

Hands-On Navigation Skills

March 03, 2018

Objectives:

- **KNOW:** Understand and be able to use practical navigation techniques (determine an azimuth; orient a map using compass and terrain features; measure on a map; use time control points)
- **TEACH:** Suggestions for teaching practical navigation techniques to a crew
- **USE:** Techniques (and questions) to prompt youth to navigate effectively

KNOW Navigation Techniques

- Land & inland water navigation using map and compass (GPS comments later)
- How to use a compass
 - Point "north", direction of travel, straight edge on base
 - **Azimuth** - determine on land & on map)
Exercise (if needed): Determine azimuth to terrain features
- Declination & orienting a map
 - **Where are you going this year?**
 - **Why is that relevant to map & compass navigation?**
 - Hand out U.S. declination diagram
 - Discuss differences between DC, Maine, No. Tier & Philmont
Exercise: Distribute maps (& compasses); orient map using compass, including declination
- Know how to use topographical map
 - Which way is north (2 kinds of north—actually, 3 kinds of north)
 - Elevation (contour lines)
Exercise: Associate contour lines with diagrams of elevation (test)
 - Symbols
 - Scale (horizontal, plus contour interval)
Exercise: Find current location using terrain association
- Carrying map while hiking
 - Protect the map (bad example: map that disintegrated)
 - Fold accordion-style - “short” -- leave room for folding back
 - Keep the map out, handy (bad practice: stow map to use hiking poles)
 - Keep map and compass tethered
- Navigating with verification
 - Plan route prior to leaving, at least evening before on multi-day trek
 - Time-control “plan,” or at least “points,” when expect to get to points on route
 - Questions to ask:
 - Which way to go at intersection?
 - Confirm decision by direction of trail and surrounding terrain
 - Ask crew to help (ex. 7 March hike): find trailhead, read map & terrain

TEACH *Navigation Techniques to Crew*

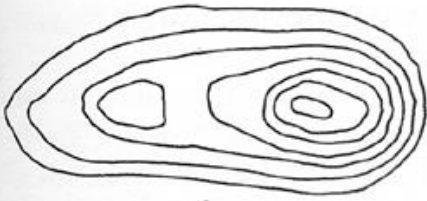
- Anywhere (meeting, shakedown, other campout)
 - How to use compass and orient map
 - Declination - explanation &
 - How to orient map near DC with declination of 10° W
 - Difference between DC and location of trek
 - Contour lines & map symbols
 - Route Planning - Crew Leader & Navigator with crew watching
- Outdoors (shakedown or other campout)
 - How to orient map using terrain features
 - How to carry map & compass while hiking
 - Route Planning - Crew Leader & Navigator; control points
 - Practice navigating with verification

USE *Practices to Prompt Youth*

- Discuss with crew/crew chief:
 - Plan the next day's route in camp (e.g., after program at Philmont)
 - Canoeing: Consider weather (winds); canoe close to shore in wind
 - Hiking: 30 min/mi, plus 1 hour per 1000' elevation
 - Hiking: Consider making an elevation diagram (or table)
 - Stop and "navigate" at **potential** turns (stream junctions, trail junctions)
 - Signs: trust, but verify
 - Rotate the duties of navigator
- "How do we get out of camp?" Finding the right trail, or getting back on the right stream, is sometimes HARD
- "When will we reach ___?" Time-control "plan," or at least "points" – Ask when we will get to a given point. And ask along the way if we're on schedule.
 - Streams
 - Ridges/passes
 - Trail (or road) intersections
 - Islands/bodies of water/mountains/man-made features
- "What is that island/mountain?" Ask the crew; see if you can get them to figure it out (without taking over the crew)
- ***Let the youth make mistakes in navigation***

Other Techniques

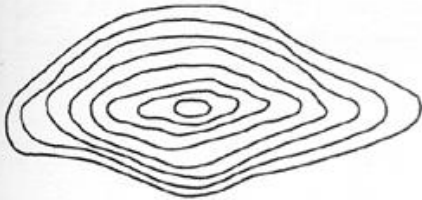
- Dead reckoning: Use an offset
- Pace count: Comes in handy when you're looking for a trail junction (x distance from a known point)
- GPS:
 - Good on water (advisors should use . . . discourage youth from using)
 - Hiking: A novelty that can be interesting but should ***never*** be used as primary means of navigation



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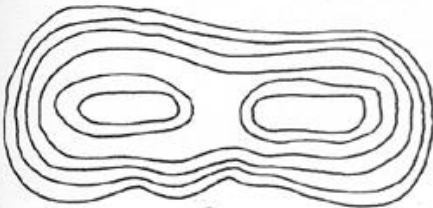
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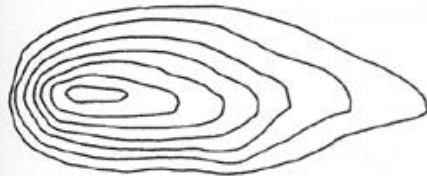
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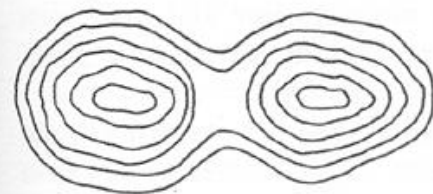
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E



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Magnetic Declination Calculator

<http://www.ngdc.noaa.gov/geomag-web/#declination>

Sample Declinations on 14 March 2015

Camp Snyder (38.83° N 77.66° W): 10.41° W

Cimarron, NM (36.5° N 104.9° W): 8.17° E

Grand Lake Matagamon (46.16° N 68.79° W): 16.89° W

All Northern Tier Bases: less than 2° E or W – Atikokan, ON (48.74° N 91.83° W)

Bissett, MB (51.03° N 95.67° W), Ely, MN (47.99° N 91.49° W)

Map & Compass Resources

How to use your declination value – <http://www.thecompassstore.com/howtouseyour.html>

The Art of Teaching Map and Compass: Instructional Techniques, Curricular Formats and Practical Field Exercises – <http://www.isu.edu/outdoor/maplong.htm>

MyTopo – order custom printed maps starting at \$10, etc. - <http://www.mytopo.com/>

Map Pass.com – online maps \$30/year & order paper maps – <http://map-pass.mytopo.com/>

Trails.com – topo maps & trail info. \$50?/year, 2 weeks free – <http://www.trails.com/>