

# ORIENTEERING

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## Maps

A map is a symbolic picture of a place. It conveys a tremendous amount of information in a format that is easy to understand and easy to carry. No one should venture into the wilderness without a map of the area, or without the skills required to interpret and to understand it.

The most common and best maps for wilderness travelers are (USGS) topographic maps. They depict the shape of the earth's surface, by showing contour lines that represent constant elevations above and below sea level. The differences in the contours on each map may be different.

### Reading Topographic Maps:

- What do the colors mean?
  - Red: major roads
  - Blue: rivers, lakes, springs, waterfalls, and other water-related features
  - Black: minor roads, trails, railroads, buildings, bench marks, latitude and longitude lines, other features not part of the natural environment
  - Green: areas of heavy forest. Solid green marks a forested area, mottled green indicates scrub vegetation, and lack of green indicates that the vegetation is too scattered to show up on the map.
  - White: the color of the paper that the map is printed on.
    - White with blue contour lines: a glacier or permanent snowfield.
    - White with brown contour lines: any area without substantial forest, like a high alpine area (above tree-line), rock face, clear cut area, open meadow, etc
  - Brown: contour lines and elevations.
  - Purple: partial revisions of an existing map.
- Translating contour lines.
  - The heart of the topographic map is its overlay of contour lines with each line depicting elevation as it follows the shape of the landscape. A map's *contour interval* is the difference between two adjacent contour lines. The contour interval is clearly stated in the lower center area of most topographic maps. The contour intervals will be listed in feet. Every fifth contour line is printed darker than the other lines and is labeled with the elevation.
  - Topographic maps show whether travel is uphill or downhill. If your route of travel crosses lines of increasingly higher elevations, you will be going uphill. If it crosses lines of decreasing elevation, you will be going downhill. Flat or side hill travel is indicated by a route that crosses no lines, remaining within a single contour interval.

- Topographic Map Features (see picture of basic topographic features)
  - Flat Areas: no contour lines at all.
  - Gentle Slopes: widely spaced contour lines.
  - Steep Slopes: Closely spaced contour lines.
  - Cliffs: Contour lines are extremely close together or are touching.
  - Valleys, Ravines, Gullies, or Couloirs: Contour lines in a pattern of a “U” for gentle, rounded valleys; a pattern of a “V” for sharp valleys. The “U” or “V” patterns point uphill, in the direction of higher elevation.
  - Ridges or Spurs: Contour lines in a pattern U for gentle and V for sharp. The U and V patterns point downhill, in the direction of lower elevation.
  - Peaks or Summits: A concentric pattern of contour lines, with the summit being the innermost and highest ring. Peaks are most often indicated by an “X”, elevation, benchmark (BM), or a triangle symbol.
  - Cirques or Bowls: Patterns of contour lines forming a semi-circle (or three-quarters of a circle), rising from a low spot in the center to form a natural amphitheater at the head of a valley.
  - Saddles, Passes, or Cols: An hourglass shape, with higher contour lines on two sides, indicating a low point on a ridge.

## Compass

A compass is nothing more than a magnetized needle that responds to the earth's magnetic field (Burns & Burns, 1999). The compass can tell you what direction you are heading. See the compass diagram.

The following terms describe the basic features:

- Magnetic Needle – a freely rotating magnetic needle; one end is a different color than the other so you can tell which end is pointing north.
- Housing – a circular, rotating housing, for the needle; this is filled with fluid that reduces the vibrations of the needle, making readings more accurate.
  - Dial – the dial around the circumference of the housing is graduated clockwise from 0 to 360 degrees, in 2-degree increments.
- Orienting Arrow – this is located inside the housing and below the magnetic needle.
  - Orienting Lines – a set of lines parallel to the orienting arrow.
- Direction of Travel Arrow (line) – this arrow points toward your objective; read bearings here.
- Base Plate – a transparent, rectangular base plate is the foundation of the entire unit; can also be used as a ruler for measuring distances on a map.

Bearings:

A *bearing* is the direction from one place to another, measured in degrees of angle with respect to an accepted reference line (true north). The round dial of the compass is divided into 360 degrees. The direction in degrees to each of the cardinal directions (N/S/E/W) is: north, 0 degrees; east, 90 degrees; south, 180 degrees; and west 270 degrees. There are two basic uses for the compass:

1. *Taking (or measuring) bearings.* To take, or measure, a bearing means to measure the direction (not distance) from one point to another, either on a map or in the field.
2. *Plotting (or following) bearings.* To plot, or follow, a bearing means to set a certain bearing on the compass and then plot out, or follow, where that bearing points, on the map or in the field.

Bearings in the Field:

- To *take* (measure) a bearing in the field, hold the compass in front of you and point the direction of travel arrow at the object whose bearing you want to find. Then rotate the compass housing until the pointed end of the orienting arrow is aligned with the north-seeking (red) end of the magnetic needle (remember: “put the red to bed” or “put the dog in the house”). Read the bearing at the end of the direction of travel arrow. See the diagram on taking a compass bearing in the field.
- To *plot* (follow) a bearing in the field, simply reverse the process you use to take a bearing. Rotate the compass housing until you have set the desired bearing at the direction of travel arrow, say 270 degrees (west). Then hold the compass level in

front of you and turn your entire body until the north-seeking end of the magnetic needle is aligned with the pointed end of the orienting arrow (“red to bed; dog in house,” etc.) The direction of travel is now pointing in whatever direction you have set (in this case, 270 degrees or west). You then proceed in that direction.

#### Magnetic Declination:

A compass needle is attracted to *magnetic* north. Most maps are printed with true north – the direction of the geographic North Pole – at the top of the map. This difference between the direction to true north and the direction to magnetic north, measured in degrees, is called *magnetic declination*. You will find this information printed on the lower left area of most topographic maps. The declination will be listed in degrees either east or west of north.