

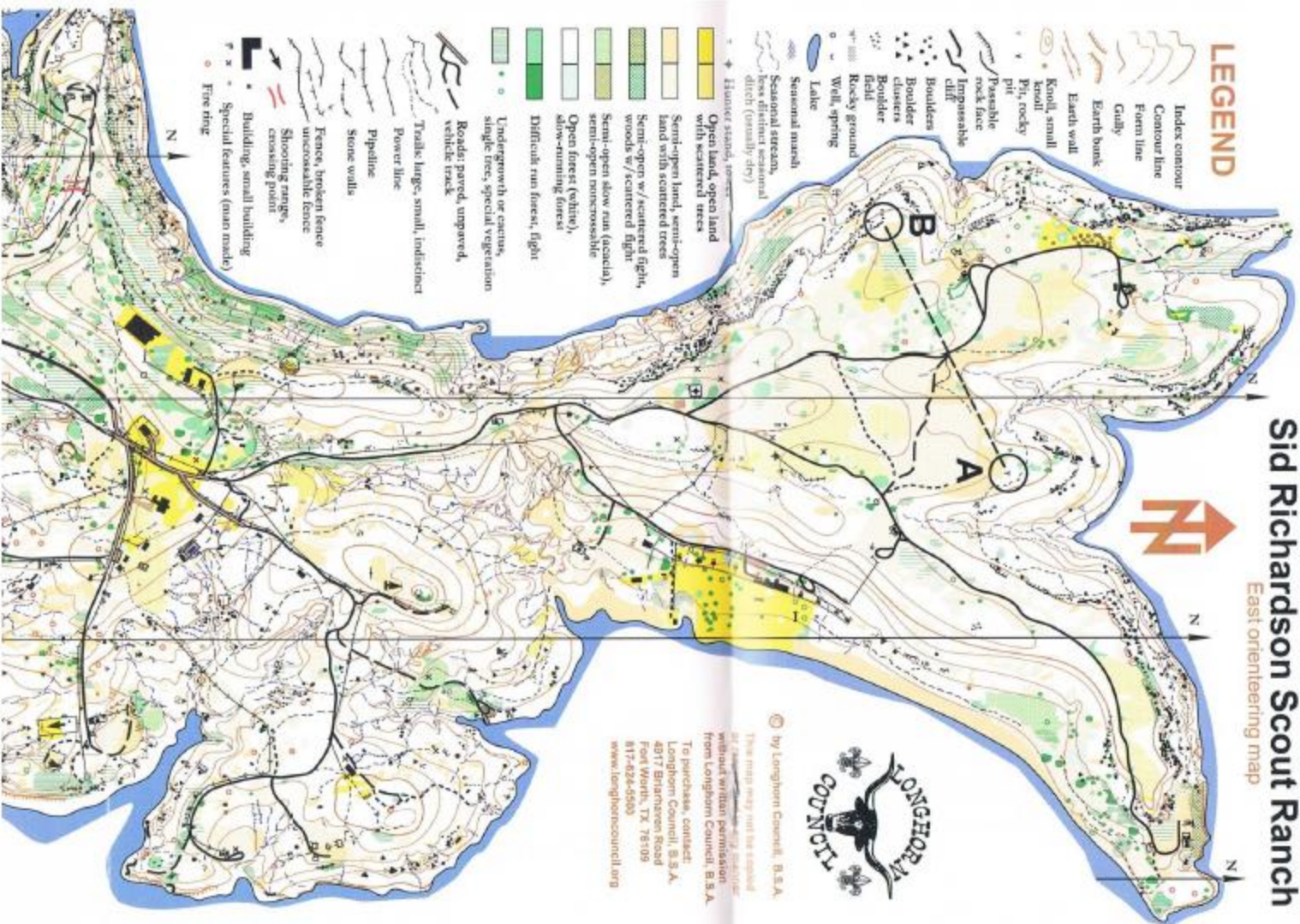
Sid Richardson Scout Ranch

East orienteering map

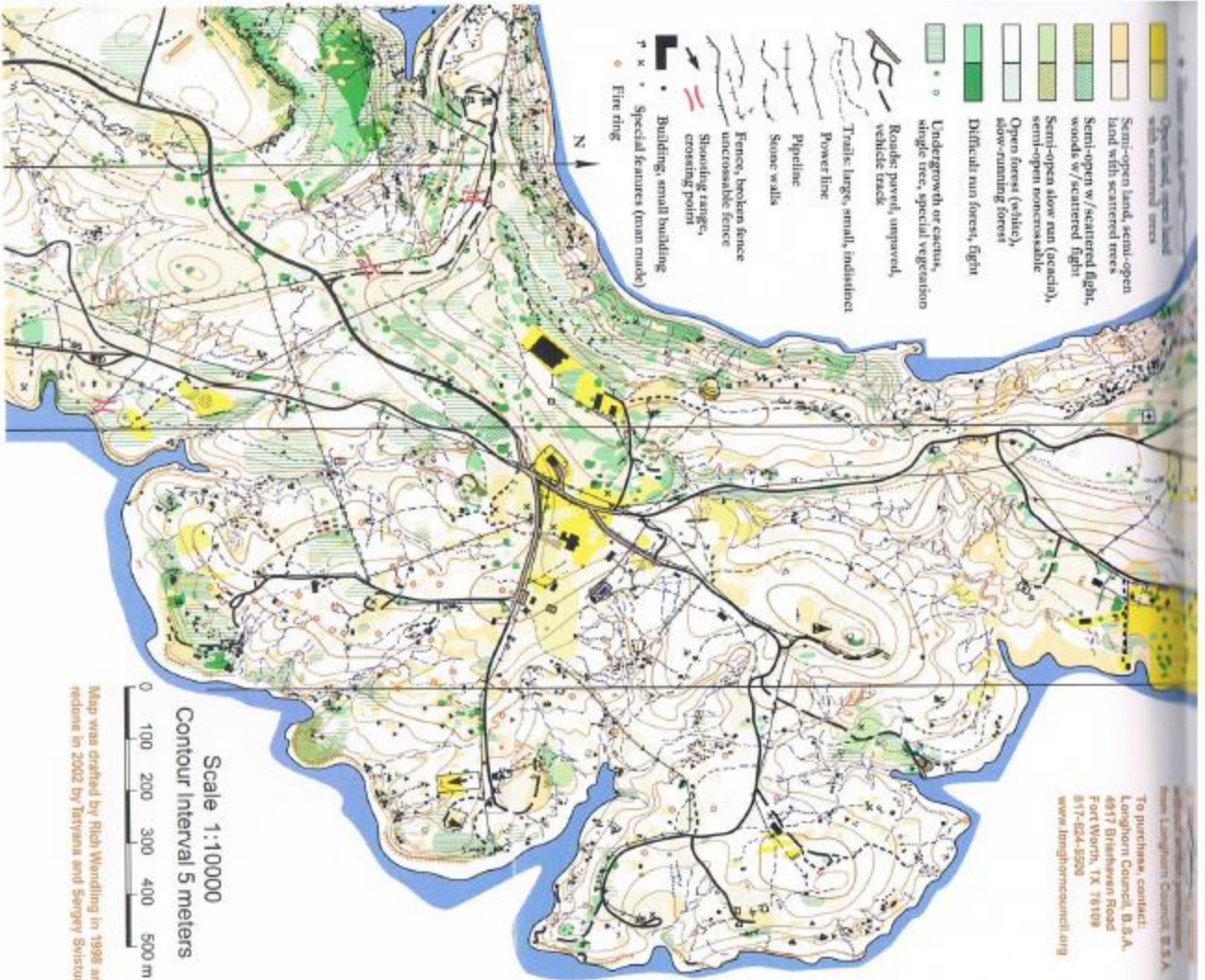


LEGEND

- Index contour
- Contour line
- Form line
- Gully
- Earth bank
- Earth wall
- Knoll, small
- Knoll
- Pit, rocky
- Pit
- Passable rock face
- Impassible cliff
- Boulders
- Boulder clusters
- Boulder field
- Rocky ground
- Well, spring
- Lake
- Seasonal marsh
- Seasonal stream, less distinct seasonal ditch (usually dry)
- Shallow stand, stream
- Open land, open land with scattered trees
- Semi-open land, semi-open land with scattered trees
- Semi-open w/ scattered trees, woods w/ scattered light
- Semi-open slow run (acacia), semi-open noncrossable
- Open forest (yukon), slow-running forest
- Difficult run forest, light
- Undergrowth or canopy, single tree, special vegetation
- Roads: paved, unpaved, vehicle track
- Trails: large, small, indistinct
- Power line
- Pipeline
- Stone walls
- Fence, broken fence
- Uncrossable fence
- Shooting ranges, crossing point
- Building, small building
- Special features (man made)
- Fire ring



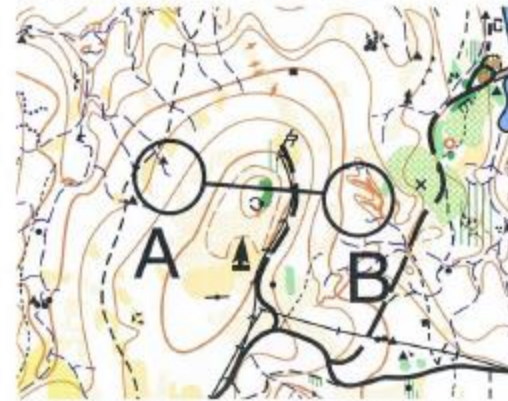
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and refer to it often. Make sure that what you are seeing on the ground matches what the map tells you should be there. If you find this is not the case, then either you are reading the map wrong or you have strayed from your intended course.

Contouring

Sometimes, the direct up-and-over or down-and-up route between controls is not the best. Take a few seconds to calculate the elevation where you are standing and the elevation at the next control. Are they roughly the same? If they are, it may be best to follow a route that stays at the same elevation. That route is plainly marked on the map—the contour line!



In this example, a person who is contouring would follow a route that is level or downhill. The direct route would mean a climb of 10 to 15 meters (33 to 50 feet). Although the distance to contour is greater, the effort expended is less.

You should consider contouring even if there is quite a difference in the length of the straight-line route versus the contour-line route. The route may look faster as the crow flies, but that may be deceptive.

Following the contour line is called *contouring*, and it is often the most efficient path of travel between two points in rough terrain.

Relocation

Contouring is also useful for avoiding obstacles. Trail builders do this all the time. If they did not, nobody would want to go hiking!

When a person is lost or potentially lost, whether on a road in a city, deep in a complex cave, in the wilderness, or on an orienteering course, *the best thing to do is stop*. The worst thing to do is to keep moving, because the problem will not correct itself; it will get worse. And time lost in correcting the problem will skyrocket.

If you don't know where you are, stop and relocate. Find a definite feature that you can correctly locate. This should be relatively easy to do if you took the time before the start to compare the map with the terrain and make a mental note of *relocation features* such as lakes and ponds, where two streams intersect, or perhaps a bridge where a stream goes under a road. Almost anything will work, but it must be prominent enough so that you do not confuse it with other features. If you mix up relocation sites, you will really be lost and might have to retrace part of the route to find a recognizable point.

In this example, the control location is the lower end of an intermittent stream shown by the circle. When you arrive at where you think it should be, you can't find the control bag. You could be at any of the stream ends marked by the small X's. Which way should you go? The large impassable cliff or the long earthbank shown by the arrows would be impossible to miss. To pinpoint your location, go west along the shoreline until you encounter one of these. Moving to a known position is always a better choice than aimless searching.



Rough Versus Fine Orienteering

The search for the next control point in an orienteering problem often can be divided into two distinct phases: the rough orienteering phase and the fine orienteering phase.

In the *rough phase*, you are moving in broadly defined directions toward a collection point found on the map. This is the time for covering a lot of ground quickly. You will not be in danger of missing the control during this phase because the control will not be close at hand yet.

Rough orienteering the whole way will cause a lot of aimless thrashing about, but fine orienteering all the way will waste valuable time. As orienteering involves a combination of speed and accuracy, so, too, does each leg of an orienteering course.

Once you reach the chosen collection point, it is time to switch to *fine orienteering*. Locate yourself precisely, and determine where you are in relation to the control. Form a plan that will accurately lead you to the control. This may involve using handrails, attack points, and compass bearings. Proceed to the control as quickly as possible, but remember that in this phase accuracy is the primary goal.

Route Choice

Orienteering allows competitors to choose their route around the course, introducing an element of skill that complements physical fitness. When confronted with many possible routes, you should consider the following:

- Terrain barriers or obstacles, vegetation
- Off-limit areas
- Artificial features and the presence of landmarks, handrails, collecting features, catching features, and attack points
- Your level of physical fitness
- The adequacy of your clothing for certain routes

Orienteers in complex terrain are always checking behind them as they go forward. This gives them the option of relocating to familiar terrain.

Moving through thick vegetation may take up to 10 times as long as moving along an open trail.

As the courses progress from the (novice) white level to the advanced beginner yellow, intermediate orange, and advanced brown, green, red, and blue courses, better route-finding skills become desirable, and then essential. The most advanced courses may have many options for reaching the control but only one or two really good ones.

Vegetation

FIGHT! This word is the orienteer's expression for vegetation that is nearly impenetrable. If you see fight on a map, or its color equivalent—dark green—you are in for "vegetable combat" if you try to go through it. It probably is chock-full with

undergrowth and deadfall. Unless the proposed route is marked runnable or is light green or, even better, white on the map, you should consider another route. A 1,000-meter detour might leave you fresh and smiling at the control and relieved that you did not take the 100-meter shortcut that left another orienteer scratched and haggard. He has been in a fight, while you were just having fun!

Elevation

No matter how sweet a route looks otherwise, if a hill sits between you and the control, it will slow your time. How much? That depends on the steepness of the hill, but a good rule of thumb is that 15 meters of climb is equal to running about 100 meters on flat ground. So a 45-meter hill will be equivalent to running

300 meters. If you can contour around the hill in less than 300 meters, then go around rather than over. Sometimes the next



control is situated at a higher elevation than the last. In this case you have no option but to go up.

Once you master the basic map reading and compass skills, the winning edge often will come down to route choice. And this skill depends a lot on experience.

Steps in Choosing a Route

Route choice will be simplified if each time you set out for a control you:

1. Note the exact location of the control on the map and read its description from the description sheet.
2. Choose an attack point (if the control is not placed in an obvious position) very close to a feature that you can easily recognize—a bridge, a trail junction, power lines over a path, a corner of a forest.
3. Look at the direct route from your present position to the attack point. See whether it will be easy to follow on a compass bearing.
4. Look to the left and right of the direct route and see whether there is an easier and quicker route. An indirect route may require less hill climbing and pushing through dense woods.
5. Take the fastest route to the attack point.
6. Run as fast as possible to the attack point, using collecting features to find the way.
7. Take an accurate compass bearing (if necessary) from the attack point to the control.
8. Measure the exact distance on the map from the attack point to the control.
9. Walk or jog accurately on a compass bearing, counting the paces until you find the control.



Route Choice Examples

Study the four points on the route choice illustration. The obvious route from the start triangle to point No. 1 is along the road. Course setters often will make the first control easy so competitors can get used to the map.

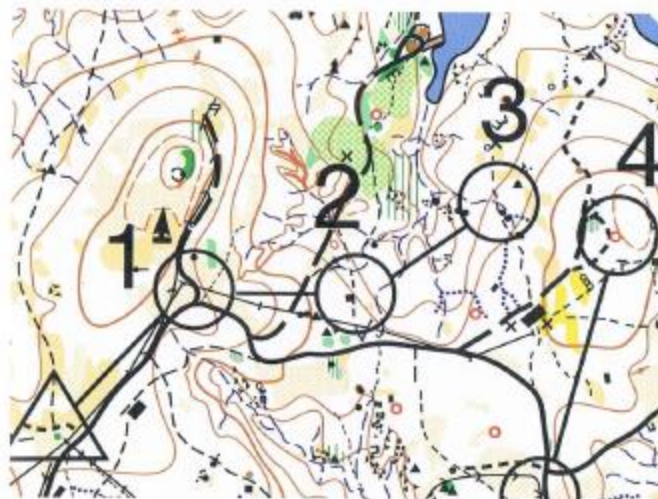
You have a choice to make from No. 1 to No. 2. The easiest route goes along the main road and then north at the trail to the building. A more direct route is along the power line and across the secondary road to the boulders, where you can take a bearing directly to the building. It is shorter, but vegetation may slow your progress.

It is a difficult choice from No. 2 to No. 3. The easy but long way is south on the trail, east on the road, northeast on the secondary road, and then north along the trail. You will

always know exactly where you are on the map. While the direct route uses a bearing and is much shorter, you must cross two streambeds and vegetation.

From No. 3 to No. 4 the choice is easier. A direct course is probably faster, as the woods are open (white color—runnable) and the road you will cross is a great collecting feature that you can't miss. In addition, the feature is near the top of a hill, making it easy to find. Going south on the trail and then northeast on the road is easy travel but twice as far.

Examine the rest of the sample yellow course in the "Competitive Orienteering" section. Decide which route you would take between the remaining points. There usually is not one correct answer; nevertheless, route choice is *the* key to successful orienteering.





Setting Up a Competition

When you take a turn at setting up an orienteering course and competition, you will see the sport in a different light. As a competitor your main goal on race day is to decipher the course and move around it as quickly and accurately as possible. As an organizer, you must begin thinking about the race weeks in advance. *When? Where? How?* and *Who?* are all questions you will have to address in setting up a competition.

When are you going to put on the competition? Maybe during camp or at a jamboree, on a summer evening, or on a weekend. You will have to choose a date and time, and let prospective participants know about it.

The *where* of the course will be a site that is both challenging and safe, and a site for which a map is available. Consider city parks and state parks, as well as areas controlled by the BSA. National forest areas also might be a possibility.

How will the competition be conducted? Will it be a cross-country or a score event? How difficult will the competition be? How long will the course be? Will the start and finish be at the same place? Will winners receive awards? What sort of refreshments will you provide for finishers?

Who will compete? Will it be for your patrol only, or will you invite the entire troop? Maybe it will be a team event where patrols compete against one another.

These are just some of the details that need to be worked out in setting up an orienteering competition. To plan the best event possible, a team of Scouts and leaders working closely together probably will be needed. Maybe your patrol could put on the competition for another patrol and then the other patrol could set up a competition for yours. This way, each group experiences the thrill of competing but also comes to understand orienteering in a much deeper way.

Be sure that you always get permission beforehand from the landowner, whether that be a private individual or government agency.

First-Aid Equipment

A comprehensive first-aid kit should be available at the start and finish—two kits if these areas are separated. A patrol or troop first-aid kit will treat a range of injuries. The most common types of injuries will be foot injuries, strains and sprains, and cuts and bruises.

Blister treatments, ice and support bandages, and other bandages and dressing should be available. Additionally, each participant may carry a personal first-aid kit for those small injuries that might occur away from the start and finish areas. (See also the chapter "Orienteering First Aid.")



Equipment

For a good orienteering competition, the following equipment and materials are necessary:

- Competitors' maps for each competitor
- Control cards, one per competitor
- Two recorder's sheets
- Control description sheets, one for each competitor
- Two time clocks
- Start sign
- Finish sign
- Rope with pegs to make a finishing tunnel
- Results board
- One control marker or punch per control point
- Extra compasses
- Whistle, for starting
- First-aid kit
- Colored tape or ribbon for marking administrative lanes, and routes from the start to the master map and from the last control point to the finish

If the course maps are not preprinted, you will need to mount three to five master maps on card tables so that each competitor can copy the course to a blank map.

Safety

Safety is the No. 1 concern for all orienteering competitions. Strive to prevent injury by stressing that competitors must make wise decisions. At least one member of the team putting on the competition should be trained in first aid. A plan should be in place in the event of a serious injury, including how to contact medical personnel and facilities. All competitors should be briefed on safety procedures. When appropriate, they should write this information on their maps.

The *First Aid* merit badge pamphlet and the *Boy Scout Handbook* cover basic first aid for a variety of situations. Portions of those books have been condensed in the "Orienteering First Aid" chapter.



Safety Lane

A well-laid-out course should have a *safety lane* where competitors may go if hurt, too tired to finish, or lost. Usually the safety lane is on the boundary of the course. It could be a major feature like a fence, power line, clear-cut, or road that bisects the area. All a competitor needs to do is set a standard bearing on the compass and follow it until he reaches the lane. After the competition, if some competitors have not returned, the officials drive along the boundaries of the course to pick up orienteers who have retreated to the safety lane.

On the Sid Richardson Scout Ranch map, the main road running the length of the ranch is used as the safety lane. On the sample yellow course in the "Competitive Orienteering" section, the safety lane is located west to the main camp road.

Final Return Time

All orienteering events must have a final return time. Competitors must return to the finish by then, regardless of whether they have completed the course. Failure to do so will result in a search being mounted. Competitors should have a watch and a signaling device as part of their basic emergency gear.

Location

The framework of all orienteering courses is the competition site and its map. Each must be considered before any detailed planning of an orienteering event is possible.

Area With an Existing Map

Even more than the compass, the map is the foundation of orienteering. Without it, there is no course. There are two options: Find an area that has an existing map, or make a map of the area yourself.

The first option is easiest. You may be surprised to discover the number of areas that have been mapped. Probably the maps most available to the general public are the USGS 7.5-minute quadrangle topographic maps, which have a scale of 1:24,000, where 1 inch on the map equals 2,000 feet on the ground. The topographic features of these maps may not be found on other maps. These are available through local suppliers or from the USGS itself. Other government agencies such as the Forest Service, National Park Service, the Bureau of Land Management, state geological surveys, state park and recreation agencies, and county and city parks departments will have maps of varying usefulness. Private property will be the least likely to have been mapped, unless a government agency did it.



From World War II through the late 1980s, the USGS made more than 57,000 7.5-minute maps covering the 48 mainland states. Today, the USGS produces more than 80,000 maps. These include the 7.5-minute series and topographic maps at smaller scales, maps of U.S. possessions and territories and of Antarctica, special maps of national parks and monuments, and geologic and hydrologic maps.

Because of the increasing popularity of the sport of orienteering, more and more maps designed specifically for orienteering are available, such as the centerfold map of Sid Richardson Scout Ranch. Such maps are often large-scale maps, typically 1:15,000 or even 1:10,000, and have legends

and colors especially relating to orienteering. If you plan to run a competition in an urban area, it would be worthwhile to ask local orienteering groups whether maps are available of the area you intend to use.

Lastly, some cartography companies will create maps to your specifications.

Area Without an Existing Map

Creating your own map sounds like a lot of hard work, but actually, it is not that hard, and it can be a lot of fun, too. Before you start the mapping process, you should have a pretty good idea of how long the course will be, the direction of travel, the locations of the controls, and the relationship of the finish to the start.

The easiest low-tech way to create a course map is to take an existing map, such as a USGS topographic map, and add more detail to it. This detail could include IOF symbols, IOF terminology, orienteering vegetation colors, and magnetic north lines. You can even change the scale of the old map to one that conforms better with IOF standards. You can make the changes right on the old map.

Most orienteering maps are made with a computer program called OCAD. You can download a demonstration version online. It is fully operational but limited in capacity. This is the standard for today's orienteering maps.

Another way of converting a USGS topographic map is to lay tracing paper or clear plastic over the old map, tracing what you want from the old map and adding detail specific to orienteering.

Aerial photos and satellite photos are available for free on the Internet, such as the USGS Web site. Be sure to get your parent's permission before downloading anything from the Internet.

It is always wise to field-check anything included on your new map—riverbeds change, structures collapse, roads come and go, homes are built, ponds are constructed, swamps are drained, etc.

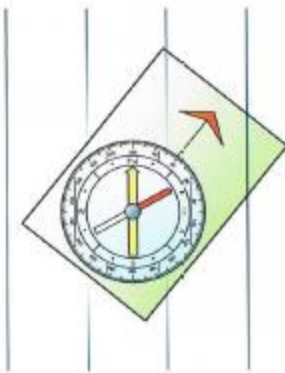
Creating a map from scratch requires a little preliminary scouting of the area. Take a half-day to thoroughly familiarize yourself with things such as the terrain, vegetation, natural and artificial features, hazards, and potential control sites. Take a small notebook along to record information about the site that you want to remember as you make your map. Understand the general lay of the land. This will begin to give you ideas about how and where you can lay out the course.

Take a few minutes after your reconnaissance (inspection) of the area to plot a rough course in your notebook. You will modify and fine-tune this working model of your course when you return to map the area. Unless you plan your course, you will waste time mapping areas that the course does not use.

This little bit of planning allows you to show up at the start point, ready to map. Take a blank sheet of paper on a clipboard, several sharpened pencils (working in pencil allows easy changes), a ruler, and an orienteering compass. Use the ruler to help you draw parallel lines on the paper to represent magnetic north lines, in effect making the sheet of paper speak the language of the compass. The top of each line points to magnetic north. Indicate this on the top of the paper.

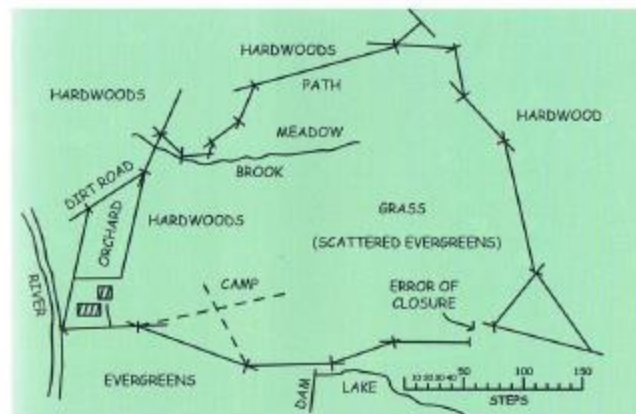
Two other questions remain to be answered before setting off: What will the scale of your map be, and where should you put the starting point on the blank sheet of paper? Because of your preliminary work, these questions should be relatively easy to answer. For instance, if the roughed-out course goes north, west, south, and then back east, it would be best to place the starting point on the paper in the lower right-hand (southeast) corner. This allows the course to remain on the paper. Mark an X on the paper to indicate the start.

The map's scale also will determine whether it will cover one or more sheets of paper. Generally, it is best to use only one sheet. A scale of 1:1,200 will allow a closed traverse of about 1,200 meters to fit onto a single sheet, while a scale of 1:2,400 will double the terrain that you can fit onto the page but will decrease the map's detail.



You are now ready to begin mapping.

1. Standing at the start (which you should mark so that you can return to it easily), take a compass bearing to the first point.
2. Plot this bearing onto the paper by placing the edge of the compass on the X and rotating the compass until the orienting arrow or the north-south lines of the compass are parallel to the magnetic north lines on the paper.
3. Using the edge of the compass, draw a line onto the paper. The point lies somewhere along this line. To determine where, walk to it as you count your paces. If you have practiced counting your paces, you will be able to figure how far the point is and place it accurately onto your line. Put a small X here. You will take the next bearing from this point.

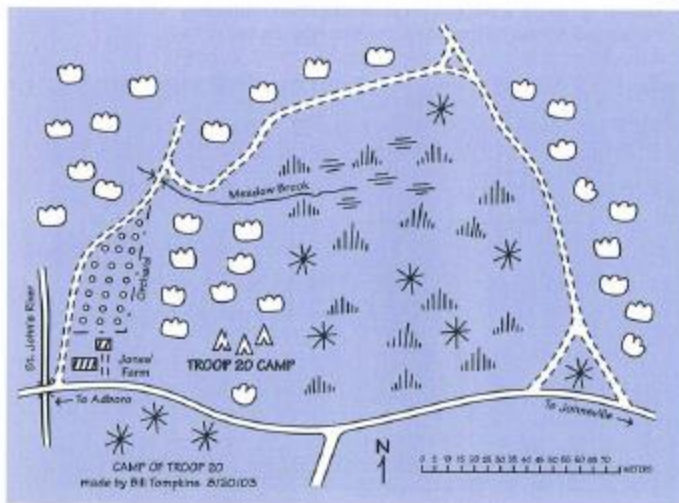


This process provides only a "stick figure" map. Add detail along the bearing lines by noting and sketching in natural and artificial features as you move along. You can reach a fair level of accuracy by pacing off distances and taking rough compass bearings. To locate a feature more precisely, take a bearing on it from two known points on the route. The feature is located at the intersection of the two bearings.

Walk around the intended course taking bearings and plotting them onto the map until you return either to the starting point or to a separate finish.

You now have a rough field map of the area. Tidy it up and add as much detail as you like. Particularly important are a scale relating distance to pace and a magnetic north arrow. You can add symbols for certain terrain features and color to show vegetation. Make sure you explain the symbols and colors in a map legend. Date your map, as features change with time. Give it a name, and put your name on it as mapmaker.

Once you have the area map in hand, whether it be a preexisting one or one you have made, make individual maps for each contestant and several master maps. The master map



You probably will not be able to place contour lines on your map. If the area you are mapping will be used extensively for orienteering, you could research and use computer software that allows you to create topographic maps.



The assembly area should be large enough to hold all competitors and officials at the same time.

will be available for all contestants to study but not carry with them. It will contain all the information you wish to give out. The individual maps do not need to contain everything that is on the master.

Competition Site

Besides the course, the location for your orienteering event will require a meeting place for contestants, officials, and spectators, and areas for checking pace, consulting the master map, and reporting to race officials for the send-off and finish. The finish should complement the other facilities without interfering with the competition.

ASSEMBLY AREA

The assembly area is a gathering place for the participants and race officials and also may be where first-aid stations are located. This area should include adequate parking, bicycle racks, changing rooms, and bathrooms. If changing rooms and bathrooms are not available at the site, the participants should be told of this before the race.

A competition often will include having the competitors copy the needed information from the master onto their individual maps before starting out.

It is a good idea to locate the master map area out of sight of the start.

A distance of 100 to 150 meters from the start will prevent orienteers from tracking one another.

Shelters can help keep participants and spectators comfortable during inclement or hot weather. These may exist on-site, or you may erect temporary ones. Orienteers gather here to register and receive instructions, maps, control description sheets, control cards, starting times, and numbers or numbered bibs. This is also where competitors study their maps and fill out control cards before moving on to the start.

PACE COURSE

Many beginners may not know their pace, and other competitors may want to check their pace. Set up a pace course over varied terrain for at least 100 meters. A course of 200 to 300 meters is even better. Mark the course with tape and have large signs at 100-meter intervals. Encourage competitors to figure a pace for both walking and running. The pace course is a good place to combine a pace check with warming up.

If there are enough helpers, have one stand at each sign and help young competitors figure out their pace. Even a single helper standing at the beginning of the course can answer enough questions to get first-timers going.

THE START

A recorder and timer's table will be located at the start. After registering, orienteers report to this area and are checked in by the recorder and then released at the proper time by the timer. Intervals between competitors will vary from race to race, depending on the number of participants, the length of the course, and the need to keep the contestants separated.

MASTER MAP AREA

Depending on the rules of the course, competitors will visit the master map area before the competition starts or after each contestant has been released by the timer. If it is before, it is best to have several master maps available (three to five) so that a bottleneck of people waiting to get the information from the map does not develop. If competitors are to visit the map after the start, it is best to space them far enough apart so that

only one person will be at the map at a time. Only one or two maps will be needed in this situation.

FINISH

The finish can be at the same place as the start, slightly removed, or in an entirely different place. Different locations usually occur in linear courses rather than in circuit courses. However, just because the course is a circuit does not necessarily mean that contestants will come back to the exact point where they began. It is sometimes better to separate the finish and the start by a short distance to ease congestion and confusion.

When an orienteer reaches the finish, the timer records his finish time on his control card. The timer then passes the card to the recorder, who grades and records the result on the recorder's sheet. The orienteer's standing is determined and posted on the results board.

The orienteer can then take a few minutes to catch his breath, cool down, and get some refreshments. Have at least water available at the site, but juice or sports drinks and fruit, such as oranges and bananas, are welcome. If there is a possibility of inclement weather, it is a good idea to have a place, such as a large tent, where competitors can get out of the rain or wind.

Post approved solution maps for the best routes on the course at the finish. This is a good place for the competitors to compare and discuss how they did with one another. Orienteers can often learn as much from discussing what went right and what went wrong as from actually running the course. More experienced orienteers can be available here to answer questions.

Course Setting

The course setter or setting team must try to produce a course that will challenge but not discourage the competitors. Do not overestimate the ability of the competitors who will run the course. It is better to make a course too easy than too hard. A competitor may not return to the sport after an initial negative experience. Consider these things:

1. Determine the type of competition. This will help you figure the amount of area needed. Alternatively, design the course to fit the area you have available.

If the finish is at a different place from the start, you may have to duplicate start facilities there, including parking, bathroom, changing facilities, and a recorder and timer's table.

- Determine the amount of time available for the event. This will give you an idea of the number of control points the course will have.
- The type of terrain required depends mainly on the experience of the competitors. For most Scouting events, a nearby wooded park is good. Experienced orienteers will find rougher, more complex terrain—even wilderness—desirable.
- For beginners, the course should not be very complicated. Do not give them too many choices.
- Avoid dangerous areas such as swift streams, highway crossings, swamps, and utility facilities. When these areas are present, competitors must be well aware of their existence. You can inform competitors by noting these features prominently on the individual maps or by having a briefing before the competition.
- The course may cross private property only when permission has been obtained from the landowner. To use private property, you may have to provide landowners with liability waivers. Off-limit and private areas should be noted on all maps.

After a bit of preliminary thought and planning, it is time to set off on the actual course-setting. Begin by simply walking the whole area, taking note of the terrain, obstacles, vegetation, prominent land forms, roads, paths, and buildings. When you have a good overview of the area, begin setting the course.

Selecting the Controls

Pick out the “problem” controls (areas that present more of a challenge to the orienteer), for example, whether to go over or around a hill. Plot controls for these key sections on the map. This basic course skeleton along with start and finish locations, the length of the course, and the number of controls will allow you to figure the general shape of the course. It is almost like connecting the dots to get a full picture.

CONTROL DESCRIPTION SHEET

Once you have decided where the controls will be, make a control description sheet for the course. Each contestant will be given one of these sheets at the start of the contest.

Checking the Course

Rarely does the perfect course result from the first attempt. Because so many factors are considered as you set up a course, it is easy to overlook something. It might be best if several Scouts worked on the course together. Afterward, ask your counselors to check the course. This is called *vetting the course*.

Event Officials

At least three officials will be needed at both the start and the finish. They may be the same people for both if the start and finish are at the same location. Their titles and duties are as follows.

At the Start

The **course organizer** briefs orienteers in the assembly area, issues control cards and maps, and calls orienteers forward to start individually. The **recorder** writes the names and start times of every orienteer on the recorder’s sheet, checks each orienteer’s name and start number on the individual control cards, and issues last-minute instructions. The **timer** controls the master clock and releases the orienteers across the start line at their start time (usually 1 minute apart) to the master map area.

At the Finish

The **timer** records the finish time of each orienteer on his control card and passes the card to the recorder. The **recorder** writes each orienteer’s finish times on the recorder’s sheet and tallies final scores based on times and correctness of control points visited. The **course organizer** verifies the correctness of names, finish times, and final scores; posts positions of orienteers on the results board; and accounts for all orienteers at the end of the event.

Officiating is the third phase of orienteering besides setting up a course and running in a competition. Each activity will teach you different things about the sport. Participation in all three positions will be rewarding for the knowledge you will gain. There is always room for more officials and assistants, as those listed above are the minimum required to run a competition. *Volunteer!*

A **vetter** is an experienced orienteer who checks control placement, routes to the controls, control markers, accuracy of master maps, correctness of descriptive clues, start, finish, and anything else that might affect the result of the competition.

Here are a few basic rules for selecting controls:

1. Give careful thought to the actual placing of the control. Beginners will find it easier to locate controls on artificial features. Advanced orienteers will have the skills necessary to identify terrain features as the site of a control.
2. The control must be a definite point, not an area or a linear feature. Orienteering is concerned with precision, not "in the ballpark" direction finding. The fact that an orienteer moves from a definite point at the start and continues to do so throughout the course means his score can be accurately compared with every other competitor's.
3. The control must be a feature that is not only apparent on the ground, but also indicated on the course map. This allows both the course setter and the competitor to locate the control exactly. Avoid vague descriptions such as "an old tree west of the clearing." Courses for inexperienced orienteers should have controls at easy-to-find locations, such as stream junctions, bridges, hilltops, and path junctions.
4. An early leg of the course should not pass near a later control. This will keep competitors from seeing activity near a late control while in the early stages of the race and being able to make use of this knowledge later in their circuit.
5. There should be no sharp angles at the controls. This ensures that the natural exit from a control site is not the same as the entry route, preventing competitors from finding a control by the path of a departing runner. Watch out for unintended doglegs. The map may show no indication of sharp angles from one point to the next, but take a look at the actual ground. Natural features may channel contestants in directions unintended by the course setter, causing competitors to leave a control in full view of oncoming contestants and giving the next competitors an unfair advantage, or at least helping them if they are "lost."
6. The logical route between two controls should not encourage competitors to go over dangerous terrain or cross private property. You can place control points so as to encourage competitors to avoid such areas. The most important rule for course setting is *safety first and always*.

7. In events for experts, the controls should be located so that good orienteers receive due reward. One method of doing this is to place the control on the near side of a collecting feature by several hundred meters. This means that novice orienteers who are off-course will have to retrace their steps from the collecting feature, while good navigators will find the site on their first attempt and will not need the collecting feature.
8. In advanced courses competitors should have to make a route choice on every control. Orienteering allows contestants to travel the route pretty much as they choose, within the constraints of a few rules. This means that orienteers are combining physical skill with navigational skills. A course for beginners can emphasize physical skills because navigation over the ground will still be new. Courses for more advanced orienteers should reward navigation skills as well as physical ability. This can be accomplished by offering subtle route choices between relatively equivalent routes or between good routes and poor ones. The idea is to strive for skill in the decision-making process and not just luck.
9. Select controls so that a variety of problems can be solved on the course. Perhaps the placement of two controls could reward the skill of contouring. Another set might emphasize the use of handrails and attack points. Yet a third might be designed to test compass skills. The course will be more interesting if this is done, and it will teach the competitors more skills as well.
10. Since the spectators, families, and officials see little of the actual competition, it is a good idea to provide a finish where everyone can see a portion of the race. An open run-in of the last 200 meters or so works well. Having the crowd on hand to cheer on the competitors adds a dimension of excitement to the race.
11. Each control marker should be placed where it can be seen easily by someone who has arrived at the feature. Place it head-high and directly over the location given by the clue, visible from 25 meters but not 200 meters away.

Orienteering First Aid



Be prepared!

Before going out, spend a few minutes reviewing possible injuries and their treatment. Make safety your first priority!

Orienteering is a physically demanding activity that takes place over several kilometers of very mixed and often rugged terrain. Hot weather may result in sunburn, heatstroke, heat exhaustion, and dehydration, while cold weather can lead to hypothermia and dehydration. In the hurry to be first, you might stumble onto dangerous animals or poisonous plants.

Physical Conditioning

The best thing you can do to prevent injury is to be well-rested, well-fed, and physically fit before going out on an orienteering course. A normal night's sleep and healthy meals will help you endure the rigors of the course and decrease the possibility of a physical or mental slip that could result in injury. Regular exercise such as hiking, running, bicycling, skiing, and snowshoeing will raise your fitness levels so that any orienteering course is an exhilarating challenge, not a desperate struggle.

Heat-Related Problems

If you are not physically fit, you may be particularly vulnerable to heat.

Dehydration

Dehydration is caused by lack of water in the body. Your body must have water for digestion, respiration, brain activity, and regulation of body temperature. A person who gives off more water than consumed can become dehydrated—in hot or cold weather. Athletes can lose up to 14 pounds of fluid in a day. To keep up with this loss, drink 1 to 2 cups of liquid 15 to 20 minutes or so after starting the course and every 15 minutes while on the course. Do not wait to drink until you feel thirsty.

Heat Exhaustion

Heat exhaustion is one result of dehydration. The body becomes overheated because its cooling methods fail. Watch for these signs: elevated body temperature (between 98.6 and 102 degrees); skin pale and clammy—even cool to the touch; heavy sweating; nausea, dizziness, and fainting; pronounced weakness and tiredness; headache; muscle cramps. To treat heat exhaustion, have the victim lie down in a shady, cool spot with the feet raised. Loosen the clothing. Apply cool, damp cloths to the skin or use a fan. Have the victim sip water.

Heatstroke

Heatstroke (sunstroke) is far more serious but less common than heat exhaustion. It is life-threatening because the body's heat control system has been overworked and overwhelmed, resulting in its failure and a skyrocketing body temperature. Watch for these signs: body temperature above 102 degrees (often above 105 degrees); red, hot, and dry skin; no sweating; extremely rapid pulse; confusion or disorientation; fainting or unconsciousness; convulsions. The victim must be cooled immediately. Place the victim in a cool, shaded spot face-up with head and shoulders raised. Remove outer clothing, sponge the bare skin with cold water, and soak underclothing with cool water. Apply cold packs, use a fan, or place the victim in a tub of cold water. Dry the skin after the body temperature drops to 101 degrees. Obtain medical help immediately.

Sunburn

Sunburn is a common but potentially serious result of exposure to sun. Long-term exposure can result in skin damage and skin cancer. The physical effort of orienteering can lure a person into removing clothing to help keep cool, exposing skin to the sun. You can prevent sunburn best by wearing loose-fitting clothing that completely covers the arms and legs and a broad-brimmed hat to shade the neck and face. Apply sunscreen with a sun protection factor (SPF) of at least 15 to exposed skin. Reapply sunscreen often and as needed.

When applying sunscreen, don't forget your ears and the back of your neck.

Before heading out, warm up and loosen your muscles by stretching, particularly the thigh and calf muscles and lower-leg tendons.



Cold-Related Problems—Hypothermia

Hypo means “a lack of”; *thermia* means “heat.” Hypothermia occurs when the body’s core temperature drops so low that it is no longer possible to keep warm. Hypothermia can happen in relatively mild weather, and the victim may not be aware that there is a problem. Cool, windy, and rainy weather are particularly dangerous. The key to preventing hypothermia is to keep warm and stay dry, and eat plenty of energy foods (nuts, dried fruits, peanut butter). Don’t push yourself to a dangerous point of fatigue.

A person in the early stages of hypothermia may be shivering. As the victim becomes even colder, the shivering will stop. Other symptoms may include irritability, disorientation, sleepiness, incoherence, and the inability to think clearly or make rational decisions. In growing confusion, the victim might have no idea that there is any danger and may aggressively reject suggestions to stop and get warm. Rewarm the victim and prevent further heat loss by moving the victim to a shelter, removing damp clothing, and warming the person with blankets until body temperature returns to normal. Cover the head with a warm hat or other covering, and offer hot drinks.

If the condition progresses, you must actively warm the victim’s body. Place the victim into a sleeping bag with one or two other people. All should be stripped of clothing so that skin-to-skin contact can hasten the warming—and perhaps save a life. Severe hypothermia requires immediate medical attention.

If you suspect hypothermia because someone is acting strangely, challenge the orienteer to walk a 30-foot line scratched on the ground. If an orienteer can walk heel-to-toe for the length of the line without difficulty, hypothermia is still not a problem. However, unsteadiness, loss of balance, or other signs of disorientation require quick action to see that the orienteer gets warm and dry.

Cuts, Scratches, Puncture Wounds, and Blisters

Running through brush, trees, swampy areas, and uneven terrain on orienteering courses can easily lead to minor injuries. These types of injuries can easily be prevented by dressing appropriately for the activity (jeans, shoes, socks, long sleeves).

Cuts, abrasions, and scratches usually require little attention other than to clean them with soap and water and disinfectant. Leave them to heal in the air, or cover them lightly with a dry, sterile dressing. Unless a cut is serious, bleeding probably will stop on its own or with slight pressure on the wound. Clean and disinfect the wound, then cover with a sterile dressing or bandage.

Always consider blood to be a potential source of infection; never touch someone else’s blood with bare skin. Always use a protective barrier such as disposable gloves, and wash thoroughly afterward with soap and water.

More severe wounds may not stop bleeding readily. Apply direct and firm pressure to such wounds with a sterile dressing or compress. It may help to raise the injured limb (if no bones are broken) above heart-level. Apply pressure to the local artery. If the bleeding is prolonged, treat for shock and seek medical attention immediately.

Puncture wounds, caused by something piercing the skin, often do not bleed very much and are difficult to clean. Encourage bleeding to help remove anything that might have been forced inside the wound. Use sterile tweezers or a sterile needle to pull out any foreign matter that you can see. Clean the wound as thoroughly as possible with soap and water, rinse well with clear water, and apply disinfectant. Allow the wound to air dry, then cover it with a clean, dry bandage.

Tetanus is a very real danger with puncture wounds. Be sure that the injured person sees a physician as soon as possible for a tetanus shot if necessary.

Take precautions to help prevent blisters by using the proper footwear.

Blisters on the feet are common injuries among outdoors enthusiasts, and they can certainly make life miserable. A "hot spot" is a warning that a blister is forming. It is a pinkish area caused by the rubbing of a shoe or boot.

Stop as soon as you notice the discomfort of a hot spot, and treat the area. Cut several pieces of moleskin (every orienteering first-aid kit should have this item) slightly larger than the hot spot. Cut out the center of each piece of moleskin so that it is like a small doughnut, and stack the pieces over the sore area with the holes arranged directly over the most painful part. Tape the stack in place. This will help keep pressure off the hot spot and, with luck, no blister will appear. If a blister does appear, apply a gel pad from the first-aid kit directly over the blister before adding the doughnut bandage. This will help reduce friction and speed healing.



Stings and Bites

Orienteering requires you to be aware of your surroundings and take precautions so that you can stay safe and comfortable. No matter how much insect repellent you apply, stings and bites from insects will happen. The best prevention is to pay attention where you walk, run, and step, and don't place your hands, feet, or head into blind areas of vegetation, wood, or rock. Treat **ordinary insect stings** by scraping the stinger out with the blade of a knife. Don't try to squeeze it out; that will force more venom into the skin. Elevate the affected part, gently wash the area, and apply hydrocortisone cream if you have it.

A **wasp, hornet, or bee sting** can cause severe allergic reactions in some people. Those people should take a field treatment kit with them on all outings, and their companions should be familiar with its use. If a sting reaction on an arm or leg is particularly severe, isolate its effect by tying a constricting band between the sting and the heart. The band must be loose enough for a finger to slide under it. Cool the wound with water (or ice, if available). Monitor the victim's breathing and do rescue breathing if necessary. Seek medical help.

Fire ant stings can be extremely painful. You can spot fire ants by their distinctive loose mounds of dirt. When disturbed, these aggressive ants will swarm and attack as a group and sting repeatedly. Their stings form tiny blisters; take care not to break the blisters. Wash the injured area well with antiseptic or soap and water, then cover with a sterile bandage.

The **stings of the common scorpion** usually are not as dangerous as bee stings. The stings often cause severe, sharp pain, swelling, and discoloration, but generally cause no lasting ill effects. To relieve itching and pain from a common scorpion sting, apply ice packs or a cold compress if you have it. An over-the-counter antihistamine also can be given. If the victim has a history of allergic reactions to insect stings or shows signs of illness (persistent pain and swelling, numbness, breathing difficulties), and doesn't respond to the prescribed antidote, get medical help as soon as possible.

Rarely, an orienteer may encounter a **venomous spider or scorpion**. Of particular concern are the bites of the black widow spider (identified by a red hourglass on the underside of its abdomen) and the brown recluse spider (recognizable by the fiddle-shaped mark on its back). Less common are stings from the venomous scorpions found in the desert areas of Arizona, California, and New Mexico. A bite or a sting from one of these creatures should be treated in basically the same manner:

- Ice the bite.
- Have the person lie still and, if possible, keep the bite area lower than the heart.
- Tie a constricting band (loose enough to slip a finger between it and the skin) between the bite and the heart.



Bumblebee

If you have 0.5 percent hydrocortisone cream, apply it to help soothe insect stings and bites.

- Treat for shock, and watch for difficulty in breathing; give rescue breathing if required.
- Seek immediate medical attention.



Brown recluse spider

Always avoid direct contact with a tick because disease can be transmitted by finger contact.

Ticks feed on blood by embedding their head into the skin. They can carry diseases such as Lyme disease and Rocky Mountain spotted fever. Remove a tick as soon as it is discovered by grasping its head as close to the skin as possible with tweezers or gloved fingertips; gently tease the critter from the wound. Don't squeeze, twist, or jerk the tick; that could break off the mouth parts, which would remain in the skin. Wash the wound area carefully with soap and water or an alcohol swab, and apply antiseptic. After handling a tick, wash your hands thoroughly.



Tick



Black widow spider

Snakebite

If you are bitten by a snake, assume that it is poisonous unless it can be absolutely identified. The ability to recognize poisonous varieties allows a person to take evasive action when necessary and speeds proper treatment when a bite has occurred.

Two types of poisonous snakes are present in the United States. Pit vipers (rattlesnakes, copperheads, cottonmouths) have triangular-shaped heads with pits on each side in front of the eyes. Coral snakes have black snouts and bands of red and yellow separated by bands of black. Coral snakes inject a powerful venom that works on the nervous system of the victim; pit viper venom affects the circulatory system.

A pit viper bite is likely if there are puncture marks, pain and swelling (possibly severe), skin discoloration, nausea and vomiting, shallow breathing, blurred vision, and shock. A coral snakebite is marked by a slowing of physical and mental reactions, sleepiness, nausea, shortness of breath, convulsions, shock, and coma.

Treatment for either type of poisonous snakebite is best done under medical supervision. Obtain medical help for the victim as quickly as possible. While doing this it is important to limit the spread of the venom and to maintain vital signs. Keep the victim still and the wound below the level of the heart, and tie a broad constricting band an inch or more wide between the bite and the victim's heart (2 to 4 inches above the bite). Do not use constriction bands



Copperhead



Rattlesnake



Cottonmouth moccasin



Remember this ditty for safety around coral snakes: red and black—friendly jack; red and yellow—deadly fellow.

on fingers, toes, the head, the neck, or the trunk. Swelling may cause watchbands, rings, clothing, and shoes to restrict circulation. Remove these items in the area of the bite. Treat for shock. Do not apply ice or give alcohol, sedatives, or aspirin.

Poisonous and Pesky Plants

You can prevent most problems with poisonous plants by being able to identify them and by being careful. Poison ivy, poison oak, and poison sumac are the three most common troublemakers; learn how to identify these plants and avoid them.

If you have touched or even just brushed against one of these plants, immediately wash the skin thoroughly with soap and water to help prevent the rash from developing; the sap must be on your skin for 10 to 20 minutes before it causes problems. Further cleanse the area with rubbing alcohol. If a rash develops, apply hydrocortisone cream (0.5 percent strength) if you have it, to help relieve the itching. Scratching the affected area will cause the irritation to spread. Unless the rash becomes severe, further medical attention is not necessary.

Steer clear of the stinging nettle, a wild plant that grows in many parts of the United States. This dreadful plant might attract butterflies, but it stings like a bee. It can grow to more than 6 feet tall. Short spines cover the stem; its leaves are thin and egg-shaped with a tapered tip, and are covered on the underside with short hairs. Its flowers are light green. It is not poisonous (it's actually an herb), but touching the plant releases a very irritating chemical that causes extreme discomfort. If you come into contact with the stinging nettle (also called the bull nettle), do not scratch the affected area. You might get temporary relief by spreading a paste of baking soda mixed with water over the area, or apply vitamin A oil directly to the spot.

Oils from poison ivy, poison oak, and poison sumac can contaminate clothing. Immediately remove and isolate contaminated clothing, and launder as soon as you get home.



Orienteering Resources

Scouting Literature

Boy Scout Handbook; *Fieldbook*; *Deck of First Aid*; *Emergency First Aid* pocket guide; *Be Prepared First Aid Book*

Visit the Boy Scouts of America's official retail Web site (with your parent's permission) at <http://www.scoutstuff.org> for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books

Bagness, Martin. *Outward Bound Orienteering Handbook*. Lyon's Press, 1995.

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Bratt, Ian. *Orienteering: The Essential Guide to Equipment and Techniques*. Stackpole Books, 2002.

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Videocassettes

Braggins and Pearson. *Trail Orienteering*, 21 minutes. A&E Orienteering Inc., 1997.

Cassone, Chris. *Orienteering—All Welcome*, 12 minutes. A&E Orienteering Inc., 1998.

Finding Your Way in the Wild: An Easy, Step-by-Step Guide to Using a Map and Compass, 35 minutes. Available from <http://skimaps.altrec.com>.

Orienteering: The First Steps. Part One: Orienteering at School, 25 minutes. Scarborough Orienteering.

Orienteering: The First Steps. Part Two: First Events in the Woods, 25 minutes. Scarborough Orienteering.

Orienteering: Going for It. Part Three: From Light Green to Brown, 27 minutes. Scarborough Orienteering.

Orienteering: Going for It. Part Four: Reaching the Top, 27 minutes. Scarborough Orienteering.

Organizations and Web Sites

Canadian Orienteering Federation
Web site: <http://www.orienteeering.ca>

International Orienteering Federation
Web site: <http://www.orienteeering.org>

U.S. Geological Survey
12201 Sunrise Valley Drive
Reston, VA 20192
Telephone: 703-648-4000
Web site: <http://www.usgs.gov>

U.S. Orienteering Federation
P.O. Box 1444
Forest Park, GA 30298-1444
Web site: <http://www.us.orienteeering.org>

Equipment Sources

A&E Orienteering
P.O. Box 443
Baldwin City, KS 66006
Telephone: 785-594-3516
Web site: <http://www.aeorienteering.com>

Berman's Orienteering Supply
23 Fayette St.
Cambridge, MA 02139
Telephone: 617-868-7416

The Compass Store
ROC Gear
5210 Palmero Ct., Suite 104
Buford, GA 30518
Telephone: 678-318-3660
Web site:
<http://www.thecompassstore.com>

Orienteering Unlimited Inc.

3 Jan Ridge Road
Somers, NY 10589-3007
Telephone: 914-248-5957
Web site:
<http://www.orienteeeringunlimited.com>

Scarborough Orienteering

3015 Holyrood Drive
Oakland, CA 94611
Telephone: 510-530-3059
Web site: <http://orienteeer.com>

U.S. Geological Survey Topographic Maps

A local sporting goods store or bookstore may carry topographic maps of your area. You can also find local dealers in your state at the U.S. Geological Survey Web site, <http://www.usgs.gov>. Or send a postcard to the National Cartographic Information Center, 507 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192.

Ask for a free topographic map index circular of your state. The index circular is a small map of the state divided into sections called quadrangles. Each quadrangle is a separate map. Find out which quadrangles cover the area in which you want to orienteer. Order the map by giving the name of the quadrangle and include a money order or check for payment. Send your order to Branch Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225.

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Notes