

Minimum Clubwide Standards: Off-Trail Navigation Badge

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.

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.

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. Students must appear for Field Trips with appropriate clothing and equipment.

Instructors

Instructor qualifications are: active Mountaineer membership; possesses an active Off-Trail 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 Off-Trail Navigation Badge. Off-Trail Navigation Badges awarded by any Mountaineers Branch Committees shall be accepted by any Mountaineers branch or activity. Certification is valid for three years and may be renewed by retaking the course or instructing.

To qualify for the off-trail navigation badge students shall learn:

- 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 man-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 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
- Identify the parts of a compass
 - Transparent baseplate
 - Capsule
 - Rotating bezel
 - Magnetic needle
 - Orienting arrow
 - Degree markings
 - Index marking or Direction of Travel line
 - Meridian or orienting lines
 - Straight edge and measurement markings
 - Declination adjustment
- 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 the 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 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

- o Plan a Route:
 - o Given some information from a route description, plan a route.
 - o Identify parts of the route on the map.
 - o In planning the route, include techniques to keep you oriented -- handrails, aiming off, and backstop/catchline.

In the field, demonstrate “Situational Awareness”. Constantly answer the following questions in an ongoing cycle that includes: Observe, Orient, Decide, and Act.

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:
 - o Orient the map two ways, with a compass and with terrain association to identifiable features (field trip area dependent).
 - o Relate map landmarks to actual landmarks.
 - o Relate contour lines, slopes, and elevations to actual terrain.
 - o Learn that some variations within a map’s contour interval don’t appear on the map.
 - o Relate human-made features on the map with actual features.
 - o Relate map distances with actual distances.
 - Demonstrate the skills to use a compass in the field.
 - o Measure bearings on several stationary targets until consistently within ± 3 degrees.
 - o Follow a bearing accurately cross-country as part of a team, using leap-frog and back-bearing (reciprocal) techniques.
 - o 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)
 - o While measuring and taking 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).
 - o 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. (Note: Students are not required to have a GPS and altimeter, so any readings with these instruments can be provided by an instructor or trip leader.)

- o A terrain feature
- o An intersection
- o An elevation
- o A human-made feature
- o A bearing of an object and/or a fall line

- A Universal Transverse Mercator (UTM) coordinate

Plan and Follow a Route:

- Plan a route through all or part of the field trip area.
- Follow the route through the field trip area.
- Learn how route options throughout the field trip can include a handrail, a backstop/catch line, and a turnaround time.

Students shall accurately follow one or more bearings on at least one "long navigation problem" that requires traveling cross-country, off-trail, and over terrain that presents difficulties in movement, such as limited sight distance, steep ground, brush and woods. The distance shall be at least one-third mile (500 meters), exiting the problem within an acceptable range of error from their target bearing.

Safety Considerations

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)
- Communication devices for contacting emergency responders (Personal Locator Beacon, Satellite Messenger, Cell Phone)

Comparable Standards

UIAA Standards for Voluntary Leaders and Instructors, Mountain Qualification Labels, Guidance Notes for Member Associations' Training and Assessment Schemes (4th Edition 2016) – UIAA includes navigation knowledge in their Training Standards for Mountain Walking, Trekking, and Snowshoeing as well as their Sport, Rock, Alpine, and Ice Climbing. It is not the intent for the Mountaineers to achieve a "Mountain Qualification Label" from UIAA. Rather it is one of the only documents from an industry association that references any kind of navigation training standard.

http://theuiaa.org/documents/safety/MQL-2016_Presentation-General_final-version2016.pdf

They are stated simply as:

- Skills Standard -- “Route finding and navigation through typical and difficult terrain”.
- Knowledge Standard -- “Journey planning, route choice, route grades, way marks and guidebooks”.

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