

## **Minimum Clubwide Standards: Off-Trail Navigation Course**

### **Application**

This standard applies to club sponsored workshops, classes, clinics, seminars, field trips and any other event relating to teaching skills for the club-recognized Basic Navigation Badge, Wilderness Navigation Badge.

### **Target Audience**

Any Mountaineers member who wishes to understand the basics of on-trail navigation using information from a map and observations in the field combined with a compass, watch, altimeter and GPS. Mountaineers who have earned the badge will be well-prepared to confidently follow even remote backcountry trails.

### **Definitions**

Off-Trail Navigation refers to navigation performed off trail and includes navigating in an emergency or in poor conditions.

### **Participants**

There is no prerequisite for earning the badge.

Students attending a Field Trip must be in reasonable physical condition and capable of traveling off-trail, over challenging terrain and conditions. Students must appear for Field Trips with appropriate clothing and equipment.

### **Instructors**

Instructor qualifications are: active Mountaineer membership; possesses an active Basic Navigation Badge, Wilderness Navigation Badge; or permission of the Navigation Committee Chair or Sponsoring Committee.

The Instructor-to-Student ratio for the Workshop or Field Trip should be considered such that adequate instruction, guidance, support, and safety are incorporated into the program.

### **Courses**

Mountaineers Branch Committees may offer courses that award the Basic Navigation Badge. The Basic Navigation Badge, Wilderness Navigation Badge awarded by any Mountaineers Branch Committees shall be accepted by any Mountaineers branch or activity.

To qualify for the Basic Navigation Badge students will demonstrate the ability to:

- Identify items related to topographic maps
  - What is Declination and how does it relate to the difference between magnetic north and true north?
  - Datum
    - What is it?
    - Where is it on the map?

- Why is it important?
  - What do the colors on the students' maps mean? (black, blue, green, red, brown)
  - Identify the scale of the map and the distance scales
  - Recognize a combination of topographic, area, and human-made features:
    - What are the contour lines, contour interval, and what type of slope do they indicate? (steep, gentle, flat)
    - Identify a ridge, valley, hill/summit, pass, cliff
    - Identify a pass, saddle, or col
    - Identify a valley, gully/draw, or couloir
    - Identify contour trends (up/down) for ridges/spurs compared with valleys/gullies
    - Identify water features such as lakes, ponds, tarns, creeks, streams, and rivers
    - Identify vegetated vs less-vegetated areas
    - Identify several different types of roads, a railroad, power line, and trail
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- Identify the parts of a compass
  - Transparent baseplate
  - Rotating housing (bezel)
  - Magnetic needle
  - Adjustable declination arrow
  - Degree markings
  - Index and Direction of Travel line
  - Orienting lines
  - Straight edge and measurement markings
  - Declination adjustment scale
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- Demonstrate basic procedures for using a compass alone.
  - Define what a "bearing" is in the context of a 0 to 360 degree circle.
  - Follow a bearing: Given a bearing measurement toward some object, set the compass to the bearing, sight it, and identify the object to which it points.
  - Measure a bearing of an object in your environment and read the bearing from the compass.
  - While measuring and following bearings, demonstrate the basic techniques for boxing the needle, using the direction of travel arrow, turning the whole body, and sighting appropriately for the type of compass (mirrored or un-mirrored).
- Demonstrate how to use a compass with a paper map.
  - Given two points on a map, **measure a bearing** from one point to the other.
  - Given a specific feature on a map, and a bearing to that feature, **plot the bearing** on the map.
  - Given one or more of these elements, determine your line and point position on the map:
    - A bearing
    - A Universal Transverse Mercator (UTM) coordinate
    - An elevation

- A topographical feature

### UTM coordinates

Plot a UTM position on a map (by estimation and/or using a romer or scale).

Understand briefly how UTM relates to or differs from Latitude/Longitude

Understand GPS as a source of UTM coordinates and why we use UTM for precision locating on a map

- Plan a Route:
  - Given some information from a route description, plan a route.
  - Identify parts of the route on the map.
  - In planning the route, include techniques to keep you oriented -- handrails, aiming off, and backstop/catchline.
  - Plan a route through all or part of the field trip area.
  - Follow the route through the field trip area.
- Demonstrate Route-finding Awareness. Some suggested questions:
  1. Where are you?
  2. Where are you going?
  3. What route will you take to get there?
  4. How long will it take?
  5. What do you expect to see along the way?
- Relate items in the field to items on topographic maps:
  - Orient the map two ways, with a compass and with terrain association to identifiable features (field trip area dependent).
  - Relate map landmarks to actual landmarks.
  - Relate contour lines, slopes, and elevations to actual terrain.
  - Learn that some variations within a map's contour interval don't appear on the map.
  - Relate human-made features on the map with actual features.
  - Relate map distances with actual distances.
- Demonstrate the skills to use a compass in the field.
  - Measure bearings on several stationary targets until consistently within  $\pm 3$  degrees.
  - Follow a bearing accurately cross-country as part of a team, using leap-frog and back-bearing (reciprocal) techniques.
  - Follow a bearing accurately cross-country as a solo person using the landmark technique (for safety, a partner may be assigned to follow the same bearing)
  - While measuring bearings, demonstrate proper techniques for boxing the needle, using the direction of travel arrow, turning the whole body, and sighting appropriately for the type of compass (mirrored or un-mirrored).
  - While following a bearing, get around an obstacle using the 90 degree offset method and resume the line of travel on the other side.

- Determine your line and point position (Where am I?) using the map and one or more of these other elements obtained in the field. A terrain feature
  - An intersection
  - An elevation
  - A human-made feature
  - A bearing of an object and/or a fall line
  - A UTM coordinate
  
- Students shall accurately follow one or more bearings on at least one "long navigation problem" that requires traveling over terrain that presents difficulties in movement, such as limited sight distance, steep ground, brush and woods. The distance of a singular bearing exercise consisting of one launch point and one catch point shall be at least one-third mile (500 meters) exiting the problem within an acceptable range of error from their target bearing.

Alternatively, students follow a route using one launch point and one catch point with multiple waypoints in between, each leg requiring a different bearing to be measured by the student (not issued by an instructor), the aggregate distance shall total at least 500 meters,

### **Certification**

Certification in any branch's Off-Trail Navigation Course shall be accepted by any Mountaineers branch or activity that is primarily focused on off-trail travel. For this reason, adoption of common standards across branches is appropriate. Certification is valid for three years and may be renewed by one of the following:

- Retaking the course
- Instructing Off-Trail Navigation

### **Safety Considerations**

At least one of The Mountaineers leader or instructor must carry a communication device (Personal Locator Beacon, Satellite Messenger, Cell Phone) for contacting emergency responders. Each branch should consider their own safety protocols for their field trips, and incorporate these safety items as necessary. These are recommended, based on past experience.

- Use of whistles in case of needed immediate attention – lost navigator (panic)
- Use of two way radios for instructors manning the start/stop and boundary lines
- Flagging to identify out of bounds areas (handrails)
- Field trip leader or instructor as a designated safety manager
- At least one instructor with wilderness first aid certification

### **Equipment**

Minimum Compass Standard: Students must use a compass that includes:

1. ***Adjustable declination:*** A moveable orienting arrow. This is the marking on the bottom of the compass housing, usually represented as an outlined red arrow.

2. A **transparent base plate** with an **index line or direction of travel arrow** and a **straight edge** on at least one side.
3. A **capsule containing a magnetized needle** calibrated for North America (A global needle is acceptable).
4. A **rotating bezel** marked **clockwise from 0 to 360 degrees in increments of two degrees** or less. (Some compasses are numbered counterclockwise. Some are numbered in quadrants of 0-90 degrees per quad. Neither of these are suitable for earning the badge.) In general, bezels should be large to allow use while wearing gloves and the larger size also improves readability and accuracy.
5. **Meridian or orienting lines**: Parallel marks on the bottom of the interior of the circular housing, or imprinted on the bezel ring itself, which rotate with the bezel when it is turned. The meridian or orienting lines run parallel to the north-south axis of the bezel, however turned.
6. A **ruler and/or scale** inscribed on one of the straight edges, used for measuring distances on maps.
7. **An Orienting Arrow**. A marking on the bottom of the compass housing, usually represented as an outlined red arrow.

Recommended But Not Required Compass Features:

1. A built in inclinometer.
2. A mirror.
3. Glow in the dark luminescence for visibility in low light.
4. Magnifying lens on the transparent baseplate.
5. A measurement scale for plotting within USGS 1,000 meter grid squares (1:24,000).
6. Any additional measurement scales or rulers.
7. A lanyard.

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