



CLIMBING



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MERIT BADGE SERIES

How to use this pamphlet.



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

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

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

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Send comments along with a brief statement about yourself to Boy Scout Division • Boy Scouts of America • 1325 West Walnut Hill Lane, P.O. Box 152079, Irving, TX 75015-2079.

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CLIMBING

OCT - 4 2000



BOY SCOUTS OF AMERICA
IRVING, TEXAS

Note to the Counselor

Climbing is potentially dangerous. This pamphlet is intended to be only an introduction to the sport, not a sole source of information. To minimize risks, Scouts should learn to climb by taking a class from a qualified instructor, practice only with appropriate supervision and the proper equipment, and never climb alone. With the proper precautions, climbers can avoid injuries. Learn and use the safety rules for climbing and rappelling.

Qualified Supervision

All climbing and rappelling must be supervised by a mature, conscientious adult (at least 21 years of age) who understands the risks inherent to these activities and knowingly accepts responsibility for the well-being and safety of the youth in his or her care. This person must be trained in and committed to compliance with the Boy Scouts of America's Climb On Safely guidelines. In addition to two-deep leadership, one additional adult (at least 18 years of age) is required for each 10 additional youth participants. For example, a group of 11 to 20 youths requires at least three adult leaders, and a group of 21 to 30 youths requires four adult leaders.

During any BSA climbing or rappelling activity, at least one person must be present who has current American Red Cross Standard First Aid (a 6½-hour course that includes CPR), or who has completed a course of at least equivalent length and content from the Red Cross or another nationally recognized organization. The two-hour module "First Aid: When Help Is Delayed" is recommended.

Physical Fitness

Evidence of physical fitness is required for climbing/rappelling activity, with at least a current Class 1 medical, which includes a complete health history from a licensed health-care practitioner, parent, or legal guardian. The adult leader should adapt all supervision, discipline, and protection to anticipate any potential risks associated with individual health conditions. If a significant health condition is present, the adult leader should require an examination by a physician before participation in climbing or rappelling is permitted. The adult leader should ensure that the climbing instructor is informed about each participant's medical conditions.

Safe Area

BSA climbing/rappelling activities must be conducted using an established or developed climbing/rappelling site or facility. A qualified climbing instructor should survey the site in advance of the activity to evaluate possible hazards and to determine whether the site is suitable for the age, maturity, and skill level of the participants. The instructor should also verify that the site is sufficient to comfortably accommodate the number of participants in the activity within the available time. An evacuation route must be identified should an emergency occur.

Equipment

The climbing instructor should verify that the proper equipment is available for the size and ability level of participants. Helmets, rope, and climbing hardware must be approved by the Union Internationale des Associations d'Alpinisme (UIAA) or be CEN-approved (European Community Norm).

All equipment must be acquired new or furnished by the instructor. Records must be kept on the use of and stresses on each item



of equipment, which must be specifically designed for climbing/rappelling. Outside providers should be asked whether they are aware of any stresses that have been put on their equipment. Any rope or webbing that has been subjected to three hard falls must not be used. Refer to *Topping Out: A BSA Climbing/Rappelling Manual*, No. 3207, for records that must be kept.

Planning

Written parental consent must be obtained for each youth who wants to participate in climbing/rappelling. The climbing/rappelling plan and an alternate in the event of severe weather or other problem should be shared with parents and the unit committee. The unit must obtain necessary permits or written permission for using private land and also must enlist the help of a qualified climbing instructor. The instructor should have topographic maps for the area being used. It is suggested that at least one of the adult leaders has an electronic means of communication in case of an emergency. A leader should know where the nearest medical facility is located and how it can be contacted.

Environmental Conditions

The instructor assumes responsibility for monitoring potentially dangerous environmental conditions, which may include loose, crumbly rock; poisonous plants; wildlife; and weather. The buddy system should be used to monitor concerns such as dehydration, hypothermia, and an unusually high degree of fear or apprehension. The adult leader is responsible for ensuring that the group leaves no trace of its presence at the site. Check weather forecasts before departure.

Qualified Instructors

A qualified instructor for rock climbing/rappelling must supervise all BSA climbing/rappelling activities. The climbing instructor must have successfully completed a minimum of 10 hours of climbing/rappelling instruction

from a nationally or regionally recognized organization, climbing school, or college-level climbing/rappelling course or be a qualified BSA climbing instructor. In the future, the BSA plans to offer a section of National Camping School for climbing directors, who in turn can train climbing instructors. Until 2002, a Project COPE director or instructor can fulfill this requirement. The council's BSA climbing director should be contacted to learn about qualified climbing instructors in the council area. Any instructor must have prior experiences in teaching climbing/rappelling to youth and agree to adhere to the guidelines in *Topping Out*.

Discipline

Each participant should know, understand, and respect the rules and procedures for safely climbing and rappelling and should be oriented in Climb On Safely guidelines. BSA members should respect and follow all directions and rules of the climbing instructor. When participants know the reasons for rules and procedures, they are more likely to follow them. The climbing instructor must be strict and fair, showing no favoritism. BSA unit climbing is limited to *top-roping*. Anyone on a single-rope rappel must be protected by an independent belay rope with a separate anchor system. Anyone using a double-rope rappel may be belayed with an independent belay rope or with a fireman's belay. Climbers are required to wear UIAA- or CEN-approved climbing helmets during all climbing and rappelling activities.

Requirements

1. Show that you know first aid for injuries or illnesses that may occur during climbing activities, including hypothermia, blisters, sprains, snakebite, abrasions, fractures, and insect bites or stings.
2. Identify the conditions that must exist before performing CPR on a person. Demonstrate proper technique in performing CPR using a training device approved by your counselor.
3. Present yourself properly dressed for belaying, climbing, and rappelling (i.e., appropriate clothing, footwear, and a helmet; rappellers must wear gloves).
4. **Location.** Do the following:
 - a. Explain how the difficulty of climbs is classified, and apply classifications to the rock faces or walls where you will demonstrate your climbing skills.
 - b. Explain the following: top-rope climbing, lead climbing, and bouldering.
 - c. Evaluate the safety of a particular climbing area. Consider weather, visibility, the condition of the climbing surface, and any other environmental hazards.
 - d. Determine how to summon aid to the climbing area in case of an emergency.
5. **Verbal signals.** Explain the importance of using verbal signals during every climb and rappel, and while bouldering. With the help of the merit badge counselor or another Scout, demonstrate the verbal signals used by each of the following:
 - a. Climbers
 - b. Rappellers
 - c. Belayers
 - d. Boulderers and their spotters

6. **Rope.** Do the following:
 - a. Describe the kinds of rope acceptable for use in climbing and rappelling.
 - b. Show how to examine a rope for signs of wear or damage.
 - c. Discuss ways to prevent a rope from being damaged.
 - d. Explain when and how a rope should be retired.
 - e. Properly coil a rope.
7. **Knots.** Demonstrate the ability to tie each of the following knots. Give at least one example of how each knot is used in belaying, climbing, or rappelling.
 - a. Figure eight on a bight
 - b. Figure eight follow-through
 - c. Water knot
 - d. Double fisherman's knot (Grapevine knot)
8. **Harnesses.** Correctly put on at least ONE of the following:
 - a. Commercially made climbing harness
 - b. Tied harness
9. **Belaying.** Do the following:
 - a. Explain the importance of belaying every climber and rappeller.
 - b. Belay three different climbers ascending a rock face or climbing wall.
 - c. Belay three different rappellers descending a rock face or climbing wall.

10. **Climbing.** Do the following:
 - a. Show the correct way to tie into a belay rope.
 - b. Climb at least three different routes on a rock face or climbing wall, demonstrating good technique and using verbal signals with a belayer.
11. **Rappelling.** Do the following:
 - a. Using carabiners and a rappel device, secure your climbing harness or tied harness to a rappel rope.
 - b. Tie in to a belay rope set up to protect rappellers.
 - c. Rappel down three different rock faces or three rappel routes on a climbing wall. Use verbal signals to communicate with a belayer, and demonstrate good rappelling technique.
12. Demonstrate ways to store rope, hardware, and other gear used for climbing, rappelling, and belaying.

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Introduction

"Great things are done when men and mountains meet . . ."

—*William Blake*, noted English artist and poet of the past

"Now for our mountain sport; up to yon hill!"

—*William Shakespeare*

"On belay?" you shout, and give the rope tied to your seat harness a final inspection.

Far above you, at the top of a steep cliff, your partner answers, "Belay on!"

"Climbing!" you respond. Your partner says, "Climb on!"

You reach up and lock your fingers over small nubs on the rock, then place your foot on a foothold. Leaning out from the rock, you find a higher foothold, then jam one hand into a narrow crack and move the other hand up to grab a thin ledge.

Another foothold, another place for a hand, and you are moving smoothly up the cliff. There is nothing but empty air below you and open sky above, but you know what you are doing. If you slip, your partner will lock off the belay rope and keep you from falling more than a foot or two.

But you won't fall this time. You've been practicing hard, and you feel at home in this vertical world of rock. With grace and skill, you glide from one hold to the next, always looking ahead to plan your next moves.



A cool wind blows against your face and the sun warms your shoulders. As you near the top of the cliff, you are in control. You respect the heights but do not fear them. You are using every bit of your ability and concentration to make your way up the wall of rock.

With a final move, you lift yourself to the top of the cliff as your partner takes in slack from the rope. "Off belay," you say when you reach a safe place, and wait for the answer: "Off belay." You have successfully climbed 30, 40, 50 feet or more—and a huge smile fills your face.

The Adventure

Do you love to climb? Do you feel freedom in leaving the flat earth behind? Do high and windy places invite you to come and explore?

Maybe you've climbed trees and hiked to the tops of hills. Perhaps you've made your way up the stairs of a fire tower or to the observation floor of a tall building. If you've felt the excitement of being above it all, then the sport of climbing may be for you.

Climbing allows you to challenge yourself. It is a sport that does not require tremendous physical strength, but it does demand mental toughness and the willingness to practice hard to master a set of skills.

The adventure of climbing can also give you a new way to enjoy the outdoors. As you climb, you may develop a deeper respect for the world around you and the important role you can play in protecting climbing areas from harm.

Climbing really is an activity in which at least half of the fun is getting there. It's great to stand on top of a mountain, but even more exciting is what it takes to reach the heights—making good moves and using balance, judgment, and skill to move up a steep wall.

As you explore the world of climbing, you can feel the joy of making your way upward toward the open sky. You can test your body and your mind. The skills you learn will form the foundation of a sport you can enjoy for many years to come.

Today, you don't have to go to the mountains to learn how to climb. While there are plenty of opportunities for climbing in rugged terrain, there also are many climbing walls throughout the country, and even indoor climbing gyms. If you are in the mountains, your Scouting unit might combine climbing with hiking and camping for terrific outdoor adventures.

Climbing Makes an Impression

There's no telling where earning the Climbing merit badge might lead you. Years ago, two Scouts, Jim and Lou Whittaker, began going with their troop to the mountains near their home in Seattle, Washington. One of their Scoutmasters was an experienced mountaineer. He taught the Whittaker brothers how to climb, making sure they learned well.

One thing led to another and, in 1963, Jim Whittaker became the first American to climb Mount Everest, the world's highest peak, which is located between Nepal and Tibet. Lou Whittaker has also climbed many famous mountains around the world, and today runs a guide service that leads people to the snowy top of Mount Rainier in Washington State.

Your climbing might not take you up Everest or Rainier, but it can give you confidence, increase your flexibility, and improve your balance and strength. It might even show you a new way of looking at the world.

Early mountaineers, their feet shod in heavy boots, attacked the slopes with little more than hemp ropes (which often broke) and raw determination.

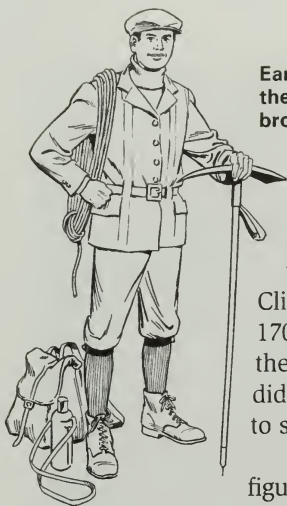
A Short History of Climbing

Climbing as a modern sport has its beginnings in the 1700s, when people in Europe began trying to go up the high peaks of the Alps. How they got to the top didn't matter to them; early climbers simply wanted to stand on the summits and then get down alive.

By early in the 20th century, climbers were starting to figure out ways of using ropes to help protect each other from falling. They also invented *rappelling*, a way of descending using a rope passed under one thigh, across the body, and over the opposite shoulder. While climbers were still interested in reaching the tops of big peaks, they also were climbing small mountains and even cliffs that led nowhere. This sort of climbing let them practice new ways to move up steep faces, and gave them the skill to tackle more difficult routes.

After World War II, plenty of Army surplus camping and climbing equipment was for sale at low prices. Better rope also became available. Many people practiced climbing in places like Yosemite Valley in California, and the techniques and equipment of climbing continued to develop and improve.

Modern climbers favor lightweight climbing shoes and use immensely strong nylon ropes and other gear for safety as they glide smoothly up rock faces.



Special climbing shoes became popular in the 1960s, providing climbers a better chance to use small—even tiny—holds on the rock. Many people also decided to do *free climbing*—relying upon their skill alone to get up a face. They no longer let the *belay rope* (safety rope) hold their weight, but used the rope only to stop a fall if they slipped.

The sport of *bouldering* increased in popularity as climbers worked out their moves just a few feet above the ground on boulders rather than up on cliffs. Since they weren't climbing very high, boulderers could—with permission—also enjoy their sport on the sides of stone buildings and anywhere else they could find a few holds for their hands and feet.

By the 1980s, artificial climbing walls began to appear throughout the country, both indoors and out. Many climbers use the walls to practice their technique and to gain endurance before going on trips in real mountains. Other climbers never leave the walls, finding satisfaction in mastering the moves to do difficult ascents on the artificial surfaces.

Climbers today can spend time on any of hundreds of climbing walls throughout America, or in dozens of climbing gyms. They also can challenge the mountains that might be nearby, or set off for the great peaks of the world. But one thing about climbing has never changed: The sky is still the only limit.

The Language of Climbing

Much of the climbing jargon used in this pamphlet might be new to you. When you find a word or phrase in *italics* that you don't understand, try to figure out what it means by closely reading the section in which it appears. You'll also find many of these terms, from *aid climbing* to *wall*, defined in the glossary that begins on page 86.

Getting Started

This pamphlet describes many ways that you can enjoy climbing without taking significant risks. Whether you are a beginner or a world-class mountaineer, make safety the key to all you do.

Learn From the Experts

Climbing is not a sport you can master by reading a book or by setting out to do it on your own. Trying to learn by trial and error is simply unacceptable on cliffs, mountainsides, and other steep terrain. The dangers are far too great. You must have good instructors who can teach you the right way to climb, belay, and rappel. They also can show you what *not* to do.



Before you go climbing, take a class from a recognized instructor. You cannot safely learn this sport on your own.

A good way to begin rock climbing might be to join a mountaineering club and sign up for a class. Many Scout camps have qualified climbing instructors, as do some Scout troops and Venturing crews. Colleges in mountainous areas may offer basic and advanced instruction in climbing and mountaineering. So do climbing schools, some outing clubs, and climbing gyms.

What Is the Sport of Climbing?

The sport of climbing has three elements: climbing, rappelling, and belaying.

Climbing, of course, is the act of going up, although a good climber can also move sideways and down. Climbers use cracks, ledges, and other features on a rock face as handholds and footholds. As they climb, they study the rock for the route ahead and figure out a series of moves that will lead them where they want to go.

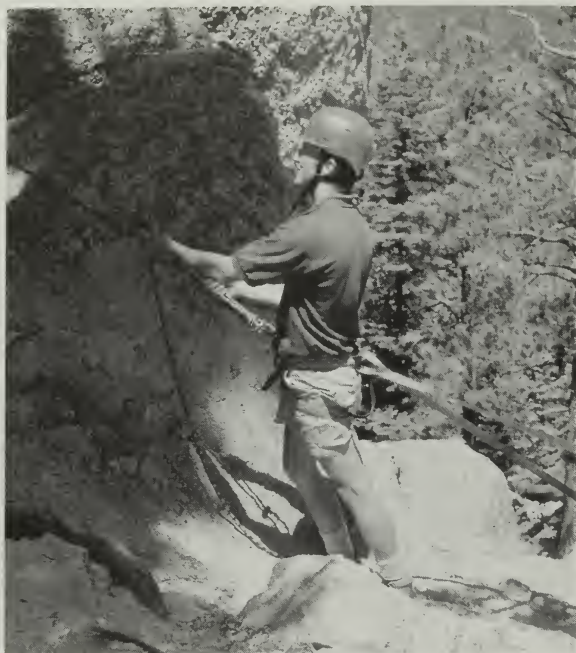
Rappel is a French word meaning "recall." A climber can rappel down steep cliffs by making a controlled slide on a rope. In modern rappelling, the rope is threaded in a special way through a *rappel device* connected to a harness around the waist so that the rappeller can regulate the speed of descent.



Climbing



Rappelling



Belaying

A basic fact of climbing and rappelling is that people sometimes fall. They might slip while trying moves that are more difficult than they've done before, or a hand or foot might simply slip off of a hold.

Belaying, a way of protecting climbers from injury, is intended to stop climbers before they can fall very far. Belayers use certain techniques to tie themselves to trees, boulders, bolts, or other *anchor points* from which the

belayer cannot be pulled. A belayer then uses a *belay device* to control a belay rope that is secured to a climber, taking in slack as the climber moves up a wall, and holding the rope tightly if the climber falls.

A belayer can also protect a rappeller by letting out a belay rope as the rappeller descends. If the rappeller slips, the belayer can stop the fall with the belay rope.

The BSA climbing and rappelling guidelines require that any climber or rappeller more than 6 feet above the ground must be protected by a belayer. Anyone who is bouldering—practicing climbing moves closer to the ground—does not need to be tied into a belay rope, but should be protected by two or three *spotters* in position.

Climbing Classification System

Climbers have developed rating systems for describing the difficulty of different climbs. Guidebooks for popular climbing areas use these scales to help people decide which routes match their skills. In the classification system most frequently applied to climbing in North America, there are five classes.

Climbing Classification System

Class 1—Hiking. Hands are not needed for balance.

Class 2—Simple scrambling. Hands may be used now and then for balance. A rope is not needed, although one may be carried.

Class 3—Scrambling, using the hands and some basic climbing skills. A rope may be used to belay any party members uncomfortable with the exposure.

Class 4—Climbing with a belay. Climbers should be protected with a belay rope.

Class 5—Roped climbing with protection. Class 5 climbing is divided into 14 categories of difficulty ranging from 5.1 (very easy) to 5.14 (extremely hard). Class 5 climbers ascending more than 6 feet above the ground must always be protected with a belay rope.



Class 1—Hiking. Hands aren't needed for balance.

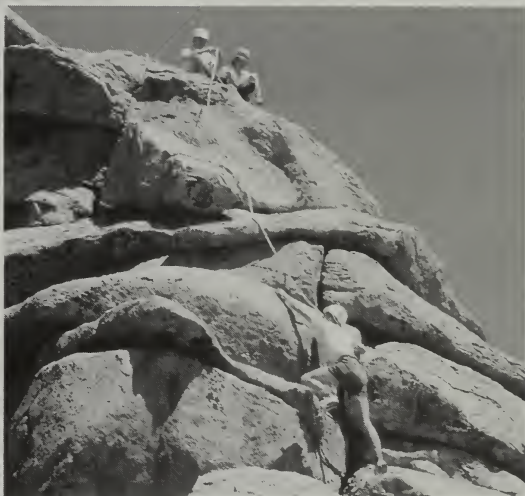


Class 2—Simple scrambling. You may use your hands now and then for balance.



Class 3—Scrambling and/or slab climbing. The angle is steep enough that you often will balance yourself using your hands and/or will incorporate some basic climbing skills.

Class 4—Climbing with a belay. The danger may lie in the steepness of the slope, a long distance to the ground, or both. Climbers are belayed with a rope to protect them in case of a fall.



Class 5—Roped climbing with protection. Class 5 climbers must always be belayed, but they do not use the belay rope to hold their weight. They rely instead on placement of the hands and feet; the rope serves only to keep them from falling far if they slip.

If you have been on a Scout hike, you already know about Class 1 travel. And, if you have backpacked cross-country, you may have done some Class 2 work without knowing it. Traveling through steeper terrain may have introduced you to slopes rugged enough that you must frequently use your hands for balance and be especially careful because of an increased danger of falling; that's Class 3 scrambling and/or slab climbing. In Class 4 climbing, the steepness of the face and the chances of injury from a fall make it important that climbers be protected with a belay rope.

Scouts can practice Class 5 skills at an outdoor climbing/rappelling area or indoors at a climbing gym. Class 5 climbers may become good belayers, too, since they often take their turn handling the belay rope that should protect every Class 5 climber.



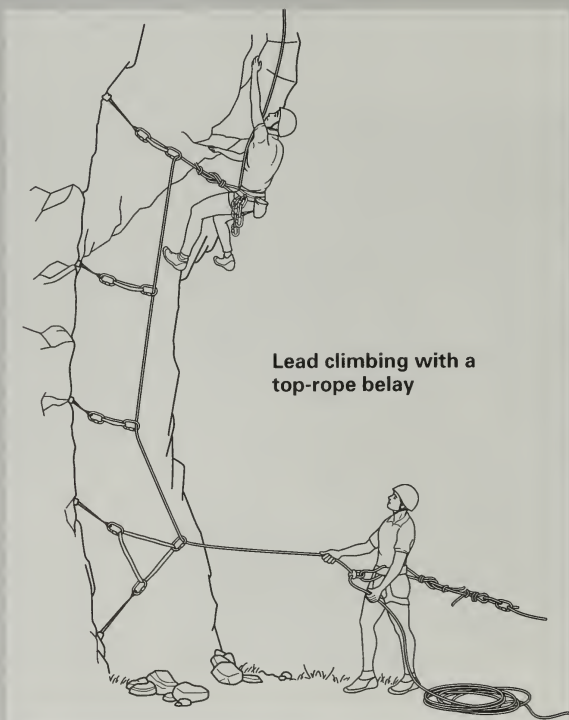
Top-Rope Climbing and Lead Climbing

Anyone involved in BSA climbing activities who ascends higher than 6 feet above the ground must be protected with a top-rope belay.

In *top-rope climbing*, climbers are tied to belay ropes that are anchored above them throughout their climbs. Belayers may be managing the ropes from the tops of climbing routes, or may be at the bottom of the cliff or wall. A belayer stationed on the ground uses a rope that goes up to an anchor at the top of the climb, then back down to the climber. Because of its shape, this kind of top-roping is sometimes called a *slingshot belay*. (See the illustration of a top-rope belay on page 56.)

In *lead climbing*, climbers are tied to belay ropes that extend below them. As they climb, they insert chocks, nuts, or other hardware into cracks in the rock, then attach the rope with *carabiners*. In this way they are able to establish

points of protection as they ascend. The distance a lead climber may fall is determined by how close the climber is to a point of protection, how securely the protection has been placed, and how effectively the belayer handles the rope. **Lead climbing may be practiced during BSA activities only if lead climbers are protected by a top-rope belay.**



Lead climbing with a top-rope belay

Safety and First Aid

Climbing and rappelling, when properly done, are as safe as most other Scouting adventure activities. Even so, you must know how to protect yourself and others from hazards in climbing areas, and be prepared to give first aid if an injury or illness does occur.

As a climber, you'll follow many of the same safety guidelines that you would for any Scout hike or camping trip. Drink plenty of water. Watch out for poison ivy, biting insects, and snakes. Dress for the conditions—warm clothing in cool weather, cool clothes if the day is hot. Keep a close watch on the sky, and be ready to retreat if the day turns stormy or there is lightning in the area.

Whether you are climbing indoors or outdoors, short falls can lead to minor bruises or skinned knuckles and knees. A rope running too quickly through someone's hands can cause friction burns. Though rare, a longer fall can result in sprains or broken bones.

Even climbers with perfect technique can suffer scrapes and cuts to the hands when climbing rough rock. Wrapping the hands with cloth tape (athletic or "coach's" tape) gives some protection. Your climbing instructor can show you how to tape your fingers and hands.

CPR

Cardiopulmonary resuscitation, or CPR, is an important first response in the event of a cardiac emergency. At least one person trained in CPR should be on-site during any BSA climbing or rappelling activity. The *Boy Scout Handbook* and *First Aid* merit badge pamphlet explain the importance of CPR and when it should be used.



Climbing instructors should be trained and practice responding quickly to emergencies.

Responding to Emergencies

Before beginning a climb, your group should work out an emergency response plan that includes information about the location of the nearest telephone and the telephone numbers of the closest hospital, sheriff's department, and rescue unit. (In many areas of the country, dialing 911 contacts all three.)

Always have a well-equipped first-aid kit close at hand, both while climbing and while traveling to and from climbing areas.

Instructors at climbing and rappelling areas at Scout camps should be trained to respond quickly to emergencies. At indoor climbing gyms, the staff will take the lead in treating injuries and contacting help.



Always have a well-equipped first-aid kit close at hand.

Climbing Smart: The Where and When

Good training, safety awareness, and common sense will let you enjoy climbing for many years. Taking chances may bring your climbing days to a quick end. Experienced climbers take pride in climbing smart, and so can you.

A big part of climbing smart is knowing when *not* to do it.

- Don't go climbing alone. If you fall and are hurt, you will need others to give first aid and contact rescuers.
- Don't go climbing unless you are with qualified instructors who can belay you and teach you the skills you need.
- Don't go climbing unless you have the proper equipment.

Any time you want to go climbing, talk over your plans with your Scout leader, parents, or other responsible adults. They may approve of your idea or suggest changes in your plan. Sometimes it might be best to put off climbing and enjoy some other kind of adventure.

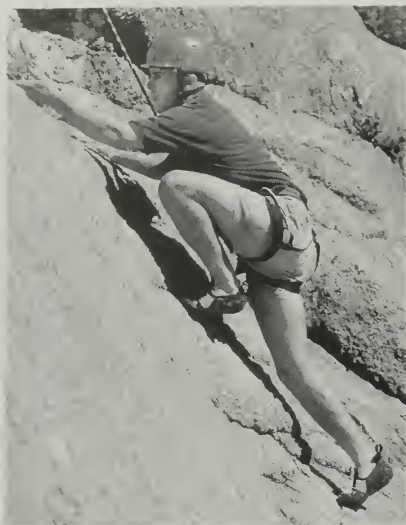
Always think about the "what if." You might be tempted during a campout to climb a cliff. But first, ask yourself some "what if" questions. *What if I fall and am injured? What if I can't get down?* "What if" questions can help you climb smart, even if that means not climbing at all.



Seek the advice of a skilled instructor to help you decide when and where to climb.

Safety Pointers for Climbing Smart

- Learn from experts.
- Never climb alone.
- Stay within your abilities.
- Don't hurry.
- Keep your mind on what you're doing. Stay focused.
- Climb no higher than 6 feet above the ground unless you are belayed with a rope.
- When climbing lower than the height requiring a belay, have two spotters in position to help protect you from injury if you fall.



Natural climbing area

Where to Climb and Rappel

At one time, serious climbing was done only in the mountains. Today, however, you can find climbing areas throughout the country. Following are some of the most popular kinds of climbing areas.

Rock Faces

The handholds and footholds on steep cliffs, mountainsides, and canyon walls have long attracted climbers. Trees, boulders, rock outcroppings, or specialized bolts driven into rock serve as anchor points for belay and rappel ropes. Spectacular scenery is often a bonus.

Rock faces offer a wide variety of opportunities and levels of difficulty. Some cliffs have lots of nubs, ledges, and cracks to help climbers on their way. Other rock faces are smoother and more challenging.

Natural climbing areas can be found in many Scout camps, in state and national parks, and on public lands. Other inviting rock faces are on private property. Be sure to get permission from property owners or land managers before setting out on a climb, and follow any guidelines the public agency or private landowner might require.

Artificial Walls

In recent years, outdoor climbing walls have been built in many of America's city parks and Scout camps. These walls often are formed from concrete embedded with small rocks that serve as holds for hands and feet. Metal rings set into the tops of the walls provide anchors for belay ropes. The base may be surrounded with a bed of gravel or shredded rubber to help cushion the landing of a climber coming off the wall.

A growing number of schools, climbing clubs, and climbing gyms have indoor walls that challenge climbers from the beginning level to the expert. Bolted to the walls, handholds of different shapes create climbs of varying difficulty and interest. The handholds can be moved around to provide climbers with fresh routes. Belay ropes anchored above the walls protect climbers as they practice their moves.



Artificial climbing wall



Indoor climbing gym

Checking the Safety of a Climbing Area

The temperature, lighting, and stability of an indoor climbing wall can be controlled as easily as the conditions in any sports gym. However, most climbing areas are outdoors, where conditions can vary. Before beginning, take a few minutes to evaluate the safety of the place you want to climb. Here are some factors to consider.

Weather

Stay off rock faces when it is raining. Water can make climbing surfaces slippery. Wet ropes can be difficult for belayers to hold, and climbing equipment that has become soaked must be dried before you store it.

Storms may develop quickly in mountainous areas, catching climbers unprepared if they are not careful. Some rock faces are near the tops of ridges that may be the targets of lightning. Lightning can also hit locations deep in valleys. Carabiners and other metal climbing hardware can conduct electrical currents from lightning strikes, as can wet rope. Whenever there is bad weather or lightning, stop climbing and retreat to a safe location.



Be alert for storm clouds, which can blossom suddenly. Don't climb when it's stormy or raining.

Rock

The kind of rock in an area can make a big difference in the safety of climbing. In general, hard rock such as granite offers climbers the best surfaces. Softer rock or rock that is fractured or layered, such as shale, may crumble or slide away under a climber's weight.

Even the hardest rock may have pieces that can come loose. Approach every handhold and foothold carefully; until you have tested a hold and found it to be sound, assume that it will pull out.

Look above the climbing area, too, to see what might be waiting to fall. Stay away from faces that are beneath leaning pinnacles or hanging boulders. Listen for the sound of small stones bouncing down the rock—a sign that there is unstable material above.



When there is no danger of falling objects, it is not necessary to wear a climbing helmet.

Safety on Edges

Cliff or rock edges can be hazardous because of the possibility of falling or of knocking stones loose and sending them down toward people below. Anyone standing or working within a body-length of the edge of a cliff (6 feet or less) must be tied in to a belay, an anchor, or a safety line. Before climbing or rappelling activities begin, instructors should make sure cliff edges are clean, carefully removing as much loose material as is practical to make the edge usable.



For climbing, wear clothing that lets you move freely but is not baggy.

Clothing and Equipment

For the most part, any clothing that is comfortable, rugged, and suitable for the weather will be fine for climbing. Pants, shorts, and shirts should let you move freely as you stretch to reach handholds and footholds, but not be so baggy that folds of cloth can catch on rock outcroppings or tangle in belay or rappel systems.

What you wear on your feet can make a big difference in how well you can climb. Avoid shoes with slick soles. Tightly laced athletic shoes are fine for learning the basics. As you become more skilled, you may want to try shoes made especially for rock climbing. They will allow you to “feel” the rock with your toes and twist your feet to fit into cracks. The sticky rubber of the flexible soles will help you stay on tiny footholds. Climbing shoes fit very tightly in order to prevent your feet from turning inside them. That support can give you better balance as you stand on small footholds.

Whenever you are climbing, rappelling, or belaying on rock faces, wear a helmet that has the approval of the UIAA (Union Internationale des Associations d'Alpinisme, or International Union of Alpine Associations in English) and/or be CEN-approved (European Community Norm) and that is designed just for climbers. A helmet will protect your head against stones and debris falling from above, and against injuries if you collide with a rock face during a fall. A chin strap helps keep a climber's helmet from falling off or shifting. Wear a properly fitted helmet when you are on artificial walls, too, in case a carabiner or other piece of equipment drops from above.

Rappellers must wear gloves with leather palms to prevent friction burns while they are handling the rope. The gloves must be dry and fit well.

Before climbing, rappelling, or belaying, remove belt buckles, wristwatches, rings, and any other jewelry. Tie back long hair and tuck it into your helmet or into the back of your shirt so it won't become tangled with ropes, belay or rappel devices, or carabiners. If you wear glasses, consider using a strap to keep them from slipping off.

For your first climbs as a beginner, you won't need to take much with you. Eventually, however, if you become skilled enough and want to climb in remote areas, you'll need a sturdy daypack or backpack to carry your first-aid kit, compass, map, food, water, flashlight, pocketknife, sun protection, waterproof matches, clothing to protect you from wind and rain, and other items necessary for extended climbs.



Climbing shoes

Gear

The gear used for climbing, rappelling, and belaying has been developed over more than 150 years of mountaineering. The UIAA (Union of Alpine Associations) is a group of mountain-travel experts who set standards and testing procedures for climbing equipment. The CEN (European Community Norm) serves as a similar standard for excellence. All ropes and hardware used by Scouts for climbing, rappelling, and belaying must have UIAA or CEN approval.

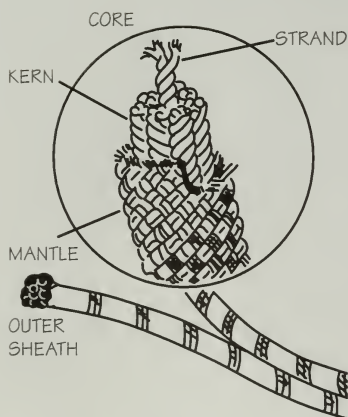
Rope

Rope is the lifeline of climbing. Before the 1940s, the best rope available was manila rope, made by twisting together tough, stringy fibers of the manila plant. However, manila rope may rot if it remains wet for long periods. Manila rope is also *static*, which means it stretches very little. A falling climber belayed by a manila rope will be yanked to an instant stop. This can put excessive strain on the rope, the anchors, and the climber's body, often causing damage to equipment and/or possibly injury.

After the invention of nylon in the 1930s, manufacturers developed ropes that are *dynamic*, meaning they will stretch. A dynamic rope stops a falling climber gradually rather than all at once. A gradual stop reduces the shock on the rope and helps the climber avoid injury.

Nylon ropes are also stronger than those of similar diameters that are made of manila. Nylon ropes must be treated with care and dried before storage, but they are less likely than manila ropes to be harmed by rot.

Today, the best rope for climbing and rappelling is a nylon *kernmantle* rope with a braided core (the kern) surrounded by a woven sheath (the mantle) that has a breaking strength of at least 26.9 kilonewtons (6,000 pounds) when new.



Kernmantle rope. Note the woven outer sheath and the braided core.

Rope Inspection

Your life and the safety of those climbing with you may depend upon your rope being in good condition. Climbing ropes are immensely strong but they can be damaged. Before each day's climbs begin, perform an inch-by-inch hand and eye inspection of any rope you plan to use. Search for cuts or abrasions, fraying, puffs of fiber, soft or hard spots, lumps, stains, or fused areas that are smooth and slick. Tie a figure eight on a bight in one end of a rope to indicate that it has been inspected. Mark any rope that should be retired with a black marker along its entire length. Do not use again any rope that shows signs of damage.

Rope Care

The following guidelines will help you prevent a climbing rope from being damaged.

- Never step on a rope or drag it along the ground. Dirt and tiny bits of rock that work through the sheath and cut the core can weaken the rope.
- Never pull a rope over a sharp edge, especially if there is a weight on the end of the line. Route the rope away from sharp edges and narrow cracks that might cut it, or shield the rope by placing pieces of burlap or carpet between the rope and the rock.
- Protect rope from heat.
- Never allow a rope to run over another rope or a piece of nylon webbing. Friction between the two can harm the stationary webbing or rope, and perhaps wear through it.
- Never leave a rope stretched or under tension for an extended period of time.
- If possible, keep rope dry. Before putting it into storage, let wet rope air-dry in a place safe from direct sunlight.
- Keep rope away from chemicals and petroleum products, which can erode and weaken nylon.

- Prolonged exposure to sunlight damages nylon rope. Don't leave rope out in the sun any longer than necessary.

You can wash a rope to remove dirt and rock crystals that might shorten its useful life. Wash a badly soiled rope by hand or in a front-loading washing machine with cool water and a mild laundry soap that does not contain bleach. Thoroughly rinse the rope, then air-dry it completely (out of direct sunlight, and don't use a dryer) before using the rope again or putting it into storage. Be patient—it may take several days for a rope to dry.

Coiling or Bagging a Rope

A typical climbing rope is 165 feet long and about 11 millimeters ($\frac{7}{16}$ -inch) in diameter. Coiling or bagging a rope keeps it in a neat package that is easy to carry and

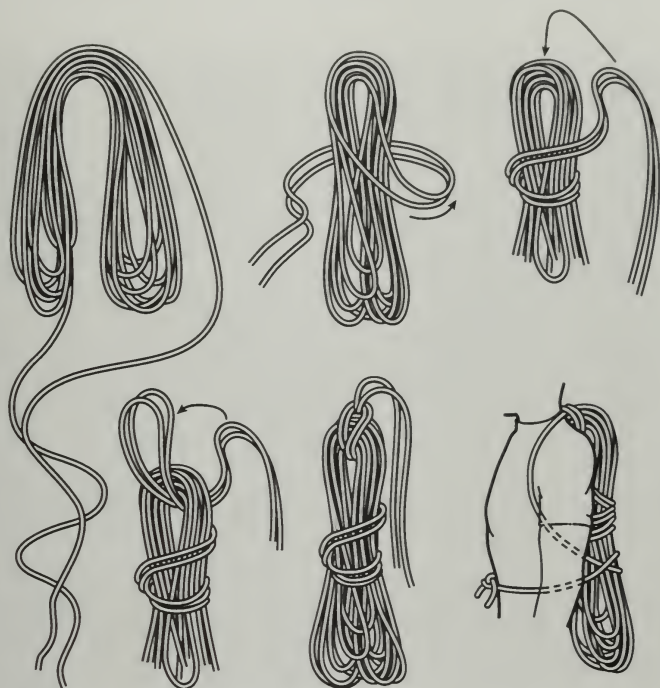
store. You can also loosen a coiled or bagged rope without its becoming a tangled mess. This is especially important when throwing a rope down a cliff for a belay or rappel.

Begin a coil by removing any knots and hardware from the rope. Starting about 10 feet in from one end, drape lengths of the rope over the back of your neck so that the loops hang down below your waist.

When you are about 10 feet from the other end, remove the loops from your neck, grasp the two ends of the rope, and wrap them several times around the coil. Thread a bend of the remaining rope lengths through the coil, then pass the ends through the bend and pull it snug. For a convenient way to carry a coil, some climbers leave enough of the two ends to place them over their shoulders and around the coil, then tie the ends around the waist. This is called the *butterfly coil*.



To begin coiling a rope, drape lengths of it around your neck.



Butterfly coil

Another practical way of organizing a rope is with a rope bag. Any stuff sack can be used as long as it is large enough to contain all of the rope. Commercially made rope bags may have a nylon loop sewn inside. A climber can begin storing a rope by tying one end of it to the loop. (Don't attach it with a carabiner; the carabiner could be damaged if the bag is thrown over a cliff.) Then simply stuff the rope into the bag for carrying or for storage.



You can simply stuff a rope into a stuff sack for carrying or for storage.

Throwing a Rope Down a Cliff

When setting up a belay or a rappel, it may seem a simple thing to toss a rope down a cliff. However, climbers can waste a remarkable amount of time untangling ropes that have been improperly thrown. For orderly rope handling, follow these steps.

- Secure one end of the rope. It should be clipped into an anchor, or simply grasped tightly, but it must be held in some way.
- Shout, "Rope!" and then wait a moment. This standard signal warns anyone below to be alert for rope falling toward them. If there is some reason the rope should not be thrown, that information should immediately be shouted up to the person with the rope in hand.
- If the rope has been coiled, loosen any loops used to hold the coils together. Split the coil in half. Toss the first half down the cliff and, once it has straightened itself, toss the other half.
- If the rope is in a rope bag, secure one end of the rope and then toss the bag over the edge of the cliff. The rope should feed out neatly as the bag descends.

Storing Rope

To store a rope overnight or for a few days, coil it or bag it and then put it in a safe place that is dry, clean, cool, and shady. For longer storage, be sure that the rope is dry and stowed away from sunlight, sources of heat, petroleum products, chemicals, or dirty areas. Do not store a rope in the trunk of a car. (Also see "Storing Equipment" later in this pamphlet.)

Carabiners

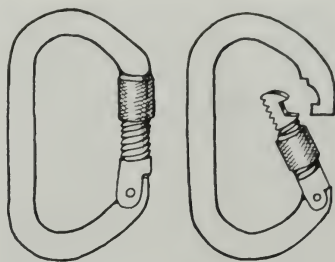
Carabiners serve as the essential connectors of belay and rappel systems. They are used to attach climbers, rappellers, and belayers to ropes and anchors, and to clip together ropes and *runners* (loops of webbing—see page 39). Most carabiners are made of aluminum alloy or high-grade steel. A spring-loaded gate on one side allows a carabiner to be snapped onto a rope or piece of webbing.

Locking carabiners have a sleeve that you twist with your fingers to lock the gate closed (take care not to overtighten the sleeve). With *double-locking carabiners*, a climber must twist and pull the gate to open it; they provide protection against an accidental opening. The gate of a *nonlocking carabiner* may accidentally open if it pushes against a rock, a rope, or even a climber's clothing. When two nonlocking carabiners are used together, the gates should be reversed so that when they are pressed open the gates form an X. This helps prevent both from being unintentionally opened at the same time.

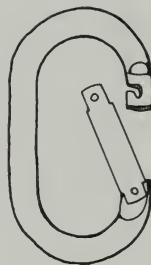
Inspect carabiners for any signs of damage or wear. The gates must work smoothly and close cleanly. Grooves worn into the metal by friction from ropes can weaken a carabiner. Do not drop carabiners on hard surfaces, drag them along the ground, or otherwise mistreat them. Retire from use any carabiners that have become significantly grooved or bent, or that have been dropped from a significant height onto a hard surface.

Tubular Webbing

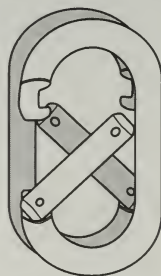
Seamless, 1" nylon tubular webbing is used to form tied-seat harnesses; for anchors used by belayers and rappellers; and for other uses in climbing, rappelling, and belaying. Tubular webbing is strong and light. A piece of webbing can be made into a loop known as a *runner* in one of two ways: The ends are commercially sewn together, or the ends are tied with a water knot backed with safety



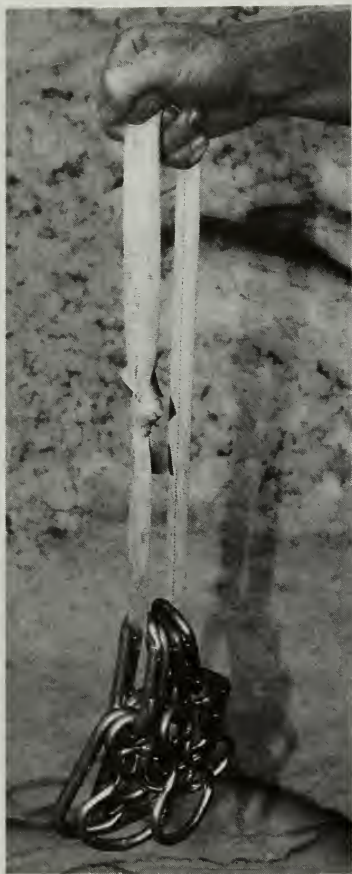
Locking carabiner. This type of carabiner helps protect against accidental opening.



Nonlocking carabiner



Always use nonlocking carabiners in pairs, with the gates of the carabiners reversed.



Webbing can be used to organize climbing gear.

knots. Climbers use runners—or *slings*, as these loops are also called—for rigging anchors, managing rope, and many other tasks.

Like nylon rope, nylon tubular webbing is harmed by friction, dirt, and long exposure to sunlight or harsh weather. Get rid of webbing that shows any sign of damage or that has an unknown history.



Belayers use tubular webbing to anchor themselves securely.

Knots

Rope is such an important part of climbing and rappelling that you shouldn't be surprised to discover that tying knots is a basic skill all climbers must learn. You may already know how to tie some climbers' knots.

Practice tying knots before you go climbing. Continue practicing so that the knots become natural to your fingers and you can tie them almost without thinking. You should be able to tie all of the basic climbers' knots quickly and neatly with your eyes closed, especially if you plan to go on to more advanced Class 5 climbing.

A good way to learn climbers' and other knots is to carry a 2-foot piece of parachute cord in your pocket. When you have spare time—while waiting for a bus, for example—you can pull out the cord and run through your collection of knots.



Figure eight on a bight

Safety Knots

A safety knot (also known as a *stopper knot*) added to a knot such as a figure eight follow-through will help keep the free end of the rope from working itself back through the primary knot. The most effective safety knot goes by several names—*barrel knot*, *one-sided grapevine knot*, and *half a double fisherman's knot*. You form it by loosely looping the tail of the rope twice around the standing part, and running the end up through the two loops thus formed. (This is also exactly the same method you use to tie the first portion of the double fisherman's knot, described later in this chapter.) Work any slack out of the safety knot so that it lies snug against the knot it is protecting. Safety knots can be used to protect knots tied in webbing, too. The overhand or half hitch is used as a safety knot in webbing.

Figure Eight on a Bight

A *bight* is a bend in a rope. Forming a bight in a rope and then tying a figure-eight knot with it results in a loop that will not slip or come loose. Snap a carabiner into the loop, and the rope can be attached to an anchor sling. When this knot is tied in the end of a rope, back it up with a safety knot.

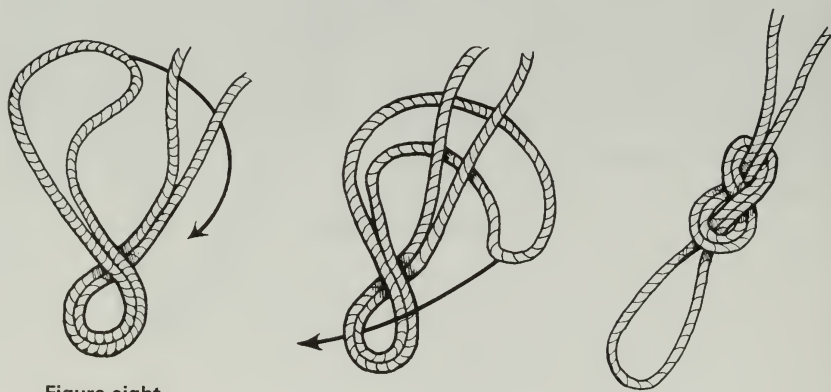


Figure eight
on a bight

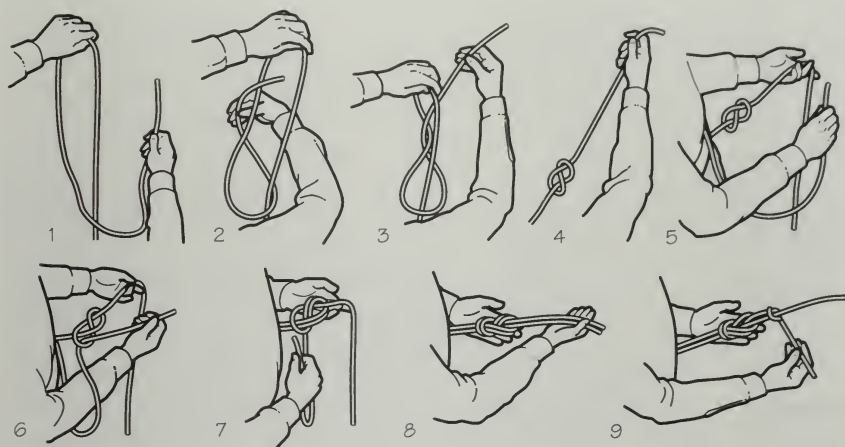


Figure eight follow-through

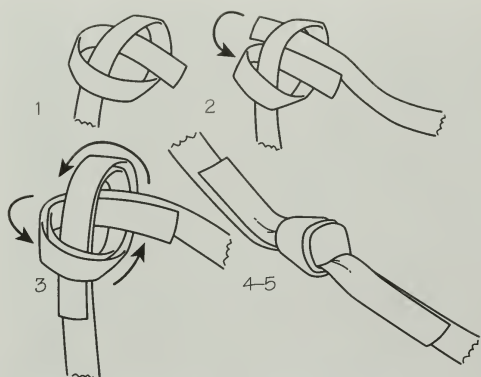
Figure Eight Follow-Through

This is the same knot as the figure eight on a bight, but with an important difference in the way it is made. The figure eight on a bight must be tied in a rope *before* it is attached to a carabiner, while the figure eight follow-through is tied directly to a harness.

Begin a figure eight follow-through by tying a simple figure-eight knot in a rope (steps 1 through 4 in the above illustration). Run the end of the rope through the climbing harness or the device to which you want to attach it (step 5). Then trace the end of the rope back through the figure-eight knot (the "follow through," steps 6 through 8). Back up the figure eight with a safety knot (step 9).

Water Knot

A water knot protected by safety knots can be used to tie together the ends of a piece of 1" seamless tubular webbing to make a runner for use in anchors, and to tie some seat harnesses. The water knot seldom slips once it has been tightened by weight, but it can be very difficult to untie after being tightened. Back it up with safety knots.



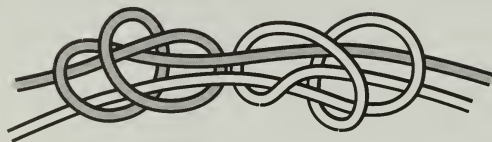
Water knot in seamless tubular webbing

Tie an overhand knot in one end of the tubular webbing (step 1), leaving at least a 6" tail. With the other end of the webbing, trace the first end all the way back through the overhand knot (steps 2 and 3), again leaving at least a 6" tail. Straighten the knot (step 4) so that the webbing surfaces lie flat against one another, then pull it as tight as possible (step 5). Back it up with safety knots.

Double Fisherman's Knot (Grapevine Knot)

For tying together the ends of two ropes, the most reliable knot is the double fisherman's knot. It can also be used to secure the ends of a piece of cord to form a runner. Half of a double fisherman's knot (also known as a *barrel knot*) can be used as a safety knot to back up a primary knot such as a figure eight on a bight.

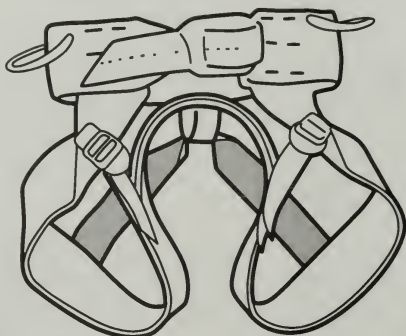
Lay about 2 feet of the ends of two ropes alongside one another, ends opposite. Loosely loop one rope end twice around the other, then thread the end of that rope through the loops. Repeat the process with the second rope end. Carefully tighten the two parts of the knot, then slide them against one another. If they don't fit together neatly, the knot is incorrectly tied.



Double fisherman's knot

Harnesses

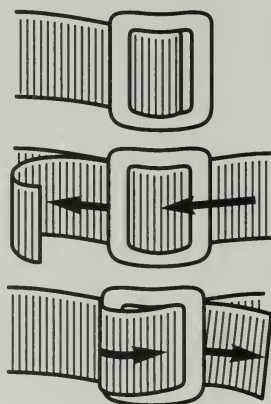
A harness gives climbers, rappellers, and belayers a way to attach themselves safely and reliably to ropes and belay anchors. In a fall, a harness will distribute a person's weight in several directions, which can be safer than if the person had a belay rope tied directly around the waist.



Sewn harness

Commercial Harnesses

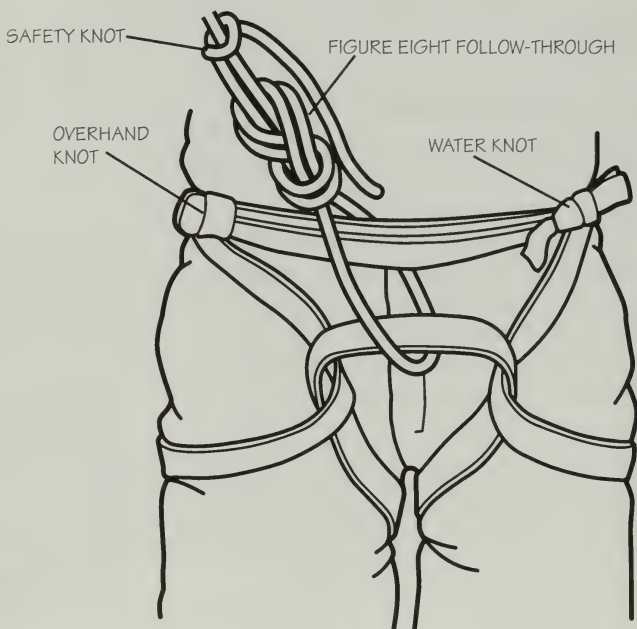
Commercially made climbing harnesses usually require only that you put your legs through leg loops and then secure the waist strap with a buckle. (Always double-check to make sure you have secured the end of the belt according to the manufacturer's specifications. In most cases, that includes threading the belt back through the buckle.) The leg loops of some harnesses can be adjusted; you should just be able to slip two fingers between the loop and your thigh. If the harnesses available to you are not adjustable, you'll need to choose one that fits your body snugly but not tight enough to restrict circulation.



Many harnesses are secured by doubling the belt back through the buckle.

Tied Harnesses

A 30-foot length of nylon tubular webbing can be wrapped around your body and tied in special ways to form a reliable tied harness for climbing, rappelling, and belaying. While not as convenient as a commercially made climbing harness, tied harnesses are used in some climbing areas for reasons of economy and to increase the participant's sense of accomplishment. Each tied harness must be tied exactly right every time to ensure your safety. Therefore, you must learn how to tie a seat harness from a qualified instructor. Once you have mastered tying one of these types of seat harnesses, you can use the following descriptions as reminders of the correct methods.



Tied harness

How to Tie a Seat Harness

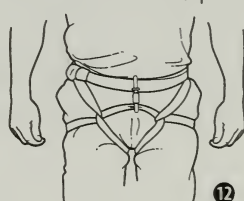
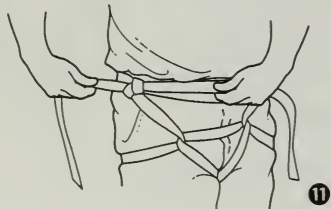
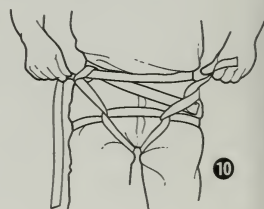
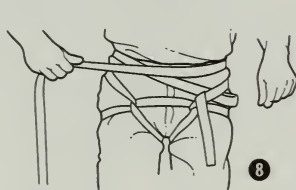
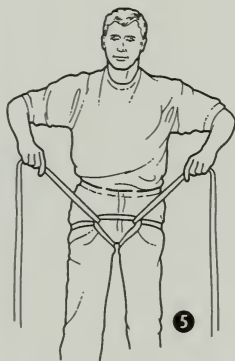
Tie the seat harness using a piece of webbing 24 to 30 feet long.

1. Drape the center of the webbing behind your neck.
2. Step over the ends of the webbing and bring them around the sides of your hips, taking care not to allow any portions of the webbing to cross or twist. Pull the webbing snug.
3. Pass the webbing ends behind and then through the lengths of webbing lying against your lower torso.
4. Slip the webbing off your neck.
5. As you pull out the slack, the bend that had been around your neck will become the horizontal band between the loops of webbing that have formed around your legs.
6. Going first behind your back, wrap the remaining lengths of webbing around your waist in this fashion:
 - a. The piece originally in your right hand goes clockwise.
 - b. The piece originally in your left hand goes counterclockwise.
7. Continue wrapping until only about 3 feet remains at each end of webbing. Keep the webbing flat and snug against your body.
8. Tuck the end of the counterclockwise webbing beneath the sling on your left hip. (You will need it in a moment to finish tying a water knot.)
9. With the end of the clockwise webbing, tie a loose overhand knot ($\frac{1}{2}$ of a water knot) around the wraps of webbing on your right hip.





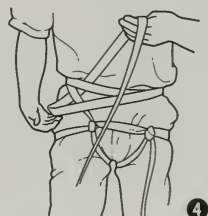
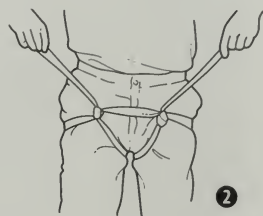
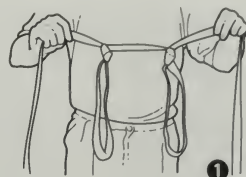
10. Retrieve the other end of the webbing and use it to trace back through the loose overhand knot, thus completing a water knot.
11. Tighten the water knot. Check the harness to be sure it fits securely and that there are no unnecessary twists in the webbing. Wrap any remaining length of webbing around your waist and tuck the end under the previous wraps.
12. Use a locking carabiner (double locking preferred) to clip together all the webbing between the knots in front of your body.



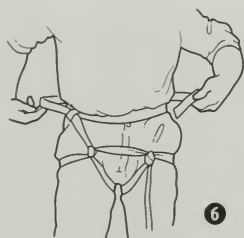
How to Tie a Knotted Leg-Loop Harness

Form the knotted leg-loop harness using a piece of webbing 24 to 30 feet long.

1. a. Holding one end of the webbing, measure off a length that stretches from your nose to your outstretched hand. Keep that length marked with one hand while you tie the first leg loop.
- b. Form the first leg loop. Just beyond the measured piece, wrap the webbing around your thigh to size it to your leg. Add another 4 to 6 inches to allow for a knot and form a leg loop with an overhand-on-a-bight knot.
- c. Move about 6 inches further along the webbing and repeat step 1b to form a second leg loop.
2. With the shorter, measured piece of webbing on your left side, put on the leg loops as you would a pair of pants. Pull the loops all the way to your crotch with the knots toward the front. For the sake of comfort, be sure there are no twists in the webbing. Each loop must be snug, but not tight enough to restrict circulation. You should be able to easily slip two fingers between a leg loop and your leg.
3. Let the shorter, measured piece of webbing hang down on your left side. Starting by going behind your back, wrap the longer piece of webbing clockwise several times around your waist. Bring the end of it across your belly to your right side.
4. Tuck the webbing end up and behind the wraps of webbing on your right hip, leaving enough slack to form a bend.

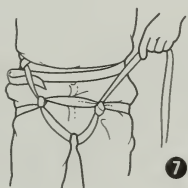


5. Pass the webbing end through the bend to form an overhand knot. Work any slack out of the webbing so that the harness fits snug around your waist and the overhand knot is secure.



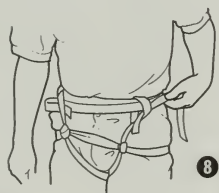
6. Wrap the remainder of the longer piece of webbing a final time around your waist, going clockwise, as before. To keep it out of the way, tuck the end behind the webbing above the right leg loop. (You will need it in a moment to finish tying a water knot.)

7. Turn your attention to the shorter, measured length of webbing on your left side.



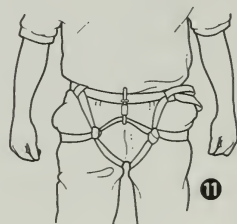
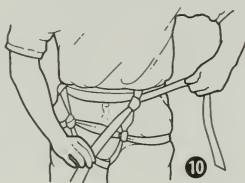
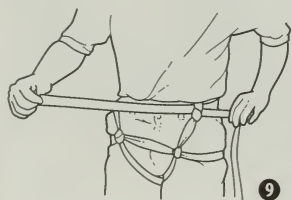
8. With the measured length of webbing, tie a loose overhand knot ($\frac{1}{2}$ of a water knot) around the wraps of webbing on your left hip.

9. Retrieve the other end of the webbing and use it to trace back through the loose overhand knot, thus completing a water knot.



10. Tighten the water knot. Check the harness to be sure it fits securely and that there are no unnecessary twists in the webbing. Wrap any remaining length of webbing around your waist and tuck the end under the previous wraps.

11. Use a locking carabiner (double locking preferred) to clip together all the webbing between the knots in front of your body.





Using a harness that fits properly helps make climbing and rappelling, safer, more comfortable, and fun!

Anchors, Belay Systems, and Belaying

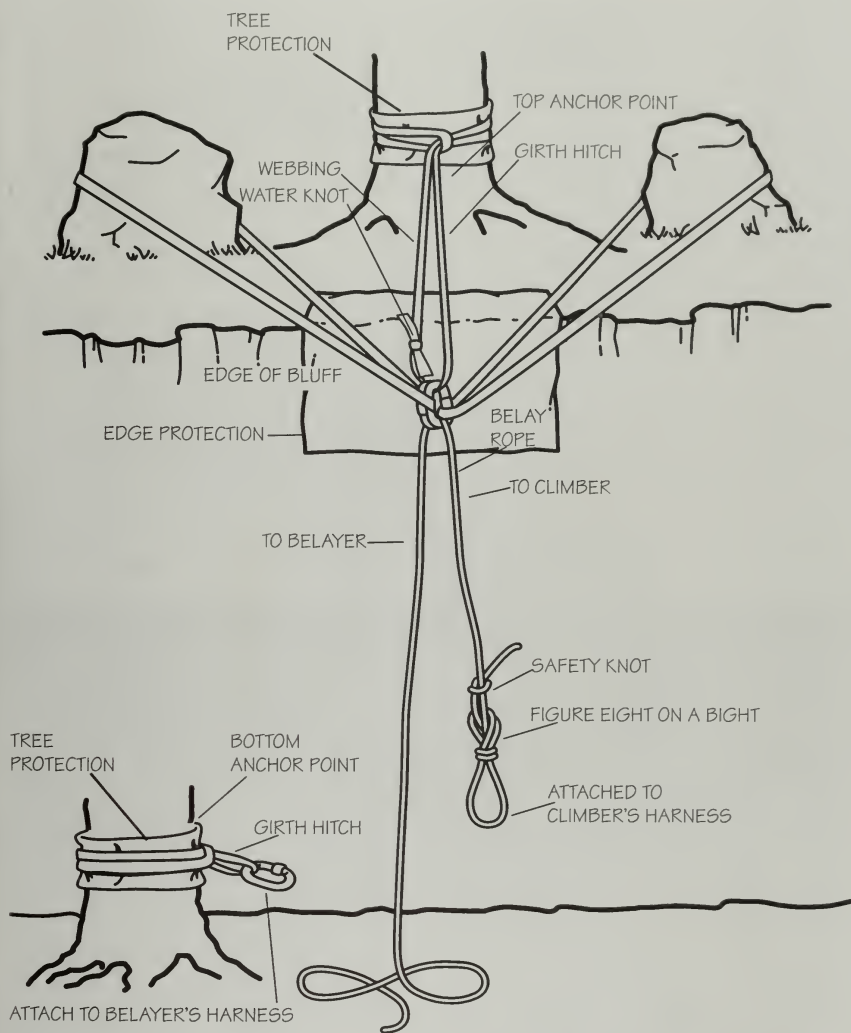
The *protection system* in climbing combines harnesses, ropes, carabiners, anchors, and an alert partner (the *belayer*) to stop any fall of a climber or rappeller.

You've learned about harnesses, ropes, and carabiners. Now let's look at two other essential parts of the protection system: the anchors and the belayer.

Anchors

Choosing and rigging anchors for climbing or rappelling should be left to highly experienced climbers who have special training in establishing and monitoring anchor points and belay systems. You can learn a lot from them as they explain the anchors that you'll be using for your climbs and rappels. They may even ask you to assist in setting up or taking down anchoring systems. Among the basic information you might learn is the following.

To protect climbers and rappellers from injury, the system that secures them must be attached to failproof *anchor points*—boulders, sturdy trees, or other points that absolutely will not give way. Trees should be at least 6 inches in diameter at the point of anchor and firmly rooted. Boulders should be located so they cannot be pulled out of position. Nuts, chocks, bolts, and other forms of artificial protection are acceptable only if they have been placed by qualified people.



How to set up a belay system using a tree at the top of a cliff as the top anchor point, and a tree at the base of the cliff as the belayer's anchor point. Note that the anchor webbing is long enough to allow the carabiners securing the rope to the top anchor to hang over the edge of the cliff. That helps prevent the rope from being abraded.

TREE USED AS ANCHOR
POINT FOR RAPPEL ROPE—
SEPARATE FROM TREE USED
AS BELAY ANCHOR POINT

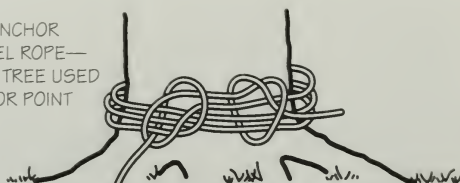
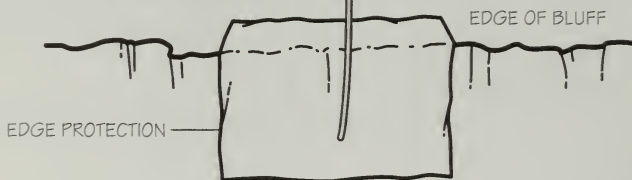


FIGURE-EIGHT DESCENDING
DEVICE—CLIPPED TO
RAPPELLER'S HARNESS
TO ALLOW FRICTION TO BE
USED TO CONTROL SPEED
OF DESCENT



For rappelling, use two ropes on separate anchors. This illustration shows a tree as the anchor point for the rappel rope. The rappeller must also be tied into a belay rope that is anchored separately from the rappel rope.



Deciding where to place an anchor depends upon the way it will be used. If a belayer will be at the top of a climb, it is better to find an anchor 6 to 10 feet back from the edge of the cliff so that there will be room for belayers to do their work and for climbers completing their routes to move about without danger of falling.

Never assume that an existing anchor point is safe simply because it has been used in the past. Check every anchor every time you intend to use it. Webbing and rope left on an anchor by previous climbing parties may have been damaged by heavy use or exposure to the elements. Replace anything you find that was left attached to an anchor with equipment that you know to be in top condition.

Whenever possible, also use one or more *backup anchors*. If the primary anchors fail, the backups can keep you safe. **All anchors must be failproof or backed up and the load equalized.**

Runners or ropes must be correctly attached to anchors to safeguard the lives of climbers, rappellers, and belayers. Always follow the guidance of a climbing area's instructors when selecting and rigging anchor points. Make sure rope does not run over any edges that could abrade or cut it. Don't let carabiners under tension lie against edges where they could be damaged.



An anchor system for tying in a belayer. Note that the belayer should be seated.



In a top-rope belay, a climber is protected by a belay rope anchored at the top of a climb. The belayer may be at the top or bottom of the cliff.

Belaying

A belayer provides protection to climbers and rappellers whenever they are more than 6 feet above the ground. If they slip, the belayer can help guard them from injury by quickly stopping the fall. Climbers and rappellers can be belayed either from above or from below with a *top-rope belay*. (Study the photos and illustrations in this section to see how the setups differ for each method.)

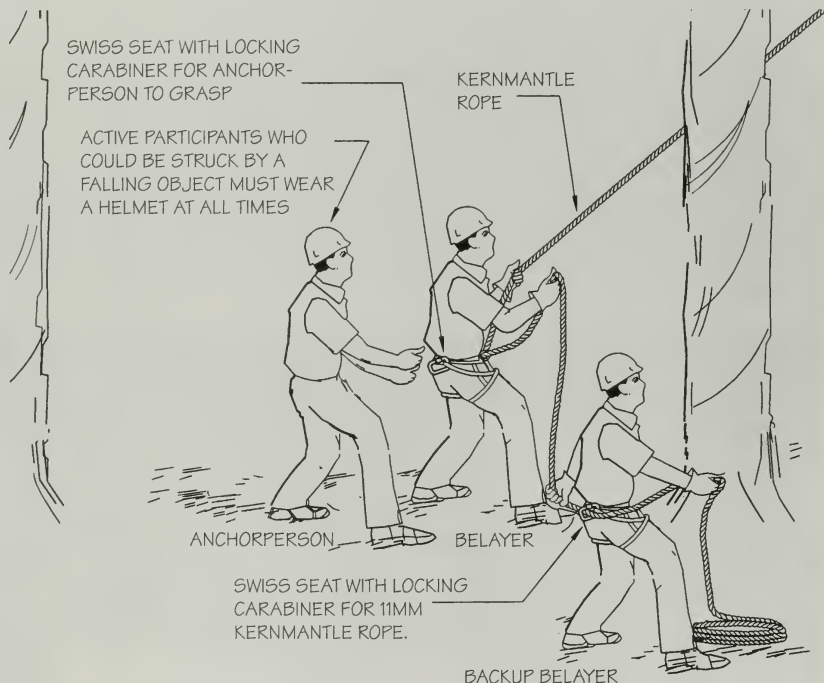
The belay rope passes through a *belay device*—a piece of hardware shaped to increase a belayer's control over the rate at which a rope will move through the device. Friction plays an important role. More friction between a rope and a belay device means a slower descent for a climber or rappeller. Less friction allows the rope to move more quickly. Most belay devices are easy to use and highly reliable. A belayer does not need great strength to stop the fall of a climber or rappeller.

Belay devices appropriate for BSA climbing and rappelling activities are the tube device, slotted plate devices including the Sticht plate, the figure-eight descending device, and specialized belay devices such as the Grigri. (See the examples shown on the following pages.)



Bottom belay system setup

Prepare to belay a climber or rappeller by putting on a climbing harness and attaching yourself to the belay anchor with a locking carabiner backed up with a second carabiner. Move forward to take up any slack in the anchor system so that you will not be yanked out of position if the climber or rappeller you are belaying falls. If necessary, shorten or lengthen the anchor system to improve your belay stance. Make sure you are in line with your anchor system and the direction of pull on the rope in the event of a fall. This will prevent your being yanked out of position.



Always follow the guidance of a climbing area's instructors regarding the way you anchor yourself to act as belayer and the belaying technique to be used. Among the variations on belaying that you may encounter are these:

- A belayer on the ground can sometimes be anchored by a second belayer tightly gripping the first belayer's harness and using body weight to hold the first belayer in place.
- The belays at some climbing areas are set up so that the belay device is connected directly to an anchor rather than to the belayer's harness.



The Grigri is a specialized belay device.

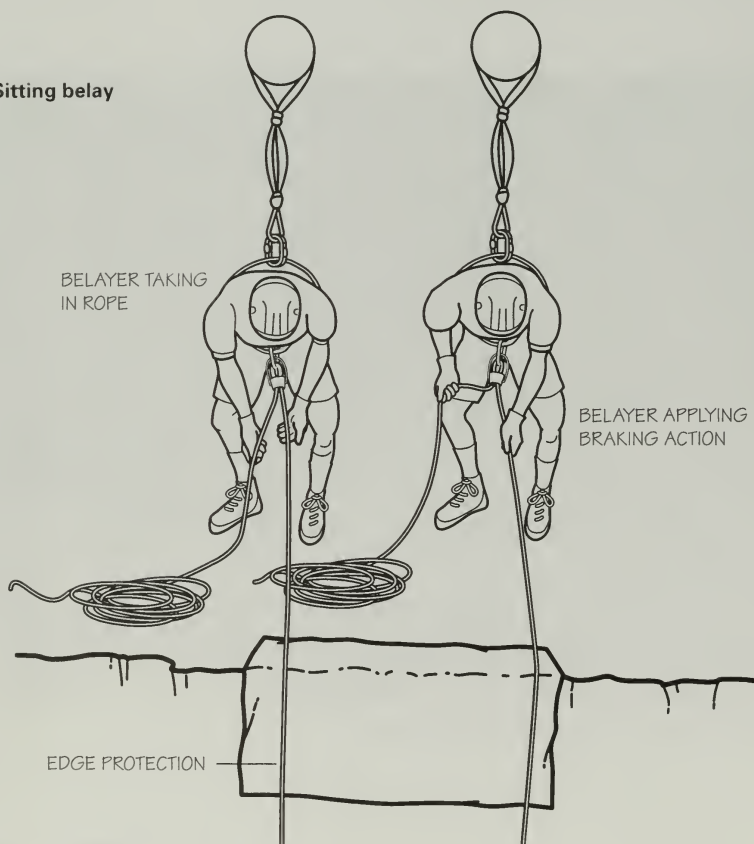


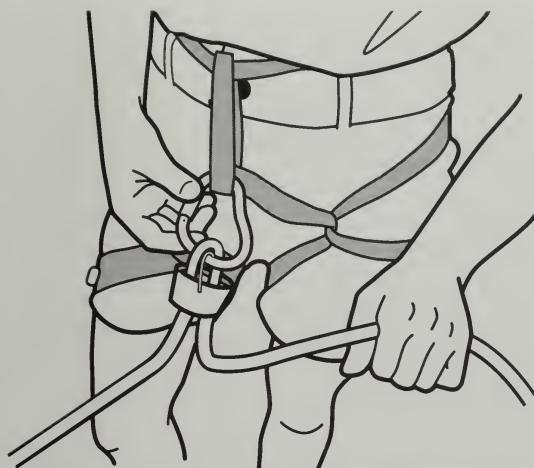
A belayer properly anchored for a bottom belay

Belaying a Climber

After you are connected to a belay anchor, insert a bend of the belay rope into the belay device. Use a locking carabiner to secure the bend of rope and the keeper loop of the device to your harness or directly to an anchor system. Arrange the rope so that your stronger hand (usually your right hand if you are right-handed) will be the *brake hand*—the hand closest to the free end of the rope. Your other hand will be the *guide hand*, resting on that part of the rope leading to the climber or rappeller. (Specialized belay devices such as the Grigri are set up a little differently. Refer to the manufacturer's guidelines.)

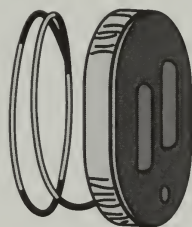
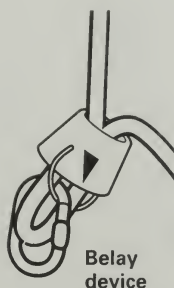
Sitting belay



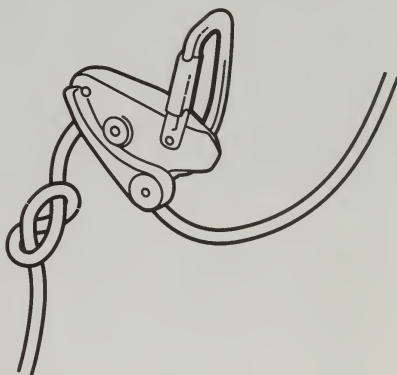


Running the rope through a belay device allows a belayer to stop a fall easily, just by bending the rope to one side.

Double-check the belay system to be sure it is correctly anchored and that the belay device is ready. Exchange verbal signals (see the chart on page 63) with a climber. As the climber ascends, pull through the belay device any slack that forms in the rope, and let the loose rope pile up next to your feet. While holding the rope firmly with your brake hand, slide your guide hand out along the rope. Then clasp both sections of the rope with the fingers and thumb of your guide hand so that you can slide your brake hand back along the rope toward your body. (*Your brake hand must never leave the rope.*) Repeat the process. Keeping slack in the rope to a minimum will limit the length of a fall if the climber slips.

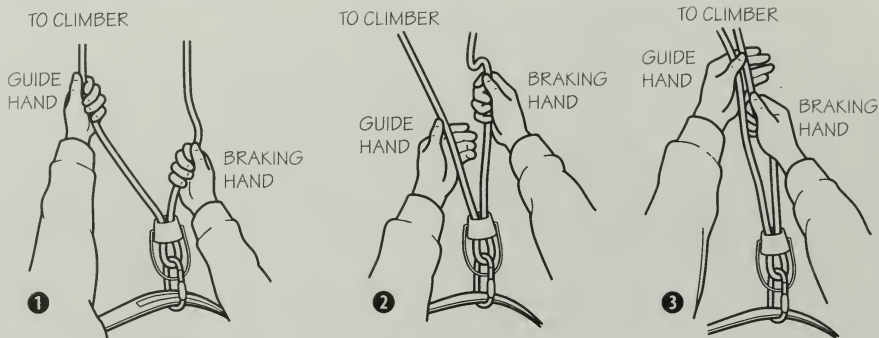


Spring-loaded
Sticht plate



Grigri

As a Climber Ascends

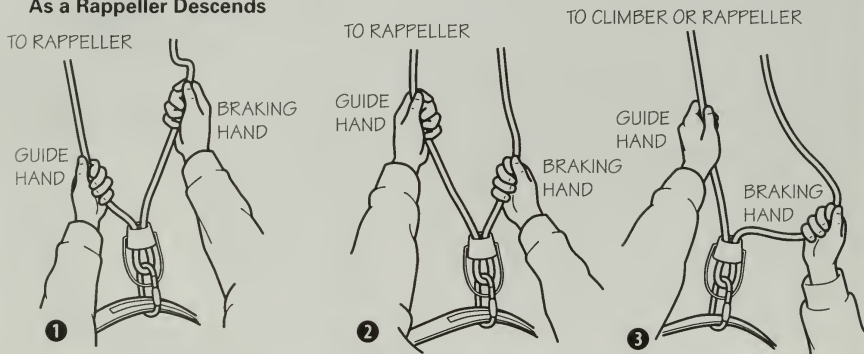


Belaying with a belay device

To take up slack as a climber ascends:

1. Grasp the rope with both hands and feed it through the belay device, pulling the guide hand toward the body and moving the brake hand away.
2. Holding the rope firmly with the brake hand, slide the guide hand out along the rope, away from your body.
3. Use the fingers and thumb of your guide hand to clasp both sections of the rope firmly, then slide your brake hand back toward your body. Begin the sequence again. *(Remember—the brake hand must never leave the rope!)*

As a Rappeller Descends



To let out rope as a rappeller descends:

1. Feed the rope through the belay device, pulling the rope away from your body with your guide hand and pulling the brake hand toward your body.
2. The guide hand releases rope to the rappeller a little at a time as you allow the rope to slip through the brake hand. (Remember that the fingers of the brake hand are always curled around the rope, ready to clamp down.)
3. Whether you are letting out rope or taking up slack, stop a fall by grasping the rope tightly and pulling it back toward the hip on your brake-hand side.

Verbal Signals for Climbers and Belayers

Verbal signals allow a climber and a belayer to communicate and work together as a team even if they cannot see each other. Get in the habit of using verbal signals every time you are climbing or belaying. If the day is too windy or the area too noisy for climbers and belayers to hear one another clearly, postpone your climbs or move to another area.

Climber	Belayer	Meaning
"On belay?"	→	"Is the belay ready?"
	"Belay on." →	"Your belay is ready."
"Climbing."	→	"Here I come."
	"Climb" or "Climb on." →	"Come ahead."
"Slack."	→	"I need some slack in the rope."
"Up rope."	→	"Take in the loose rope."
"Falling!"	→	"I'm falling! Brake the belay rope!"
"Tension."	→	"Hold the rope tightly in case I fall."
	"Got you." →	"There's tension on the rope."
"Ready to lower."	→	"Lower me."
	"Lowering." →	"I'm letting you down now."
"Rock!"	→ "Rock!" →	"Look out for falling objects."
"Rope!"	→ "Rope!" →	"Rope being thrown down."
"Off belay."	→	"I'm in a safe place and no longer need a belay."
	"Off belay." →	"I'm no longer belaying you."

Verbal Signals for Rappellers and Belayers

The verbal signals rappellers use are a little different from those used by climbers, but the basic information they share is the same.

Rappeller	Belayer	Meaning
"On belay?"	→	"Is the belay ready?"
	"Belay on." →	"Your belay is ready."
"Rappelling."	→	"I'm ready to start down."
	"Rappel on." →	"Go ahead."
"Falling!"	→	"I'm falling! Brake the rope!"
"Off belay."	→	"I am done rappelling and am in a safe place."
	"Belay off." →	"I'm no longer belaying you."
"Off rappel" or "Off rope."	→	"The rope is free of hardware and is ready for the next rappeller."

Belaying a Rappeller

Anyone on a single-rope rappel must be protected by an independent belay rope. Begin by double-checking the belay system to be sure it is secure, you are properly anchored, and the belay device is correctly set. The bulk of the belay rope should be loosely piled next to you on your brake-hand side. Exchange verbal signals with the rappeller. To descend, the rappeller gradually releases the belay rope through the belay device.

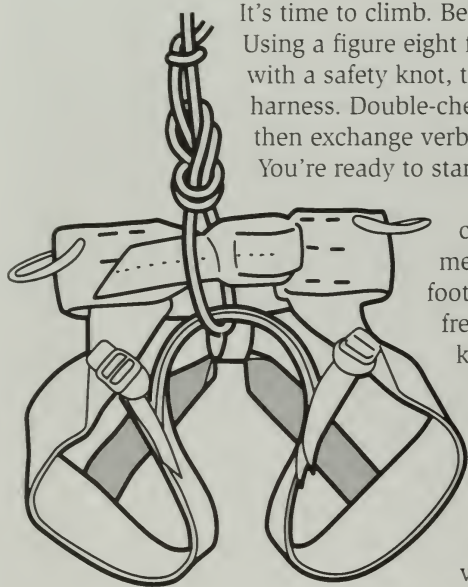
Anyone using a double-rope rappel may be belayed with an independent belay rope, or with a *fireman's belay*. Begin the fireman's belay by positioning yourself at the bottom of the route and grasping both lines of the rappel rope. Exchange verbal signals with the rappeller. As the rappeller descends, be ready to pull down on the rope to slow or stop the rappeller's progress.

Safety Pointers for Belaying

Belaying is serious business. Every moment that you are belaying someone, you must assume that the person on the other end of the rope is about to fall. Keep your attention focused at all times on the climber or rappeller, and be ready to react instantly to hold the rope and stop a fall. To ensure a safe belay every time, remember these pointers.

- When using an independent rope belay, the belayer must be correctly anchored in order to maintain an effective stance to be prepared to stop the fall of a climber or rappeller.
- The belay anchor must be absolutely secure and reliable, with no chance of failure.
- There must be no slack in the system between the belayer and the belay anchor.
- The belay device must be properly installed and the belayer must understand how it is used.
- The belayer's brake hand must never leave the rope.
- When using an independent rope belay or a fireman's belay, the belayer must anticipate the direction of pull on the belay rope and get in line with it to avoid being pulled out of position.
- The belayer must be ready at any moment to stop a fall.
- The belayer and the climber or rappeller must maintain good, clear communication.
- The belayer's attention must never leave the climber or rappeller.

Climbing



Tie the belay rope directly into the harness, using a figure eight follow-through knot backed up with a safety knot.

It's time to climb. Begin by putting on a harness. Using a figure eight follow-through knot backed up with a safety knot, tie the belay rope directly into the harness. Double-check your harness and the knots, then exchange verbal signals with your belayer. You're ready to start your ascent.

The basic climbing position is called the *three-point stance*. This means you keep two hands and one foot on reliable holds while moving the free foot to a new location, or you keep both feet and one hand on holds while the free hand moves. Lift yourself with the strong muscles of the legs, and use your hands mostly for balance.

Lean out from a wall you are climbing so that your body is vertical and your weight rests on your feet. That will give you the most secure stance as you ascend.

Beginning climbers are sometimes tempted to lean into the rock as if to hug it, but that shifts their weight and can cause their feet to slip off of holds. When your body is too close to the rock, you may also find it difficult to see where your feet are moving.

Footholds

The size and location of a hold will determine the way you position your foot to take advantage of it. Decide how you will use a hold before you begin moving your body. Place your foot solidly on the hold and keep it still until you are ready to move that foot to its next hold.

The foot techniques most often used are *edging*, *smearing*, and *jamming*. Along with the *rest step*, these are the basic moves for your feet.

Edging. Turn your foot sideways and place the edge of the sole on a nub, narrow ledge, or other hold. You probably will find it most natural to edge with the inside of the shoe, although edging with the outer portion of the sole sometimes makes possible a series of moves.



The basic climbing position is the *three-point stance*.

Edging





Smearing

Smearing. First, place the sole of your shoe toe against the rock. Then, as your foot bends and takes your weight, the rock will dig into the surface of the sole and hold you, especially if your body is vertical and your weight is directly over your feet. The sticky rubber soles of modern climbing shoes are made for this kind of traction. Both smearing and edging are harder to do with hiking boots or athletic shoes.



Jamming

Jamming. Fit your foot sideways into a crack in the rock and twist your ankle so that your foot is in a more natural position. Your foot should wedge tightly enough against the sides of the crack to hold your weight.

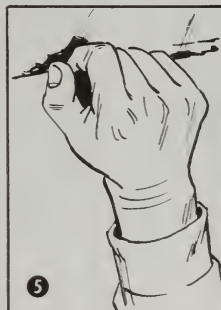
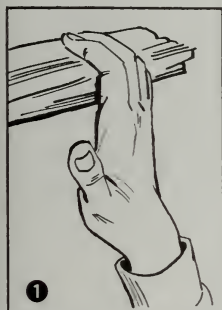
Rest step. As your legs tire with the effort of climbing, they may begin to shake up and down. Climbers call this *sewing machine leg*. Use the rest step now and then to give your legs a moment to

recover between moves. Place your foot on a wide hold, lock your knee, and let your weight settle onto your heel so that your leg bones support you while your muscles relax. If you have an arm free, shake it to restore circulation and give it renewed energy.

Handholds

You can use your hands in different ways to take full advantage of different shapes of cracks, ledges, and nubs on a rock. *Clings*, *jams*, and *underclings* are among the most common climbing holds.

Clings. Place your fingertips on the edge of a table, bend your fingers at the second joints, and pull down with your wrist. That's a cling hold, the most common way climbers hang onto edges on rock faces. If a hold is small, you might cling to it with only a couple of fingers, perhaps with your thumb braced across the top of your fingers. (Climbers sometimes call a big hold—using all fingers and the thumb—a *bucket* or a *jug* because using it is like grabbing the lip of a large container.)



Clings. 1. Open grip. 2. Cling grip. 3. Cling grip, with the thumb used to support or brace the fingers. 4. Fingertip grip. 5. Bucket or jug grip.

Jams. A crack in a wall might be just the right size for you to fit in some or all of your hand. Arch your fingers or clench your fist to tighten your hand in the crack.



Jams. 1-4. Finger jams. 5-8. Hand jams. 9-10. Fist jams.

Underclings. If you are grasping a rock with your palm up rather than down, the hold is an undercling. An undercling works because your hands are pulling one way while your feet are pushing the other. Use the undercling to move sideways along a face, or for balance as you search above for your next handhold.

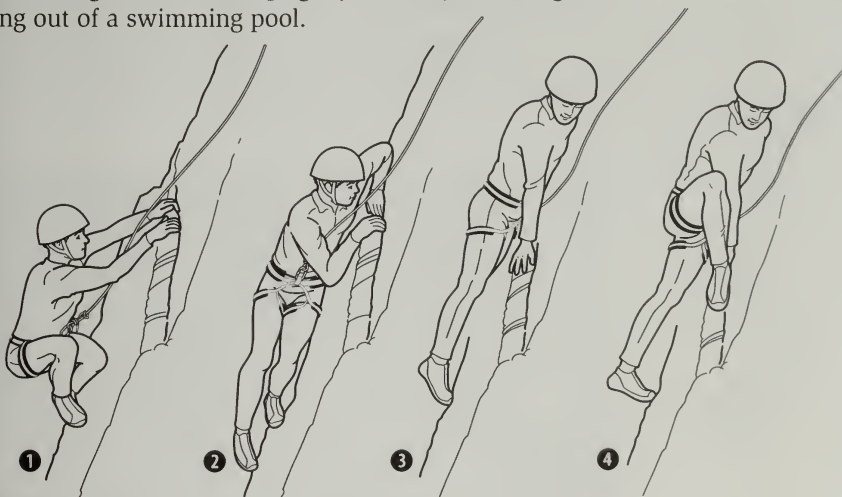


Combination Holds

In certain situations, climbers rely on holds that are a combination of handholds and careful foot placement. Combination holds that you may find useful are *mantling*, *liebacks*, *chimneying*, and *counterbalance*.

Mantling. With a mantling move, you can hoist yourself onto a ledge or over the top of a wall or cliff. Climb high enough to place a palm on the ledge. Push your body up as you straighten your arm, using your legs and your other arm as much as possible. Lift a foot to the ledge, then stand upright just as if you were getting out of a swimming pool.

Undercling. The hands pull one way while the feet push the other way.



Mantling. 1. Approach the ledge. 2. Place a palm on the ledge and cock your arm. 3. Push yourself up as you straighten your arm. 4. Lift a foot to the ledge and stand, balancing your weight over your foot.

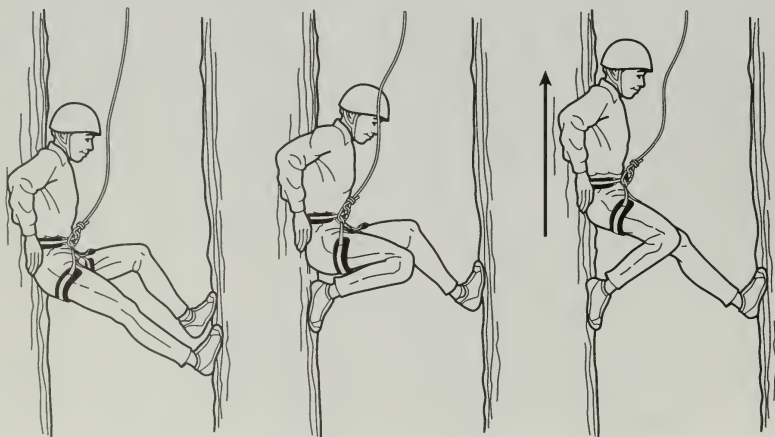


Lieback

Liebacks. Use a lieback where two rock faces meet to form a corner. With your hands, hold the crack where the walls join, then push against either rock face with your feet. Moving one foot or one hand at a time (while maintaining three-point contact at all times), work your way up the route. Constant pressure on your hands and feet will prevent you from falling.

Chimneying. If a crack in a rock face is wide enough—what climbers call a *chimney*—you can press your back against one side and your feet against the other, keeping your hands low and pressing with the palms. Or you can press one foot and one hand against each side. Move upward by “walking” up with your feet and pushing with your hands against the sides of the chimney. As you straighten your legs and push with your hands, your back slides upward against one side of the chimney.

Chimneying



Counterbalance. A climber can sometimes extend a leg or an arm to a position that does not offer a solid hold, but rather provides balance during an ascent. Counterbalancing involves the entire body, using position and weight distribution to make the most of minimal holds.

Tips for Climbing

- Try to support most of your weight on your feet to keep from tiring your hands and arms. Stretch for high handholds only when necessary.
- Practice. Reading about climbing won't build your climbing skills; only practice (under the supervision of a qualified instructor) can do that.

Planning Routes

Study a wall or rock face before you start climbing and try to figure out where your hands and feet will go. Experienced mountaineers call this "climbing with your eyes." When you do start up, you will have a better chance of putting together a smooth sequence of moves. Look ahead, as you climb, for the next two or three holds you can use.



Rock face suitable for climbing



Crumbling and excessively fractured rock face

Chalk

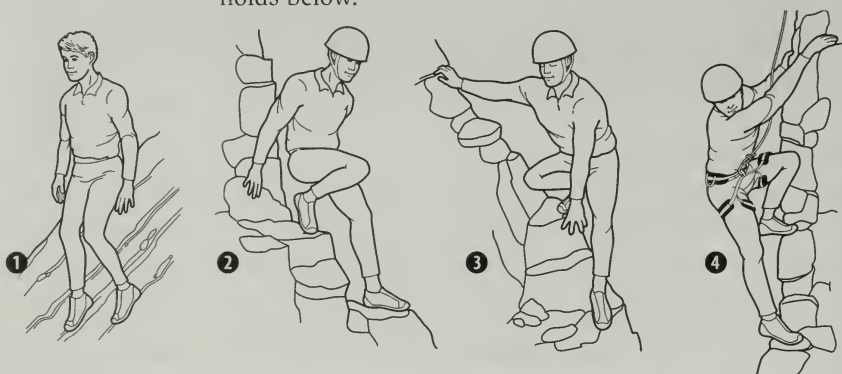
Advanced rock climbers sometimes use chalk to help keep their fingers and palms dry and improve their grip on the rock. Kept handy in a small bag hung around the climber's waist, the chalk is the same kind that gymnasts use. Some climbing areas discourage its use because it can leave white marks on the rock. If you try chalk, use it lightly and only when needed.

Climbing Down

Climbing down a cliff (called *down-climbing*) can be more difficult than going up, because you might not be able to see the holds as well. On gentle slopes, face out and lean forward in a *nose-over-toes position* to keep your weight over your feet.

Turn sideways where terrain is steeper. As you descend, keep at least one hand on the rock for balance.

On the steepest walls, face the rock and use the three-point stance. Lean out to keep your weight over your feet and to give yourself the best look at the holds below.



Down-climbing. 1. Nose-over-toes on gentle slope. 2. Facing out. 3. Facing sideways. 4. Facing the rock. A helmet is needed anytime danger from falling objects exists. A rope and harness are needed whenever the climb exceeds the comfort level of the climber.

Bouldering

Bouldering is a good way to learn climbing techniques. Bouldering takes its name from climbers practicing their moves on real boulders, but it can also be done on any face that has handholds and footholds near the ground.

The key to bouldering is that climbers move up, down, and sideways without ever getting any higher than they can jump down without injury. The goal is not to reach the top of anything, but rather to move smoothly from one hold to the next. Boulders often climb sideways, just above the ground, for extended distances. Such *traversing* builds strength and skill.



Bouldering can be done on any face that has handholds and footholds near the ground on which climbers can practice their moves.

Do not climb unroped more than 6 feet above the ground. If you want to climb higher, you must be on belay. Even if you are climbing only a foot or two off the ground, you must have two or three *spotters* ready to steady you and provide assistance if you fall.

Spotting

Spotters stand ready to break a person's fall in such a way as to prevent injury either to the person who falls or to the spotters. They are not expected to catch a falling boulderer in midair—something that is impossible in most cases, even in a fall of just a few feet. Instead, they support the head, neck, and torso of the falling person and ease the boulderer to the ground. To do this, spotters must

- Position themselves with their hands ready to support a faller, keeping their hands out in front of them with their fingers together. Spotters should keep their feet apart with one foot in front of the other for stability, and their knees and elbows flexed to help absorb the shock.
- Stay alert and focused on the boulderer they are spotting.



Boulderers rely on spotters to be their "safety net" in case of a fall.

Verbal Signals for Boulderers and Spotters

The verbal signals that spotters exchange with boulderers allow spotters to be positioned and prepared for whatever situations may arise.

Boulderer	Spotters	Meaning
"Spotters ready?"	→	"I'm ready to start."
	"Ready."	→ "I'm ready to protect you."
"Climbing!"	→	"I'll start up as soon as spotters give a go-ahead."
	"Climb on!"	→ "Go ahead."
"Falling!"	→	"I'm about to fall."

How to Fall

Falling is a natural part of learning to climb. Even expert climbers sometimes lose their grip when they are attempting difficult moves. Rappellers, too, can slip off balance.

Climbers and rappellers who are properly belayed cannot fall more than a few feet before the belay rope stops them. Because climbers without a belay must **never** be more than 6 feet above the ground, they, too, should not fall far.

When you fall while climbing, the belay rope will stop you, but you might bump against the rock. Cushion the impact with your hands and feet if you can, keeping your arms flexed rather than rigid. Then you can continue climbing, or your belayer can lower you to the ground.

The Art of Falling

Don't let the possibility of falling scare you away from climbing and rappelling. By accepting falling as a part of the sport, you can be ready for it when it does happen. These pointers will help.

- Stay relaxed. There is no need to panic.
- Maintain body control and face the rock.
- Keep your arms and legs bent and spread apart, cat-like, to act as shock absorbers for cushioning the impact of bumping into the rock. Hold your head up and try to keep your chest away from the surface.

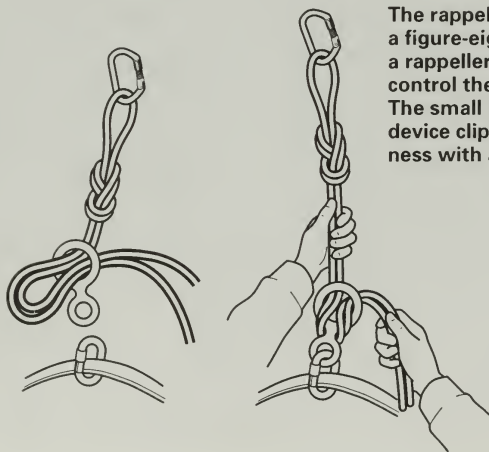


Every climber falls occasionally. Climbers and rappellers who are properly belayed should not fall more than a couple of feet.

Rappelling

Rappelling allows you to make quick descents down rock faces that might have taken a long time to climb. Rappelling is often faster than climbing down.

For rappelling, thread the *rappel rope* through hardware attached to your harness so that you can use friction to control the speed of your descent. One of the safest ways to rappel is with a *figure-eight descending device*. Bend the rope through and around the device in such a way that you can apply friction to the rope, then clip the descending device to your harness with a locking carabiner (double-locking carabiner preferred) and you will be securely connected to the rappel rope. (A safety knot tied near the lower end of the rappel rope can prevent a rappeller from sliding off the rope. Make the knot big enough that it cannot slip through a rappel device.)



The rappel rope passes through a figure-eight descender so that a rappeller can use friction to control the speed of a descent. The small hole of the figure-eight device clips to a rappeller's harness with a locking carabiner.



Tie the *belay rope* directly into your harness with a figure-eight follow-through knot backed up with a safety knot. Double-check all knots and the position of the rappel device.

Belaying a Rappeller

Belaying rappellers provides an important margin of safety, especially for those with beginning and intermediate skills.

Anyone involved in BSA rappelling activities must be belayed. For the steps of belaying a rappeller, see the section in this pamphlet on belaying, beginning on page 52.



Proper rappelling position. Lean out from the rock face, with your feet against the face and spread slightly. Look down to see where you're going.

Exchange verbal signals with your belayer, then back up to the edge of the cliff. Lean back as if you were sitting in a lawn chair. Keep your feet flat against the wall's face and your weight on your heels. Walk down the wall backward, letting the rope slide slowly through your hands and the rappel device. To stop, bend the rope behind your body so that no more rope slips through your brake hand.

Rappel in a smooth, steady manner. Don't jump or bounce; that can put extra strain on the anchors, rope, and hardware.

If you slip while rappelling, hold the rope tightly and pull it to your hip on your brake-hand side. That should stop your descent immediately, but even if it doesn't, the belay rope will catch you within a few feet. Because your hands will be on the rappel rope, you won't be able to use them to cushion your impact against the rock.

Instead, turn your body so that you bump into the rock with your shoulder and side rather than face first. Regain the rappel position and continue your descent.



Learn the basics on gently sloping terrain before moving on to steeper slopes.

Storing Equipment

Take time to store equipment correctly so that it will be in good shape the next time you want to use it.

First, remove all webbing and ropes from anchor points. That will prevent gear from being left out in the elements, and will ensure that the next climbers and rappellers set their own anchors with equipment they know to be reliable.

Coil each rope or stow it in a stuff sack. Carabiners and other hardware can be clipped together, snapped onto a loop of webbing, or stored in duffel bags. If you notice any damage to a rope or piece of equipment, immediately “retire” it so that it can’t be used again. Mark the rope with a black marker along its entire length so that it can easily be distinguished.



Always take time to store equipment properly. Equipment that is well cared for provides better safety and longer service.

Inspect runners and harnesses, too. Set aside any that might pose a danger. The rest can be stored in duffel bags.

Rope and gear that have gotten wet must be dried completely before storage. Uncoil wet rope and drape it loosely and out of direct sunlight so that air can get to it. Hang damp slings and harnesses from rustproof hooks.

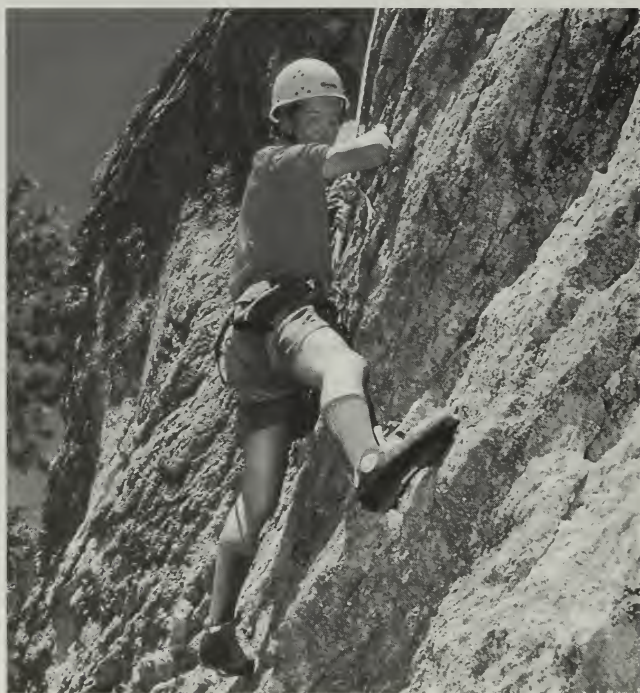
Directors and instructors at climbing areas may ask you to help fill out the detailed records that are kept to track the history of each rope and piece of equipment. Those records are an important tool for making sure that only ropes and gear in top condition are used during climbing and rappelling activities. Users should be aware of which ropes and other gear endured hard falls; this information must be noted in the written histories of the equipment and factored into equipment retirement decisions.



Climbing Ethics

The ethics of rock climbing require that you do nothing to mark or damage the rock or to change the experience for other climbers. You may not, for instance, use a hammer to chip away the rock and improve a hold. Other climbers would be furious, and with good reason.

Many climbing areas are in state and national parks. Be sure to obtain any permits that may be required to climb in those areas.



Before climbing anywhere on private property, you must get the landowner's permission. Be careful to do no damage. It takes only one careless or inconsiderate climber to cause an area to be closed to all climbers.

Leave No Trace Climbing

As a Scout, you know about taking care of the environment and using no-trace methods in the outdoors. Most of the following guidelines will be familiar to you, because most of them apply to any outdoor activity, including climbing and rappelling.



- To reach climbing areas, walk on established trails, even if it takes a little longer than following a shortcut.
- Avoid harming grass, trees, and other vegetation at the climbing area.
- Do not bother nesting birds. Their eggs might not hatch if the nests are disturbed. Climbers make it a practice to stay away from cliffs in some areas where birds are nesting. The dates when particular cliffs are off-limits to climbers are usually published in climbing guidebooks for the area.
- Never scratch graffiti into rock surfaces or chip the rock to change natural handholds.
- Chalked-up holds can detract from the pleasure of an ascent for other climbers. On natural rock, avoid using chalk. If you must use it, use rock-colored chalk if possible, and dab it only on your fingertips. Securely close chalk bags so that chalk won't spill out.
- Pick up any trash you find, whether it is yours or someone else's. Put litter in your pockets or pack, and carry it out with you for proper disposal.

Glossary

aid climbing. Using rope and other gear to give the climber something to hang from or pull up on; using any means other than hands and feet to get up a climb. (See “free climbing.”)

anchor. Ropes, runners, and other pieces of equipment set up to secure a climber, rappeller, or belayer to an anchor point.

anchor point. A well-rooted tree, rock protrusion, properly installed bolt, or other convenient location for attaching carabiners, runners, or rope for belay and rappel systems.

ascending. Moving upward.

belay. The protection provided a climber or rappeller tied to a belay rope. The rope is managed by a belayer in such a way that the fall of a climber or rappeller will be arrested almost immediately.

belay device. A piece of hardware used for belaying; it simplifies the process of locking the rope to stop the fall of a climber or rappeller.

belayer. The person who manages the rope and is responsible for stopping the fall of a climber or rappeller.

bight. A bend in a rope. A bight is important for tying certain knots used for belaying, and for securing ropes into rappel or belay devices.

bolt. An artificial anchor point formed by driving a special bolt into a hole drilled into a rock face. This should only be done by a skilled climber. A carabiner may be clipped into the hanger attached to the bolt.

bouldering. Climbing on boulders or other steep faces without going more than six feet off the ground. Boulders are usually protected by spotters rather than a rope belay.

carabiner. A steel or aluminum ring with a spring-loaded gate. Carabiners are used to connect pieces of climbing equipment and to secure rope to webbing, anchor points, and protection devices.

chimney. A crack large enough to accommodate a climber's body.

chimneying. Ascending by pressing the hands and feet against opposite sides of a large crack.

Climb On Safely. The BSA's eight points for effectively and safely managing unit climbing and rappelling activities.

climbing. A challenging sport that always involves the skills of ascending and belaying or spotting, and may also include rappelling and bouldering.

cling. A handhold involving one or more fingers bent over a hold.

counterbalance. A combination hold that involves the entire body, requiring the climber to use position and weight distribution—for instance, applying pressure with the feet or hands in opposite directions—to make the most of minimal holds.

descending. Moving downward by rappelling or down-climbing.

down-climbing. Using hands and feet for balance while descending a moderate or steep face.

dynamic rope. Rope that stretches 6 percent to 10 percent to absorb the energy of a fall.

edge. The brink of a ledge or a small horizontal hold on a rock face.

edging. Standing on a nub or narrow ledge of rock with the side of the climbing shoe.

face. A surface suitable for climbing, usually a natural rock formation. (See “wall.”)

figure-eight descending device. The hardware most often used by rappellers to control the speed of their descents.

foothold. A knob of rock, a crack, an edge, or some other feature of a climbing surface where a climber can place a foot while ascending or descending.

free climbing. Using only the hands and feet on natural features of the rock; rope and hardware are not used directly to help the climber scale a surface, but only for safety in case the climber falls. (See “aid climbing.”)

handhold. A knob of rock, a crack, a ledge, or some other feature of a climbing surface that a climber can hold onto while ascending or descending.

hard fall. An instance when a climber or rappeller falls far enough to place significant stress on the rope, webbing, or hardware. Records of hard falls must be noted in the written histories of the rope and gear involved, and factored into equipment retirement decisions.

harness. Webbing either tied or commercially sewn to fit around the hips and legs. Harnesses allow climbers, rappellers, and belayers to attach themselves to belay systems and rappel ropes.

jamming. Placing a hand or foot into a crack and wedging it so that it will not slip out.

kernmantle. Strong, synthetic rope composed of a woven outer sheath surrounding an inner core. Kernmantle rope is the only rope that should be used for BSA climbing, rappelling, or belaying activities.

kiloNewton. Commonly used to measure the impact force and breaking strength of climbing ropes (1 kiloNewton = 224.8 pounds).

lead climbing. When climbers establish points of protection as they ascend by inserting chocks, nuts, or other hardware into cracks in the rock, and clipping the belay rope to them with carabiners. This type of climbing may be practiced during BSA activities only with a top-rope belay.

Leave No Trace. The BSA's methods and commitment to caring for the outdoors; the seven principles of Leave No Trace extend to climbing areas and the routes leading to them.

lieback (layback). A climbing hold accomplished by pulling against a crack or an edge with the hands while pressing on rock with the feet (while maintaining three-point contact at all times).

locking carabiner. A carabiner fitted with a mechanism that can be screwed or set to hold the carabiner gate closed. A double-locking carabiner is preferred for BSA climbing and rappelling activities.

mantle. A climbing maneuver for hoisting oneself onto a ledge.

mountaineering. Climbing mountains. In addition to rock climbing ability, mountaineering may require the skills of route finding, wilderness camping, and ascending snow and ice.

nose-over-toes. A well-balanced position used to make descents on gentle slopes.

pockets. Holes in rock that may be used as holds.

protection. A piece of equipment used as an anchor point; sometimes shortened to "pro."

protection system. The rope, hardware, webbing, and anchors used together to belay a climber or rappeller.

rappel device. A piece of hardware such as the figure-eight descending device that helps rappellers control the speed of a rappel.

rappelling. Descending by a controlled slide down a rope that is anchored at the top of a route.

rest step. A way of settling the weight onto the skeletal system in order to allow muscles to recover during a climb.

rock gym. An indoor climbing facility.

rope bag. A bag or pack designed for stowing and carrying a climbing rope.

rope drag. Friction or resistance created when a rope runs over rock or through pieces of protection.

rope stretch. The amount of "give" in a climbing rope.

runner (sling). A loop of commercially prepared webbing used for various purposes including setting up anchors, placing protection, and connecting pieces of climbing equipment.

safety knot. A knot tied in addition to the main knot to keep the main knot from untying or slipping. Also called a "backup" knot or "stopper" knot.

sewing machine leg. The shaking phenomenon sometimes experienced by a climber when muscles tire.

slingshot belay. A top-rope belay featuring a belayer on the ground. The rope runs from the belayer up to an anchor at the top of the climb, then down to the climber, forming the shape of a slingshot.

smearing. Pressing the sole of a climbing shoe against a surface in order to climb.

spotter. A person on the ground who provides protection to a boulderer to help prevent injury to the boulderer in case of a fall.

static rope. Rope with minimal stretch. Static kernmantle rope can be used for top-rope belays and for rappelling.

Sticht plate. A simple belay device that, like all belay devices, relies on friction.

tail. The free end of a rope or piece of webbing after a knot has been tied. A safety knot is often tied in the tail to help protect the primary knot.

three-point stance. A stable position for a climber. One hand and both feet are on good holds on the rock, or two hands and one foot, freeing the other limb to move.

top-roping. Belaying a climber with an anchor at the top of a climb. The belayer may be anchored at the bottom of a climb (see “slingshot belay”), or at the top. All BSA climbing activities more than 6 feet above the ground must be protected with a belay.

traversing. Moving sideways on a face without gaining or losing much elevation.

tubular webbing. Seamless nylon straps used to rig anchors, to form seat harnesses, to make runners, and for other purposes.

tying in. Attaching a rope to a climber’s harness.

undercling. A kind of hold with the palms facing up, usually under a rock formation.

wall. A vertical climbing surface, often found at climbing gyms and constructed outdoor climbing facilities. Very high rock faces are also known as walls.

Climbing Resources

Scouting Literature

Boy Scout Handbook; *Rock Climbing and Rappelling* activity pamphlet; *Project COPE* manual; *Climb on Safely*; *Topping Out: A BSA Climbing/Rappelling Manual*; and *Passport to High Adventure*

Instruction and Guidebooks

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- Osius, Alison. *Second Ascent: The Story of Hugh Herr*. Stackpole Books, 1991.
- Rosen, Mike. *The Conquest of Everest*. Bookwright Press, 1990.

Videos

The following videos are available by contacting Chockstone Press Inc., P.O. Box 3505, Evergreen, CO 80439-3505; telephone toll-free 800-337-5012; fax 303-670-9190.

The Art of Leading. Chockstone Press, 1988.

Basic Rock Climbing. Chockstone Press, 1988.

Organizations

You can contact these national climbing organizations to get information on climbing groups located near you.

American Alpine Club

710 10th Street, Suite 100

Golden, CO 80401

303-384-0110

Fax: 303-384-0111

Web address: <http://www.americanalpineclub.org>

The Mountaineers

300 Third Avenue West

Seattle, WA 98119

800-284-8554

Fax: 206-284-4977

Web address: <http://www.mountaineers.org>

National Outdoor Leadership School

288 Main Street

Lander, WY 82520-3140

307-332-5300

Fax 307-332-1220

Web address: <http://www.nols.edu>

Sierra Club

85 Second Street, Second Floor

San Francisco, CA 94105-3441

415-977-5500

Fax 415-977-5799

Web address: <http://www.sierraclub.org>

Internet Resources

The Climbing directory in the popular Yahoo index (go to <http://www.yahoo.com/recreation/outdoors/climbing>) is a good place to start looking for World Wide Web sites, newsgroups, and other Internet resources that contain information on climbing.

Climbing magazine's online version has the latest news about record-breaking climbs, conservation, gear, and listings of events in the climbing world. You can also write a letter to the editor, subscribe to the magazine, or browse the magazine's index for other articles by going to *Climbing's* Web address, <http://www.climbing.com>.

For detailed climbing information on thousands of areas throughout the United States, Canada, and Mexico, go to Rock 'N Road—Rock Climbing Areas of North America (<http://www.rocknroad.com>). This award-winning site allows you to click on maps and search a database to find out more about every aspect of a climb. You can add photographs and information about new or existing sites and get your climbing questions answered, too.

Acknowledgments

For assistance in preparing this new *Climbing* merit badge pamphlet, the Boy Scouts of America thanks Robert Birkby, writer and member of the BSA's Climbing/Rappelling Task Force (see below).

Thanks to members of the Climbing/Rappelling Task Force for their practical and technical expertise: Dave Bates (adviser), Bob Birkby, Donna Cunningham, Kevin Dowling, William Forgey, Debra Griffith, Tom Harrover, Roger Hoyt, Bob Mitchell, Christopher Moon, John Mosby, William Murray, Linda Palit, Dan Ruth, David Shaws (chair), Reid Templeton, and David Whitner.

Thanks to the Scouts and Scouters of Troops 797, 6504, and 6542 of Mesa, Arizona, and Troops 268, 283, and members of Venturing Crew 2 of Waterbury, Connecticut, for their assistance with photos for this

Climbing merit badge pamphlet. We also than members of Explorer Post 23 and post Advisors Mike and Patti Wheelock of Snohomish, Washington; and Vertical World Indoor Climbing Gym of Seattle, Washington.

For their generous and capable assistance with photography at Philmont Scout Ranch, thank you to camp directors Ben Brezina (Miner's Park) and K.C. Hinkley (Cimarroncito) and their staff members.

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American Labor	1987	Environmental		Plumbing	1999
Animal Science	1999	Science	1998	Pottery	1969
Archaeology	1997	Family Life	1991	Public Health	1996
Archery	1986	Farm Mechanics	1997	Public Speaking	1969
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Citizenship in the		Journalism	1999	Conservation	1995
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Citizenship in the		Architecture	1969	Sports	1996
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Climbing	1999	Leatherwork	1983	Surveying	1992
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Collections	1991	Mammal Study	1972	Textile	1972
Communications	1997	Medicine	1991	Theater	1999
Computers	1993	Metalwork	1969	Traffic Safety	1992
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Crime Prevention	1996	Motorboating	1992	Transportation	1973
Cycling	1996	Music and Bugling	1994	Veterinary Medicine	1996
Dentistry	1997	Nature	1991	Waterskiing	1999
Disabilities Awareness	1993	Oceanography	1993	Weather	1999
Dog Care	1984	Orienteering	1992	Whitewater	1989
Drafting	1993	Painting	1983	Wilderness	
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