

Introduction

There are many different options and styles of compasses available. Choosing the appropriate compass depends on the application in which the compass will be used, the degree of accuracy and precision needed and what the end user is comfortable with.

Parts of a Compass

This is a general overview of the parts that make up a compass. Not all compasses have all of these parts.

Azimuth or Bezel Ring: The ring around the capsule that carries the degree or quadrant markings.

Base Plate/Base: One of the main portions of the compass. Almost all compasses have one. **Declination Scale** allows for the correction for true north from magnetic north.

Magnetized Needle: The object that points north in all compasses.

Map Scales: Allow for distance calculations.

Mirror: Allows the user to see the vial, magnetized needle and bezel ring while holding it up to take a more accurate reading.

Orienting Arrow: The bottom of the vial or liquid capsule. It allows for much greater accuracy when traveling across an unknown area.

Sight: Points in the direction to be traveled and allows for accurate sightings to target objects.

Travel Arrow: The direction that you will be traveling.

Vial or Liquid Capsule: Suspends the magnetized needle for easier readings.

Styles

A **basic compass** is just what the name says. It consists of a magnetic needle and a base plate with compass rose. This type of compass is appropriate to use if the end user simply needs a general direction.

A **directional sighting compass** takes a major step up in the degree of repeatability in comparison to the basic compass. This compass usually will include the base plate, a moveable azimuth or bezel ring, the directional or north arrow, the orienteering arrow and some map scales. By adding the extra features, it allows the end user to be more precise in measurements in the field and while using a map.

A **hand-bearing compass** is different than either of the two previous compasses in that it has an eyepiece. It still has a base and vial or liquid capsule, but this compass allows the user to sight on an object while simultaneously taking a compass reading. This allows for much greater degree of accuracy and precision. The readings can also be taken faster as there is no bezel ring to maneuver.

A **mirrored sighting compass** is similar to the directional sighting compass, but also includes a cover with a mirror, a sight and usually a declination adjustment. A mirrored compass allows the end user to see the face of the compass while taking a bearing in the field. The declination adjustment lets the end user correct the compass for even greater accuracy and precision.

Scales

Compasses are offered in two different scales. The **azimuth scale** goes around the bezel ring a full 360°. The **quadrant scale** has four equal 90° sections on the bezel ring. Each scale can be used anywhere, but some areas use quadrants instead of the full 360°. Contacting the local county extension office in the area can provide the scale that is used in that particular area.

Declination

Declination is the difference between true north and magnetic north. The magnetic needle of a compass always points to magnetic north. Since magnetic north is affected by the magnetism of the Earth, the needle will point to the varying magnetic north depending on where you are in the world.

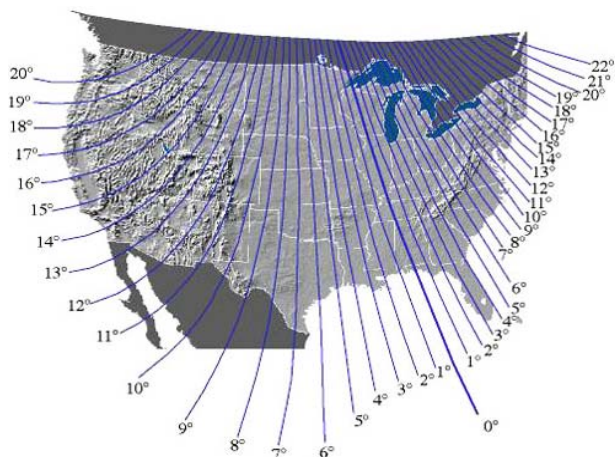
This difference becomes significant when taking measurements off of a map or trying to relay directions to someone in the field. Since the declination of the United States can vary as much as 30° in either direction it is easy to see why knowing the declination of an area is very important (**see declination map below**).

There are two different ways to adjust for the declination in any area. One is a temporary method. Simply adjust for the declination every time a compass reading is taken. For example, if the map bearing is reading 180°, and the declination is 10° East, decrease the reading to 170°. If the declination is 10° West, increase the reading to 190°.

The other method is adjusting the compass to read the correct declination in that area. There is a screw, or other offsetting mechanism, to allow for declination. If working in one core area, adjusting the declination will take care of map and field bearings.

Compass Zones

In order to get accurate readings from a compass, the needle must be balanced in the vial so that it does not drag. Due to the components of the Earth's magnetic field, a compass that works in the United States will drag or stick in Brazil. To remedy this problem, the compass industry has developed five compass zones (**see zone map on following page**).





Now that the direction of travel is known, sight on a target out in the distance that lines up with your direction (e.g. tree, bush, rock formation, etc.). You can then walk toward the target without having to retake the compass measurement. Once you reach the target, take out your compass and find a new object to sight on that is aligned with bearing. Make sure to check that the bezel ring did not get turned. Also remember to take into account the declination and make the appropriate adjustments

Commonly Asked Questions

Q. Where is there more information on using a compass with a map?

A. The following link provides useful information concerning the use of a compass with a map.
http://geology.isu.edu/geostac/Field_Exercises/topomaps/compass.htm

Q. Where can I go to get detailed information on declination?

A. The National Geophysical Data Center in conjunction with the National Oceanic Atmospheric Administration has come up with the following link. This allows for accurate updated declination information at any time.
<http://www.ngdc.noaa.gov/cgi-bin/seg/gmag/flsfnth1.pl>

Zone 1: Canada, USA, Europe, & North East Asia

Zone 2: Mexico, Central America, Panama, Columbia, Venezuela, Northern Africa

Zone 3: Peru, Bolivia, Brazil, Central Africa

Zone 4: Paraguay, Uruguay, Southern Argentina, New Guinea, Southern Africa

Zone 5: Australia, Antarctica, New Zealand

Using a Compass with a Map

The first step is to place your compass on a map. Place it on the map so the long edge of the base plate connects your starting point with the destination point. Make sure that the travel arrow or the sight is facing the direction to be traveled. Hold the base plate of the compass on the map and slowly turn the bezel/azimuth ring until the orienteering arrow is pointing to the same direction as north on the map.

Holding the compass in front of you, rotate it until the magnetized needle lines up with the orienteering arrow. The travel arrow or the sight now shows you the direction needed to travel to reach the destination.