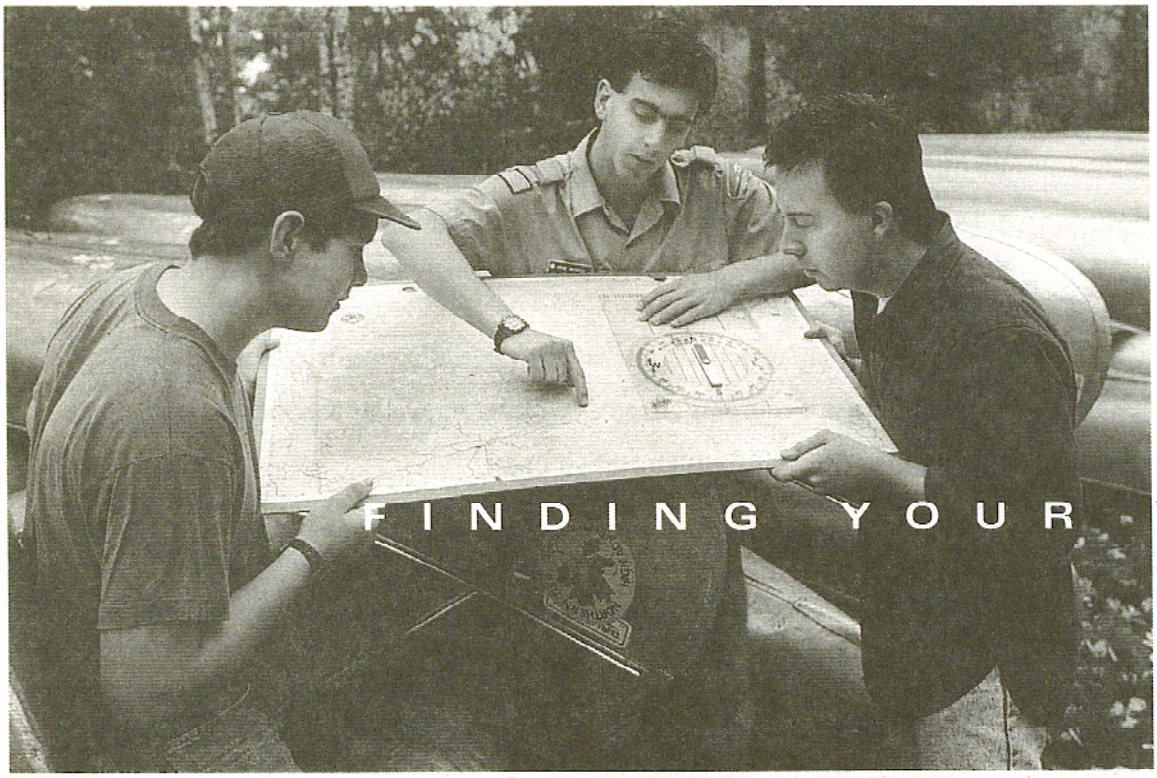

Skills Session: Finding Your Way—Map and Compass Reading

Time Frame

1 hour 30 minutes

Materials

- One topographic map for at least every two participants (All maps should be of the same area.)
- Instructor's compass plus one compass per participant
- Blank paper and pen, in lieu of a field chart (to describe map symbols and features, and parts and functions of the compass), one each per participant
- Cord, ideally a different color cord to represent a different radius of the angle of a bearing (to describe the concept of bearings as angles)

Resources

Boy Scout Handbook—chapter 4, "Second Class Scout"; chapter 5, "First Class Scout"

Goals

By the end of this session, participants will be able to

- Define what a map is, how it is used, and tell how maps can be obtained.
- Demonstrate how to read and interpret a map for descriptions, direction, distance, scale, and detail.
- Interpret a map effectively for safe travel in the country or backcountry.
- Read and use a compass effectively for safe travel in the backcountry.
- Find their way using a map and compass.

Assignments

- Demonstrate how a compass works and how to orient a map. Explain what map symbols mean. S1a
- Using a compass and a map together, take a five-mile hike (or 10 miles by bike) approved by your adult leader and your parent or guardian. (If you use a wheelchair or crutches, or it is difficult for you to get around, you may substitute "trip" for "hike.") S1b
- Demonstrate how to find directions during the day and at night without using a compass. F1
- Using a compass, complete an orienteering course that covers at least one mile and requires measuring the height and/or width of designated items (tree, tower, canyon, ditch, etc.). F2

Before You Begin

Map skills may be introduced to participants almost immediately, while traveling the first few days of the course. More defined classes are usually taught in conjunction with a "trailless" hike or mountain climb when skills can be applied immediately.

Before teaching compass reading, cover map reading and help participants develop their orienteering skills to create an understanding of how the map and compass are used in orienteering.

Lesson Plan: Finding Your Way—Map and Compass Reading

Hiking With Map and Compass

The map and compass are tools hikers use to help them stay on track and avoid getting lost as they reach their destination. The key to orienteering—using both tools together to reach a destination—is learning how to use the map and compass individually.

WHERE TO GET MAPS

Many sporting goods stores sell topographic maps of local recreation areas. The U.S. Geological Survey also makes useful topographic maps for hikers. For information about ordering maps, contact the U.S. Geological Survey, Distribution Branch, Box 25286, Federal Center, Denver, CO 80225; 800-HELP-MAP; Web site www.usgs.gov.

UNDERSTANDING HOW TO READ A MAP

MAP SYMBOLS. Reading a map requires an understanding of the symbols used in that map. Most maps have a template that shows symbols for elements such as railroads, bridges, lakes, boundaries, schools, and important buildings. Other factors include:

- **DIRECTIONS**—north (toward the top of most maps), south, east, west.
- **DISTANCES**—bar scales measure feet, meters, and miles on a map.
- **SCALE**—comparing the size of the elements on the map to the area it represents.
- **DATE**—check when your map was drawn or last redrawn; older maps may not show new buildings, roads, trails, or other changes on the land.
- **COLORS**—*green* (heavy vegetation); *white* (areas that are mostly clear of trees); *blue* (water); *black* (structures made by humans); and *brown* (contour lines and the shape of the land, such as the elevation of hills, valleys, mountains, and plains)

CONTOUR LINES. The contour lines on a map represent terrain—the elevation and steepness of the land.

UNDERSTANDING HOW A COMPASS WORKS

The compass operates with a magnetic needle that floats freely on a pivot that points toward *magnetic north* (an area in Canada more than a thousand miles away from the North Pole); *true-north* (as on maps) points toward the North Pole. The difference between true north and magnetic north, measured in degrees, is called *declination.*

The *Boy Scout Handbook* explains map symbols, contour lines, how a compass works, how to orient a map, and how to use the compass and map together in greater detail so that you can plan a hike appropriate for your troop.

Other Methods for Finding Your Way

There may be a time when you don't have a map or compass handy for finding your way. A number of methods can be used to help get you back on track, all of which the *Boy Scout Handbook* discusses in more detail.

USING THE STARS

For thousands of years, people have used stars and the constellations they form to help guide them in their travels on sea and land. Two methods—the **North Star method** (helps determine a true north-south line) and the **constellation method** (gives a sense of direction)—can still be used to find your way at night.

USING THE SUN

The sun can help you determine your direction if you take into account factors such the season and time of day. You can also utilize the **watch method** (your watch must be set on standard time), **shadow-stick method** (helps determine compass direction), and **equal-length shadow method** (another method for determining compass direction).

USING THE MOON

Since the moon comes up in the east and goes down in the west, as does the sun, the shadow-stick method will work just as well on nights when the moon is bright enough to cast a shadow.

Activities

1. Map and compass skills can be developed early on along the trail and during breaks to establish the location of north, the general direction of travel along the trail. Arouse interest by calling attention to prominent topographic features and then locating these on the map. Introducing map terminology helps make participants more aware of their natural surroundings.
2. Combine lecture and discussion during formal map classes. Focus on a general overview of all map features and their identification on sample maps. As a skills practice, instructors have participants conduct a theoretical journey across a map and describe the identifiable map features, obstacles, or land forms that will be encountered along the way. To help build awareness of map scale and a base of experience, ask them to predict upcoming terrain features along the trail and have them measure the distance traveled.
3. Help participants develop more advanced map skills by conducting a "trailless" hike where they must observe and look for terrain features in order to follow a trail on their maps. Treeless mountaintops make excellent class sites for understanding contouring, distance, and how terrain may have changed over time. Have participants orient their maps without the use of a compass—to identify prominent land features and show where they are located on the map.
4. Reinforce an understanding of contour lines by having participants use the method described in the *Boy Scout Handbook*—explaining the term and drawing lines on the knuckles of their hand. The handbook tells how to compare the contour lines drawn with those shown on a topographic map.
5. Compass training should combine lectures, demonstrations, and immediate opportunity for practice. Participants following instruction in the technique of establishing field and map bearings should immediately apply this knowledge in the surrounding environment by taking bearings on easily visible landmarks and matching the bearings to their maps.
6. Once participants have gained confidence in taking bearings, a short compass course or simple trailless hike will allow them to practice following a bearing in the field. Take special care to ensure that the compass course area is completely "safe" and "disoriented" participants cannot get lost. Participants should be teamed up so that route determination is a patrol effort, allowing mutual teaching, reinforcement, and confidence. Observe Leave No Trace rules to help preserve fragile ecosystems.