

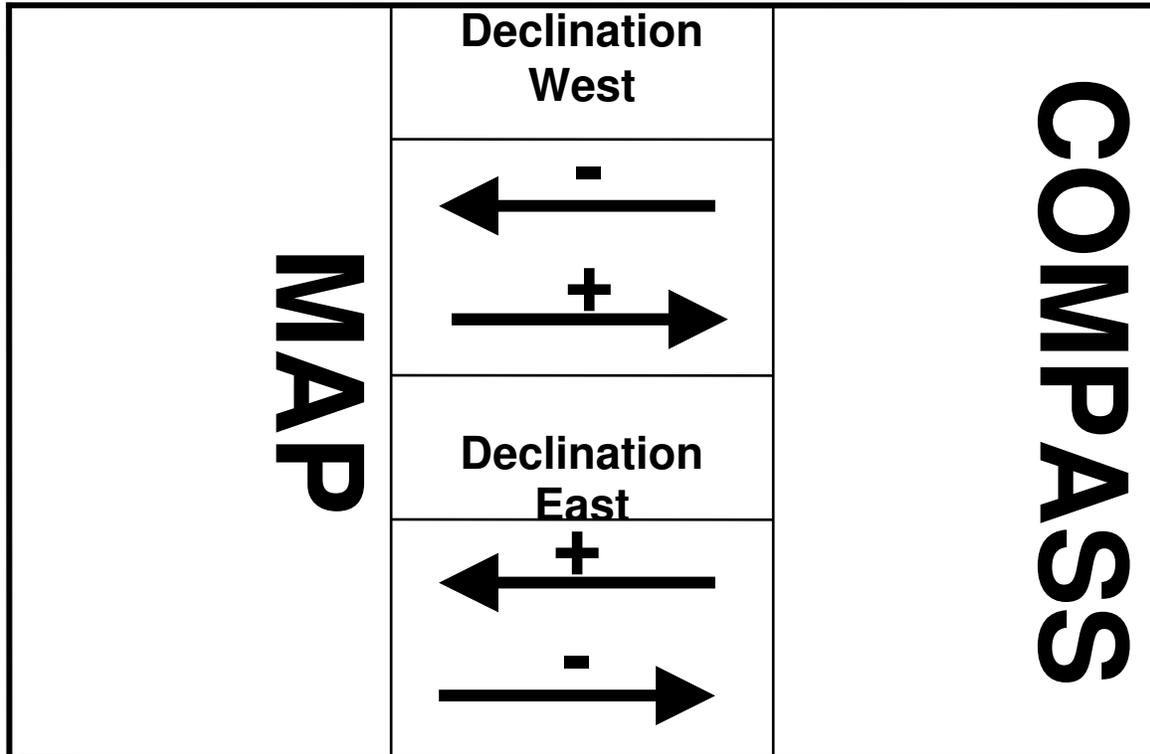
# Navigation Basics

Magnetic North (Pole)	Where the north seeking pole of your compass points to; located on the west side of Hudson's Bay; moves a little each year.
True North	Point about which the world revolves; where the line of longitude converge at the top of most maps; point at the top of the world.
Grid North	Maps are flat, the world is round. Grid north is the difference between true north and the map's vertical grid. Usually very small, and can be ignored.
Magnetic Declination	Difference in degrees between True North and Magnetic North. Is 0 degrees through Thunder Bay Ontario.
Following a Bearing	Following as accurately as possible a specific magnetic bearing to reach a destination which you can not physically see. Requires an accurate map or other instructions. A compass is used to take a <i>bearing</i> .
Back Bearing	180 degrees opposite to the direction you were previously following; the opposite direction.
Aiming Off	Deliberately heading a few degrees off of your target (usually toward the hand you write which you normally error toward when travelling). Upon arrival at your target, if it is not obvious where it is, 'aiming off' will have increased the probability that the destination lies in the opposite direction to which you aimed off.
Triangulation (also know as resection)	A method of determining your exact location on a map (usually topographic) utilizing back bearings from physical characteristics (hill tops, islands..) which you can see from where you are located.

## Map and Compass Step-by-Step

### Adjusting for Declination:

*You do not need to make this adjustment if your compass has a declination adjustment feature and it has been properly set.*



If the magnetic declination is WEST the magnetic reading is the *higher* reading than True North. Therefore you would have to SUBTRACT the declination when going from a compass bearing to the map. If you are taking a reading off the map with your compass you would have ADD the declination to get the proper magnetic bearing.

If the magnetic declination is EAST the magnetic reading is the *lower* reading than True North. Therefore you would have to ADD the declination when going from compass bearing to the map. If you are taking a reading off the map with your compass you would have to SUBTRACT the declination to get the proper magnetic reading.

**To Take a Bearing in the Field (compass only):**

- 1) Hold compass level in front of you, and point direction of travel line at desired object.
- 2) Rotate compass housing to align pointed end of declination arrow with red end of magnetic needle (“Box” the needle, put “Fred in the Shed”, put “Snoopy in the Dog House”)
- 3) Read the bearing at index line.

**To Follow a Bearing in the Field:**

- 1) Set desired bearing at index line.
- 2) Hold compass level in front of you, and turn your entire body, including your feet, until red end of magnetic needle is aligned with pointed end of declination arrow. (“Box” the needle, put “Fred in the Shed”, put “Snoopy in the Dog House”)
- 3) Travel in the direction shown by the direction of travel line. If you do not see your destination in front of you because of obstacles such as trees, travel toward an object you see ahead of you. Once there, repeat step 2 and 3 until you arrive at your destination.

**To Measure a Bearing on a Map (use map with compass):**

- 1) Place compass on map, with on long edge of base plate joining two points of interest. Direction of travel line points to objective.
- 2) Rotate housing to align compass meridian lines with north-south lines on map, with N on compass toward top of map.
- 3) Adjust for declination (unless compass is set for declination)\*
- 4) Reading bearing at index line.

**To Plot a Bearing on a Map:**

- 1) Hold compass level in front of you, and point direction of travel line at desired object.
- 2) Rotate compass housing to align pointed end of declination arrow with red end of magnetic needle (“Box” the needle, put “Fred in the Shed”, put “Snoopy in the Dog House”)
- 3) Adjust for declination (unless compass is set for declination)\*
- 4) Read the bearing at index line.
- 5) Place compass on map, with long edge of base plate on feature from which you wished to plot bearing.
- 6) Turn the entire compass to align its meridian lines with map’s north-south lines, with N on compass toward top of map. The edge of the base plate is now the bearing line.

## Map and Compass Examples

### Example (1), From Compass Bearing to Map:

The declination is 15 degrees WEST. You know where you are but want to know which mountain is in front of you

- 1) Hold compass level in front of you, and point it at the mountain.
- 2) Rotate compass housing to align pointed end of declination arrow with red end of magnetic needle ("Box" the needle).
- 3) The index line indicates the mountain has a bearing of 95 degrees. Before going to the map adjust for declination by SUBTRACTING 15 degrees. The index will now read 80 degrees. (Remember you do not have to make this adjustment if your compass has the declination adjustment feature and it is properly set).
- 4) Place the compass on the map, with long edge of the base plate place on the position you are at on the map.
- 5) Turn the entire compass to align its meridian lines with the map's north-south lines, with N on the compass toward the top of the map. Follow the edge of the base plate, the mountain you took your reading from will intersect this line somewhere.

### Example (2), From Map to Compass Bearing:

The declination is 15 degrees WEST. You are on a known camp site. You want to paddle to the portage trail you see on the map. You want to get a compass bearing to follow.

- 1) Place the base plate of the compass on the camp site on the map and align the edge of the base plate with the portage trail on the map.
- 2) Rotate the compass housing to align compass meridian lines with north-south lines on map, with N on compass toward top of map.
- 3) The index on the compass reads 190 degrees. Adjust for declination by ADDING 15 degrees. The index will now read 205 degrees. (Remember you do not have to make this adjustment if your compass has the declination adjustment feature and it is properly set).
- 4) 205 degrees is your compass bearing to use.

### Note:

- When ever you perform any of these operations, first guess at the answer. Compare your answer to the result. This assures you are not 180 degrees out of phase which is a common mistake.
- When taking and following a bearing, always align the pointed end of the declination arrow with the north seeking (usually red) end of the magnetic needle ("box" the needle).
- Never use the magnetic needle or the declination arrow when measuring or plotting bearings on the map. Just make sure the N on the compass dial is toward the north on the map, not south!