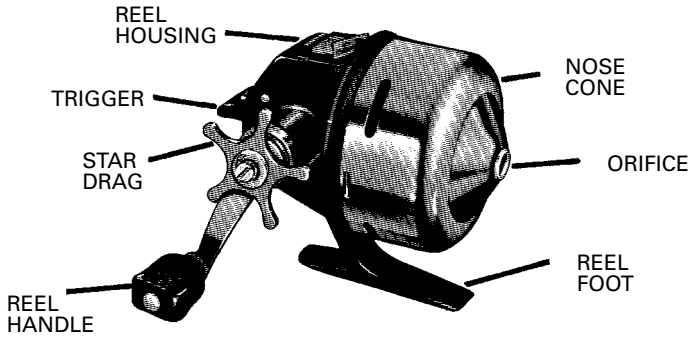
1. If the cast goes into a high arching flight, you are releasing the line too soon.
2. If the lure splashes into the water at your feet, the line is being released too late.




## SPIN CASTING

### REELS

The spin-casting (closed-face) reel is very closely related to the spinning reel. In fact, it is a spinning reel but with a covered line spool. When the spin-casting reel was first introduced, it tried to encompass the best features of the spinning reel and the conventional bait-casting reel. However, the original design of the reel bothered many fishermen for some reason. Eventually, an ingenious American fisherman came up with the idea of covering up the moving parts of the reel by putting a metal shroud over the front end. This left the handle as the only visible moving part. Thus, the closed face spinning reel of today is truly an American invention.




When selecting a spin-casting reel, look for these features:

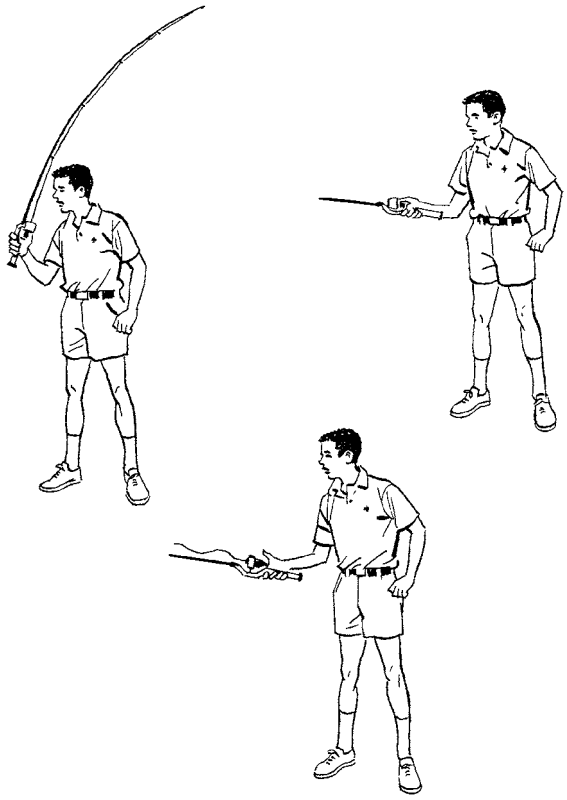
- A corrosion-resistant reel housing
- Easily accessible lubricating parts
- An easy-to-operate and comfortable push button (this replaces opening the bail and holding the line on a spinning reel)
- A smooth-working gear system with a constant in-and-out movement of the line spool so line is distributed evenly (not all spin-casting reels have this type of spool)
- An easily adjustable and conveniently located drag which works smoothly over a wide range of settings
- A smooth, hard-material orifice (opening) in the nose cone to prevent too much line wear

### SPIN-CASTING TECHNIQUE

The spin-casting reel is mounted on the same type of rod as the bait-casting reel and in the same manner—on top. The step-down reel seat makes it much easier for the angler to reach and control the thumb trigger, which plays a vital role in casting with this reel.

To prepare for the cast, just follow these four basic steps:

1. Hold the rod comfortably in your casting hand, remembering that the reel should be on top of the rod.
2. Reel the lure in so that it hangs abut 6 or 8 inches below the rod's tip-top.
3. Now that the rod and reel are ready for casting, tilt the entire outfit so that the reel handle is on top and your knuckles are on top. This manner of holding the outfit will give you freedom of wrist movement for adding an extra snap to each cast.
4. Rest the thumb of your casting hand on the casting trigger of the reel. Push the trigger down with your thumb and hold it there.

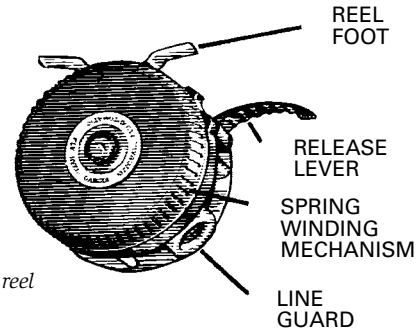


The motions and technique are almost exactly the same as described earlier in the section on spinning. Start the cast by holding the rod in the 10 o'clock position, remembering to keep the casting trigger depressed. Then, with a smooth, steady wrist/forearm motion bring the rod tip back to 1 o'clock, still keeping that trigger pressed in. Once the rod tip is up, flexing and straining with power, bring it back to the starting 10 o'clock position immediately. Now is the time to take your thumb off the casting trigger and allow the line to fire out toward your target. Don't be discouraged if your first casts are not perfect. A few practice casts should help you develop the proper coordination, and soon you'll be casting like a pro.

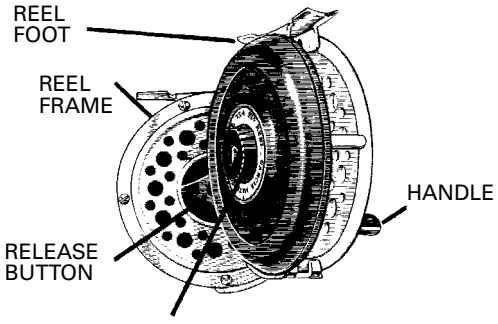
## FLY-FISHING

Fly-fishing is probably the world's oldest recorded method of angling. A book written in A.D. 300 called *De Natura Animalum* contains a chapter referring to ''a unique method of angling in Macedonia.'' The fishermen of those early days of fly-fishing began to dress up hooks to look like insects which, they noticed, the local fish were eating. In addition to using these ''insects,'' the early fishermen found that using a light, limber rod also made catching supper more exciting, adding fun to chores. Eventually, fishing began to take on the aspects of a game, and fishermen started using both lighter rods and line.

Fly-fishing, as we know it today, emerged as the most artistic and challenging form of the sport. Fly-fishermen consider catching fish relatively minor to perfecting their presentation and knowledge of fly patterns. There are two major categories of flies that concern them: wet flies, which sink slowly in the water and resemble a drowned or an underwater insect or minnow; and dry flies, which float on the surface like an insect that has perhaps just dropped into the water from overhanging foliage.




*Automatic fly reel*




*Standard fly reel*

### REELS

The fly reels used in today's sport are the single-action, the multiplying, and the automatic. Their difference is primarily a matter of mechanism, which is implied in their names. The multiplying fly reel has a fast-retrieve gear ratio while the single-action does not, and the automatic reel takes up line by means of a trigger which activates a spring-loaded mechanism.

The operating principle, however, is the same for them all. Their major functions are to store the line while fishing, to control the fish after it is hooked, and to act as a counterweight to the very long-tipped fly rod.

### LEADER CONSTRUCTION

Leaders serve as a connecting link between the line and lure. Attached to the fly-line end, a leader will transmit the power of the cast to the fly and cause it to ''turn over,'' landing gently on the surface of the water.

The majority of fly rodders prefer a tapered leader because of superior casting qualities. Standard leader lengths measure from 7½ to 9 feet. However, the longer the leader the more difficult the cast. Attach the thicker ''butt section'' of the leader to the line with a nail knot.

### FLY-FISHING TECHNIQUES

Half the excitement of fly-fishing, or fly rodding, is in the art of casting. After practicing the technique, you'll enjoy making a proper presentation even when there are no fish around. Let's take a closer look at this method of outwitting fish. Fly-casting is nothing more than applying positive, smooth power to a rod through timing and rhythm. Your size or strength has nothing to do with your ability to cast. The best place to start is at a nearby park or on your front lawn. Tie a small fly on the end of the leader, and you'll be able to follow the action of the line and fly more easily. For safety's sake, however, clip the hook off the fly while you are practicing.

There are three distinct parts to every cast with a fly-fishing outfit: the pickup, the backcast, and the forward cast. The pickup and the backcast are basic to successful casting. Once you put your mind to it, you'll see that they are relatively easy to learn.

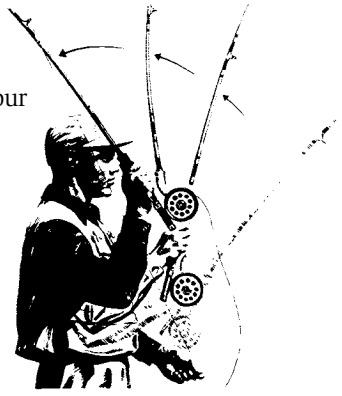
#### THE PICKUP

Stretch out about 30 feet of fly line on the grass in front of you. With the reel and guides underneath the rod, point the tip of the rod directly at the fly at the end of the line. Grasp the line between the reel and the rod's first guide with your free hand. Separate your feet and stand comfortably. Now, turn 45 degrees in the direction of your casting hand. This will allow you to follow the motion and action of the line while making the cast.

Start the line coming toward you by lifting your arm up and back in a smooth action. Don't let the line in your left hand slip through your fingers. The idea is to throw the line up and behind you toward the sky.

#### THE BACKCAST

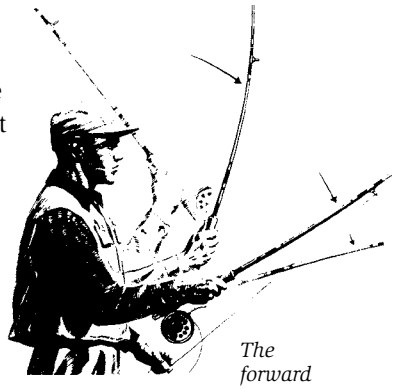
When the rod is vertical, stop the power and flick your wrist backward and upward. Keep an eye on the line: It should loop behind you and begin to straighten. Now, all you have to do is pause momentarily until the line completely straightens and you feel a slight tug. A common fault is starting the forward cast before the line is straight, which deprives the cast of the power you want. Remember that all-important pause if you wish to be a good fly-caster.



*The backcast*

#### THE FORWARD CAST

Once you have completed the backcast, including the pause with the line straight out in back of you, all that remains is to bring your arm and the rod forward. Start slowly, and increase the speed steadily. If you take your time and don't rush the cast, you'll find it easy and natural.



*The forward cast*

## ICE FISHING

By no means let winter's icy breath freeze your spirits and enthusiasm for fishing. To a great many fishermen, fishing is at its very best during the winter months even though local lakes and streams may be frozen over. In fact, some say the fish that continue to feed regardless of the cold-water temperatures—such as pike, pickerel, walleyes, crappies, yellow perch, and bluegills— are much more flavorful than at any other time of the year.

To fish, you'll naturally need to make a hole in the ice. You'll know where to put the hole and where the fish are concentrated from day to day by reading the outdoor columns in newspapers, talking to area tackle shop owners, or simply by going out to the lake itself and finding the other fishermen. You can be sure that when one fisherman finds fish, others will start to crowd around the same spot. If there are no fishermen or signs of fishing around, try to locate likely areas where the fish would be or would feed, as you would in summertime. However, before going out on any frozen water, *make sure the ice is thick enough to support your weight* by checking with local authorities.

The simplest method of cutting through the ice is with an ice auger, which looks like a squat corkscrew with a long handle. Just screw it down through the ice, and you'll be ready to fish. Chopping your way through with an ax or chisel will leave ragged edges that can cut or fray your line. Ice fishing tools should also include a sieve or strainer of some kind to lift chips of ice out of the hole and to stir the water, which turns slushy as it begins to freeze over again.

A simple hand line or lightweight tackle is enough for ice fishing. If state laws permit, you may want to use a ''tip-up,'' which is a signal, usually a flag or bell, triggered when a fish pulls the line down. For bait, use minnows, worms, or any type of grub; just keeping the hooks baited when a school of panfish comes by is a job in itself.

Chum may be used to attract fish to your area, or sometimes other fishermen may stomp the surrounding ice to scare the fish in your direction. Another feature of ice fishing is that you don't have to worry about putting fish on a stringer when there is action: just drop them on the ice, and they'll be quick-frozen and remain fresh until the day is over.

It is most important for any winter sport to prepare to be warm and dry. The wrong time to wish you had dressed more warmly is when you are out in the middle of a lake and the fish are just starting to bite. Dress with layers of clothing rather than with a few heavy, bulky clothes. Earmuffs, gloves, and sunglasses to protect your eyes from glare are a must. Above all, be sure to protect your feet with warm socks and insulated overshoes.

Many veteran ice fishermen build shanties measuring 4 by 4 by 6 feet and mount them on sled runners for easy towing from place to place. An ice shanty provides shelter from cold winds and may have all the comforts of home if stocked with a portable stove and reading material or a radio to pass the time till the fish bite. Of course, a simple windbreak of canvas or plywood constructed in an A-shape will provide shelter, if not entertainment.

## SALTWATER FISHING

The sea holds a mysterious attraction for fishermen. It's hard to know whether the early morning cries of sea gulls, the whispering hiss of a foam-laced beach, the salt spray of crashing breakers, or the endless mission to hook the big one is what lures saltwater fishers.

### THE LURE OF THE SURF

A breed unlike any other, surf casters roam the most desolate stretches of beach in search of clues to the presence of their prey. These lonely hunters can be spotted working the beaches and jetties from the time the first dogwood blooms until the bitter cold nights ice their lines and lures. They know that eventually they will be at the right place at the right time: The moment a big fish comes chasing its food across the shallows of a receding tide or lies in wait within their reach in a channel or near a rocky point.

The surf fishermen's grounds stretch out in endless miles along our country's coast. Crashing breakers, flying spray, and the hiss of spreading foam mark the battleground where the hunter and the hunted meet. This is surf country, where the sandbars, channels, riptides, and sloughs trap bait that draw the attention of game fish and angler alike.

The variety of prizes available depends largely on the area you are fishing. The gamut of fish runs through blue, striped bass, channel bass, and flounder; in size, from 1 to more than 100 pounds! A long-handled surf rod provides the leverage needed to throw your bait well out beyond the breakers. A spinning or revolving-spool reel is loaded with at least 200 yards of heavy line in case your fish decides to make a long, fast run.

Successful surf casters have learned to read a beach and recognize the signs that point to fish. They will often walk a stretch of beach at low tide studying and looking for sandbars, rocks, and gullies that are normally covered when the tide rises. They know that these places are where fish will congregate and where the action of rolling water will tumble bait and break up shellfish as natural bait.

Big fish will chase bait up to the beach if they have to, or feed in the trough created by a receding wave. Veterans will watch the waveline along the beach, looking for the spot where the water climbs highest onto the sand, indicating deep holes. They'll watch the height of incoming waves, because they know that waves begin to break when the depth of the water equals the height of the rollers.

In some parts of the country, rocky jetties extend seaward from the beach. These natural or, in some cases, constructed breakwaters generally provide consistent fishing. Most game fish gather around jetties, because baitfish seek protection there. Experienced jetty jockeys will work the pockets formed between the jetty and the beach. However, they also know that, while the fishing may be good, they have to be on guard constantly for slippery, algae-coated rocks. These can be treacherous when the seas are high, and some are tough going at all times.

#### SURF-CASTING TECHNIQUE

The basic technique of surf casting is not unlike the reel handling described in the ''Spinning'' and ''Bait Casting'' sections of this program feature. The equipment is much the same except that every piece of tackle designed for saltwater is usually built on a larger scale: Reels are huskier; rods can measure from 8 to 11 feet long; and lines and lures are made heavier.

The preparatory casting steps are the same as the ready-to-cast positions for the spinning and bait-casting reels (reviewed earlier); they are illustrated here as a reminder. The lure or terminal tackle should be reeled in to within 12 to 16 inches of the rod tip. If you are casting with a bait-casting reel, be sure to push the click button to the off position and depress the free spool button prior to casting.

In your final preparation for surf casting, grip the butt of the rod at a comfortable distance below the reel. If you are right-handed, extend your left foot out in front of the right one and point it in the direction of the target area. The cast will arc the rod over your right shoulder. If you are left-handed, the rod will be over your left shoulder with the right foot leading.

Let's go over the ready position. Point your leading foot toward the target area; hold the rod at shoulder level and point it in the opposite direction, placing your weight on the rear foot. Before casting, look behind you to make sure the hooks on your line are clear of obstructions and that anyone standing around is at a safe distance.

Begin the cast with gradually increasing speed. Swing the rod tip up by pulling the rod butt toward your chest and pushing the reel away from you at the same time. Your shoulders and hips should pivot forward as your weight is shifted from your rear foot to the leading foot. The most important factor of a good cast is a smooth and steady increase in speed.

As the rod butt reaches the vertical position (pointing at 6 o'clock) the rod tip will be pulling the terminal tackle at maximum speed. Now is the time to release the line while you continue to pull the rod tip forward: The lure will be on its way like a shot! Timing is all-important and can be mastered only with practice. Soon, this casting method will become second nature.

As you become better, you'll take pride in each cast. If at first the lure follows a high arching path, you'll know the line was released too soon. However, the lure will splash into the water at your feet if you wait too long to release the line.

## BOTTOM FISHING

Fishing with bait at or near the bottom of any body of saltwater is the most popular method of catching fish. Perhaps the reason is that at one time or another almost every type of fish feeds on the bottom. The technique is easy, the variety of fish caught is great, and it provides hours of enjoyment at little or no cost.

Wherever you find a bridge of any sort over water, you'll usually find fishermen. In fact, some piers are built especially for fishermen, and a fee may be charged to fish from them. Tackle at places like these is rarely a consideration for enticing fish—just about anything goes. Whether fishing from a party boat, pier, bridge, or causeway, the object is simply to get the bait to the fish by dropping it straight down. Also of prime importance is a line strong enough to haul the fish in and, if possible, a heavy sinker to overcome currents and get the bait to the bottom.

To some, bottom fishing is nothing more than waiting for a fish to strike. Others delight in experimenting with new riggings, baits, and techniques. Many anglers use a method called live-line fishing when a strong current is present: They use a light sinker or no sinker at all and let the bait drift naturally. Veteran fishermen carefully calculate every one of their moves—and their usual result is more fish. They check their bait often and replace it if it seems worn. You can also try different sinker weights or change the hook size. Periodic movement of the rig along the bottom at times will make a difference.

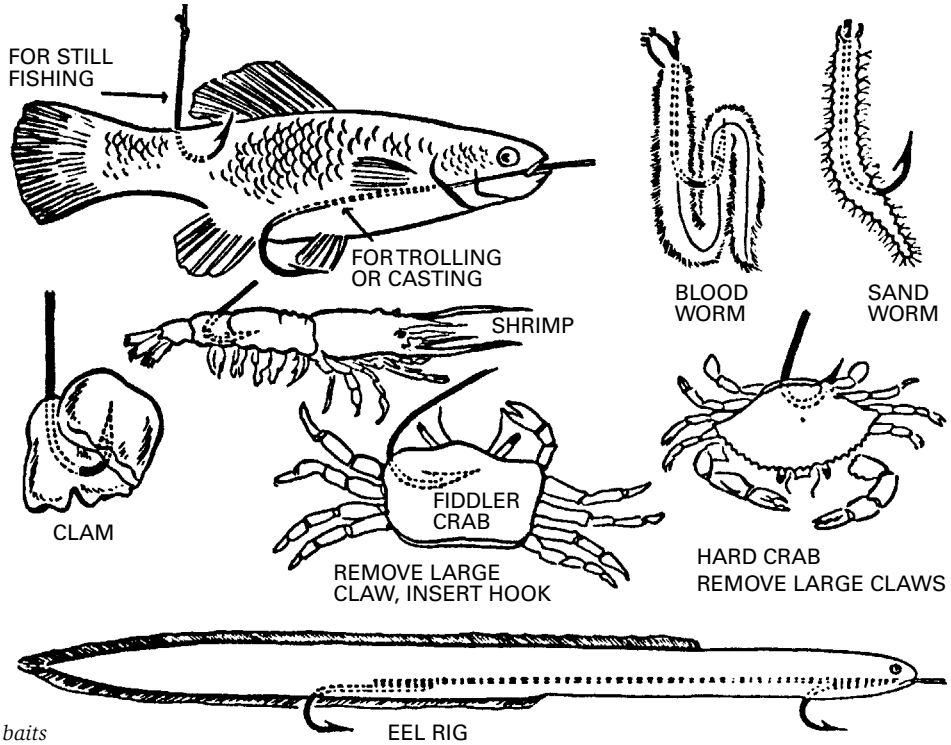
When the tide is low, study the waters surrounding bridges and piers. Much as in a bass lake, certain spots under and around them are more to the liking of fish than others as they wait for food to swim or be carried in by the currents. It is often possible to locate groups of resting fish at low tide and successfully fish these areas when the tide returns. Some of the bottom feeders are notorious bait stealers, and the angler must have a steady hand and concentration to hook them at the right moment. Bottom fishing can provide exciting sport.

## NATURAL BAITS FOR SALTWATER

There is no substitute for the real thing, and natural baits are exactly that. In most cases, if it is the natural food of the fish you are after, most of the time they will take it. Of course, the kind of bait varies in different areas, but the techniques outlined here will generally remain the same.

You can usually get good advice from bait dealers on the best baits to use. Their job is to obtain bait daily and then sell it to anglers, who provide updated information on the fishing action. Although smart anglers use more than one bait if they expect to make good catches, certain baits do produce consistent results with certain type of fish.

**Sea worms** (also known as clam worms or sandworms) are excellent for bottom-feeding fish of all kinds. They may also be trolled behind a boat or allowed to drift free in a current for surface or mid-depth feeders such as stripers or weakfish. Normally, you can dig them up yourself from the muddy sand of tidal flats or look for them under rocks along the shore at low tide.




*Natural baits*

**Bloodworms** are quite similar to sea worms and can be found in the same places. Both can be kept alive for a few days if kept cool in a container with moist seaweed. For longer storage periods, keep them on ice or in a refrigerator. Stir them every now and then to keep them separated; otherwise, they become tangled in the bottom of the container and sometimes eat each other.

When baited for larger fish, hook them in the tough skin just below the head and let their long bodies trail behind the hook. Use small sections of the worm when going after small bottom feeders.

**Clams,** which can be found on mudflats and low-tide areas, are also good natural bait. They can be kept alive and fresh for short periods on ice. For longer periods of time, it is best to put them in a container and keep them in the water. The strong muscular foot of the clam is tough and will stay on a hook very well. For some fish, cut the clam meat up in small pieces; for others, remove the meat from the shell, wrap it in a small-mesh bag, and tie it on a hook.

**Squid** is popular for taking many kinds of fish. A small squid used whole makes a great trolling bait, while the larger ones may be cut into strips. Cut baits should be shaped triangularly with a split tail so that they wiggle in the water. They can also be used with feathered jigs, spoons, and spinners as an added attraction to fish.

Fresh **shrimp** is the most popular bait of surf, jet, pier, and bridge fishermen in Florida and along the Gulf Coast. Although it doesn't necessarily have to be alive, it should be as fresh as possible. The reason is simple: Shrimp thrive in these waters and almost all the gulf species (including weakfish, flounder, redfish, small black drum, whiting, and snook) quite often feed only on shrimp. If you use them while they are alive, hook them through the tail to keep them active. Dead shrimp will appear alive if hooked in the same manner and trailed through the water; or cut a large one into pieces and use it for bottom fishing.

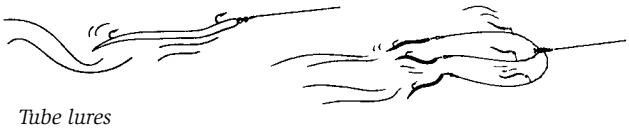
In addition to the baits listed above, various **saltwater fish** make excellent bait for other fish. The hardy saltwater killie, often called a minnow, is one that may be used as a live bait. The same is true of eels. Menhaden caught in abundance by commercial fishermen and processed for their oils work well when cut into chunks. Also in this category are butterfish, herring, bluefish, and mackerel, for they too are oily fish that as bait will leave a slick, or smell trail, in the water that attracts feeding fish. In general, determine the right bait by what is available and by what kind of fish you are after.

## ARTIFICIAL LURES FOR SALTWATER

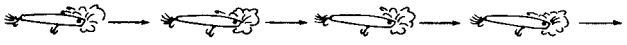
Most lures used in saltwater fishing can be used in freshwater as well, so it would not make much sense to draw a definite line between the two. If most fishermen had to make a general statement as to the difference, they would say that in some situations artificial lures

used for saltwater fishing are larger, although even the smallest freshwater lures are a must to catch some saltwater fish. Since we have already given an overview of artificial lures in the freshwater section, let's take a look at some of the lures specifically designed for saltwater and how they are used.

**Tube lures** are saltwater trolling and jigging lures made from rubber or plastic tubing. Single tubes, which can vary in length, usually have a built-in curve and imitate an eel in the water. Multiple tube rigs, often called umbrella rigs, attract many kinds of game fish by simulating an entire school of baitfish. These are not meant to be jigged but rather trolled at a steady rate at the depth of the feeding fish. A string of short tubes can be used with a heavyweight diamond jig to imitate a school of shiners as the jig is worked up and down in deep water.



*Tube lures*

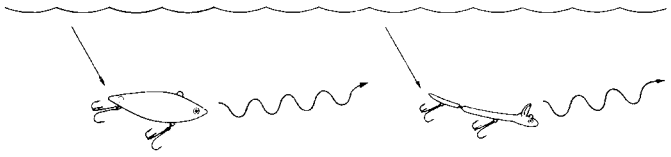


*Poppers*

*Stick baits*

Both **poppers** and **stick baits** are classified as surface plugs and are available in a large variety of sizes for both freshwater and saltwater use. The popper produces a splashing, popping, surface-disturbing commotion when reeled in rapidly with an occasional twitch of the rod tip. Stick baits are more streamlined than these blunt-nosed poppers. When they are retrieved, stick baits wag back and forth. **Sinking swimmers** are lures that sink and swim, just as the name implies. They are mid-depth plugs and can be fished at any level by letting them go down until they reach the desired depth. Work them in the same manner as the other subsurface plugs described earlier.

The soft plastic lures are designed to imitate not only the appearance but also the fleshy softness and natural movement of a live bait. The plastic eel, for example, will fool many a fish by the way it looks and by its eel-like movement. These lures are used primarily for casting and trolling in saltwater. They are most effective when retrieved at a moderate, steady rate of speed.



*Sinking swimmers*

*Soft plastic lures*

## TERMINAL RIGS FOR SALTWATER FISHING

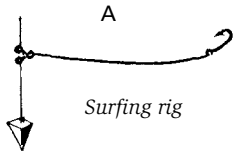
### SURF RIGS

Surf anglers generally use two basic rigs when fishing with natural baits. The first, the standard surf rig, makes use of a three-way swivel. The swivel is tied a few inches above a pyramid sinker. The hook and leader are tied to one eye on the three-way swivel, and the line is attached to the remaining eye.

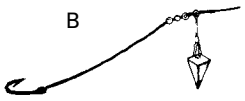
The other rig is known as the fish-finder rig. The fish-finder has a ring on one end and a snap on the other. A large-sized snap swivel may be used as a substitute. A barrel swivel is inserted between the leader and the line to act as a stop.

Both rigs can be used with different length leaders and various sizes and types of hooks, depending on the fish you are after. Nylon monofilament, wire, or stainless-steel wire measuring about 18 inches long is recommended. Either rig can be used for striped bass, channel bass, blues, weakfish, and other surf-feeding fish.

Corks can be attached to either type of rig to float the bait off the bottom and help keep it away from crabs and bottom snags.



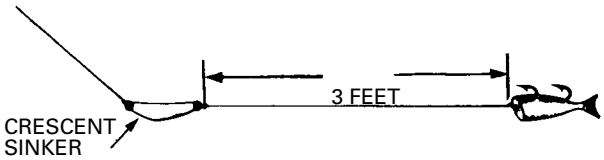

*Surfing rig*




*Fish-finder rig*

### PACIFIC SALMON RIG

This is an ideal rig for slow trolling or drifting when fishing for king and coho salmon. A plug-cut or a whole herring is attached to a two-hook rig on a 3-foot leader. The leader is attached to the eye of a crescent sinker weighing from 2 to 6 ounces, depending on the current and depth you want to fish. Let the rig go down to the bottom, and then reel back slowly.




*Pacific salmon rig*

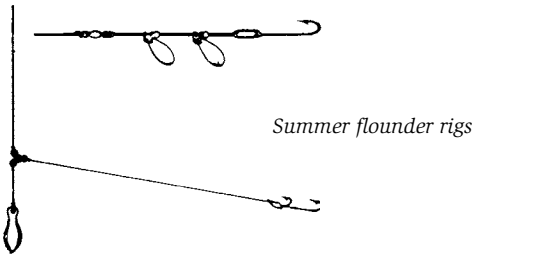
When you get your first strike, mark your line so you can let the rig down to the same depth again.

### SUMMER FLOUNDER RIG

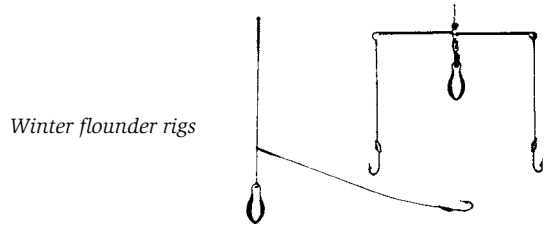
To rig for fluke, attach 2 or 3 feet of leader to one eye of a three-way swivel. Attach a sinker to another eye with only an inch or two of leader line. Then, attach a long-shanked hook to the end of the leader. Use a strip of squid or clam for bait. To further enhance the rig and draw the attention of more fish, add a spinner blade or two to the leader.

### WINTER FLOUNDER RIGS

The two-hooked rig uses a wire spreader to keep the two hooks apart so that they can lie together on the bottom where the flounder will be feeding. The sinker is attached to a snap in the middle. The single-hooked rig has its hook tied a few inches above the sinker. Both rigs use a long-shanked hook.



*Summer flounder rigs*



*Winter flounder rigs*

## CARE OF SALTWATER TACKLE

All fishing equipment needs special care (cleaning, oiling, and repair) to continue to serve its purpose. This is most important with saltwater tackle, because sand and salt combine to corrode tackle if it is not cared for. Although most saltwater equipment is manufactured from materials that can withstand much of the corrosive exposure from seaside use, special cleaning and oiling after each trip is necessary to keep this equipment in good shape.

Removing salt and sand takes only a few moments if your tackle has not been neglected. After every outing, it is always a good idea to rinse everything—rod, reel, lures, and hooks—in fresh water. Wipe them clean, and dry them thoroughly before storing. Periodically, take your reel apart and clean, oil, and regrease it to remove sand and grit. Keep your hooks cleaned and sharpened. Nicks in a rod can be touched up with a spot of varnish.

## RESOURCES

### BOOKS

*First Fish: What You Should Know to Catch Him,* by C. B. Colby. Coward, 1953.

*A Complete Guide to Fishing,* by Vland Evanoff. Crowell, 1981.

*Indian Fishing and Camping,* by Robert Hofsinde. Morrow, 1963.

*Fishing,* by Tom McNally. Follett, 1972.

*The Young Sportsman's Guide to Fresh Water Fishing,* by Ray Ovington. Nelson, 1963.

*Making Fishing Tackle,* by Thomas F. Pursell. Lerner, 1976.

*The Complete Guide to Fishing,* by George X. Sand. Doubleday, 1974.

*Fishing,* by John F. Water. Watts, 1978.

### SCOUTING LITERATURE

*Fishing* merit badge pamphlet, No. 33231
*Motorboating* merit badge pamphlet, No. 33345

### OTHER RESOURCES

Bass Anglers Sportsman Society
P.O. Box 17116
Montgomery, AL 36141-0116

National Hunting and Fishing Day
11 Mile Hill Road
Newtown, CT 06470-2359

U.S. Fish and Wildlife Service
Arlington Square Building
4401 North Fairfax Drive, Room 810
Arlington, VA 22203
http://fisheries.fws.gov//

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# VARSITY TEAM PROGRAM FEATURES

## A GUIDE TO TEAM PROGRAM PLANNING

### VOLUME I

Backpacking
Basketball
Bowling
Canoe Camping
Caving
Cross-Country Skiing
Cycling
Discovering America
Fishing

### VOLUME II

Freestyle Biking
Frontiersman
Mechanics
Operation On-Target
Orienteering
Rock Climbing and Rappelling
Roller Hockey
Shooting Sports
Snow Camping

### VOLUME III

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