

CHAPTER

4

USING A COMPASS





Using a Compass

The compass is used to determine direction between two points on earth or the direction of travel along a line between two points. A compass can help you find your way through the woods and know where you are located relative to known points. While a recreational-grade GPS can be useful for mapping and navigation in the field, with a compass you do not have to worry about lost satellite connections or drained batteries. Phone compass apps do not have the functionality of a hand-held orienteering compass, and are not adequate for forest and land management purposes.

A compass is an instrument with a rotating magnetized needle. One end of the needle (north end) always points to a location on Earth known as the magnetic North Pole. The magnetic North Pole is always changing location because it is influenced by Earth's magnetic core. It is located near the true North Pole, which is at one end of the imaginary axis on which Earth spins.

There may be times when you do not need a compass, but knowing how to use one is a valuable skill. It not only can save you time in the woods, it might just save your life.



Knowing how to use a compass is a valuable skill that can save you time and help keep you safe in the woods.

AZIMUTH VS. BEARING COMPASS

There are two commonly available navigation compass types, azimuth and bearing. Azimuth compass faces are marked in a clockwise direction. They start at 0 at due magnetic north and progress around the face to 360 degrees, with 90 degrees at east, 180 degrees at south, and 270 degrees at west. Readings from an azimuth compass are the degree headings themselves, such as 150 degrees or 275 degrees (figure 4.1).

Bearing compass faces are divided into four equal quadrants, with 0 degrees being at north and south points and 90 degrees at east and west. These quadrants are labeled northeast, southeast, southwest, and northwest.

Readings from a bearing compass include the direction. For example, on a bearing compass, N46E would be read as north 46 degrees east, and S22W would be read as south 22 degrees west (figure 4.1).

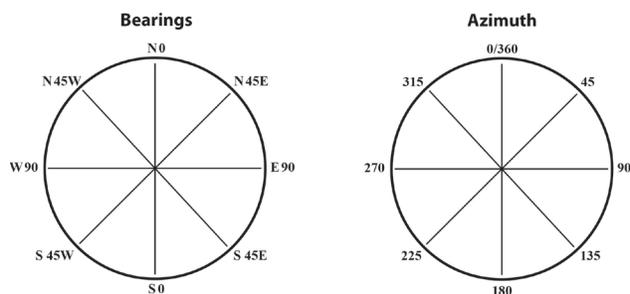


Figure 4.1. Comparison of bearing and azimuth directional designations

AZIMUTH COMPASS VS. BEARING COMPASS READINGS

While most examples in this handbook use an azimuth compass, there are times when you might need to convert between azimuths and bearings (table 4.1).

Table 4.1. Cardinal Direction Reading Conversions for Azimuth and Bearing Compasses

Azimuth Compass Reading	Bearing Compass Reading
0°	North
90°	East
180°	South
270°	West

When converting azimuth readings to bearings in the northeast quadrant (from 1 degree to 89 degrees), the numbers stay the same, but the direction letters are added (table 4.2).

Table 4.2. Converting Azimuth Readings to Bearings in the Northeast Quadrant

Azimuth Compass Reading	Bearing Compass Reading in the Northeast Quadrant
22°	N22E
43°	N43E
77°	N77E

To convert azimuth readings to bearings in the southeast quadrant (91 degrees to 179 degrees), subtract the azimuth reading from 180 degrees and add the direction letters. (table 4.3).

Table 4.3. Converting Azimuth Readings to Bearings in the Southeast Quadrant

Azimuth Compass Reading	Subtract Azimuth Reading from 180 Degrees	Bearing Compass Reading in the Southeast Quadrant
99°	180 – 99 = 81	S81E
124°	180 – 124 = 56	S56E
157°	180 – 157 = 23	S23E

To convert azimuth readings to bearings in the southwest quadrant (181 degrees to 269 degrees), subtract 180 degrees from the azimuth reading and add the direction letters. (table 4.4).

Table 4.4. Converting Azimuth Readings to Bearings in the Southwest Quadrant

Azimuth Compass Reading	Subtract 180 Degrees from the Azimuth Reading	Bearing Compass Reading in the Southwest Quadrant
190°	190 – 180 = 10	S10W
238°	238 – 180 = 58	S58W
260°	260 – 180 = 80	S80W

To convert azimuth readings to bearings in the northwest quadrant (271 degrees to 359 degrees), subtract the azimuth reading from 360 degrees and add the direction letters. To convert bearings in the northwest quadrant to azimuths, subtract the bearing from 360 degrees (table 4.5).

Table 4.5. Converting Azimuth Readings to Bearings in the Northwest Quadrant

Azimuth Compass Reading	Subtract Azimuth Reading from 360 Degrees	Bearing Compass Reading in the Northwest Quadrant
275°	360 – 275 = 85	N85W
300°	360 – 300 = 60	N60W
341°	360 – 341 = 19	N19W



Taking fewer, longer shots with your compass improves accuracy.

YOUR TURN

Convert Azimuths to Bearings and Bearings to Azimuths

Trial	Azimuth	Bearing
A	35°	
B	156°	
C	341°	
D		N77W
E		S13E
F		S59W

Answers

Trial	Azimuth	Bearing
A	35°	N35E
B	156°	S24E
C	341°	N19W
D	283°	N77W
E	167°	S13E
F	239°	S59W

PARTS OF A COMPASS

See video 4:1, Parts of a Compass, on the Alabama Extension website at www.aces.edu/go/ForestInventoryBasics.

BEZEL

Most compasses have a rotating outer ring called a bezel. For an azimuth compass, the bezel is marked with degree marks from 0 to 360 (figure 4.1). On a bearing compass face, the 360 degrees are divided into four equal quadrants of 90 degrees. These quadrants are labeled northeast (NE), southeast (SE), southwest (SW), and northwest (NW). Many recreational-grade compasses can be read to the nearest 2 degrees, others to the nearest 1 degree. Check the bezel of your compass to see what the markings represent.

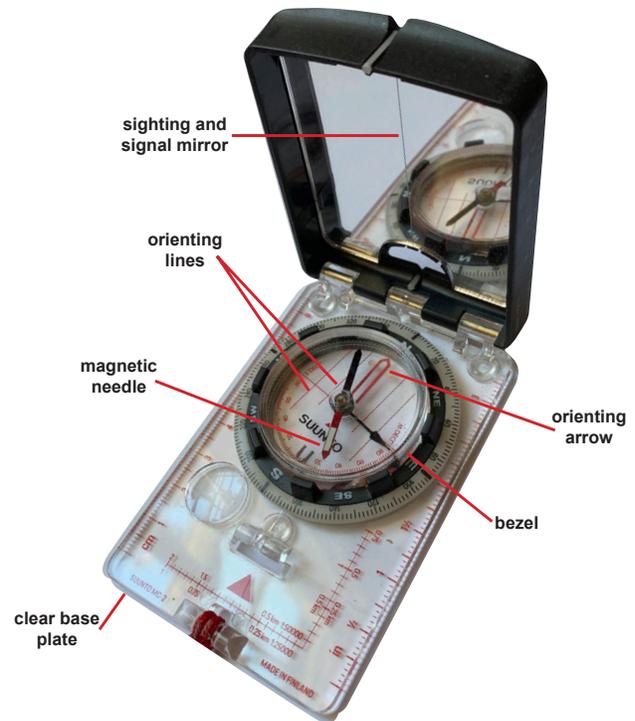


Figure 4.2. Parts of a hand-held orienteering compass.

SIGHTING MIRROR

A mirror improves your ability to take more precise readings. When the mirror is partly open, you can look through the sight at the top and see the azimuth or bearing reflected in the mirror of your targeted direction or point of interest. The mirror also can be used as a signaling device.

A GPS can be useful for mapping and navigation in the field, but you do not have to worry about lost satellite connections or unresponsive batteries with a compass.



Declination may be adjusted using the small metal screwdriver on the lanyard and the screw that may be located either on the front or back of your compass.

DECLINATION ADJUSTMENT

See video 4:2, *Adjusting Declination*, on the Alabama Extension website at www.aces.edu/go/ForestInventoryBasics.

A compass needle points to magnetic north, not true north. The difference in these is known as *magnetic declination*. A compass reading must therefore be corrected from magnetic north readings to true north readings.

An adjustable declination arrow lets you adjust declination to your current location. There is often a screw that lets you rotate the graduated face of the compass to match the current declination for an area. Once the compass has been correctly adjusted for declination, all readings made will be true north readings and will not need to be adjusted for declination until you move a substantial distance to another location.

You can determine the declination for your area by visiting websites such as the National Oceanic and Atmospheric Administration (NOAA).

USING A ROTATING BEZEL MIRRORED COMPASS WITH A SIGHT

- Open the cover of the compass at about a 20-to-40-degree angle from closed. You want to be able to see the face of the compass in the mirror while sighting on your target.
- Place the lanyard around your neck. Holding the compass in the palm of your hand or in your fingertips, raise it to eye level while keeping the lanyard tight. Keep your elbows tucked against your sides. This will help to steady the compass and give the correct distance from the compass to the eyes of the user. Keep the compass level, both right to left and front to back.
- Turn your entire body (move your feet, not just the compass) until the desired object comes in line with the sight on the cover of the compass.
- Keep the compass away from metal objects, cell phones, watches, and GPS units.
- Align the sighting line etched in the mirror with the alignment points. One point usually is located on the cover, just below the V-sight, and the other is located near the back of the compass near the latch on the base. The etched line should run through the center of the needle pivot point. This usually is easier to do with one eye closed.
- Turn the bezel until the red end of the needle lies within the red etched lines on the face of the compass and where the sides of the needle are parallel to the etched lines in the face of the compass. Depending on the direction the needle is pointing, you may or may not be able to see both lines on either side of the needle. You may see only a line on one side. If so, be sure that the line is parallel with the side of the needle.
- Be sure the compass is still level and that the sighting line on the mirror runs through the two reference points and the center of the compass capsule.
- Lower the compass and read the azimuth to the nearest degree at the line marked on the base nearest the hinge.
- If you are pacing to the object, locate a recognizable object that is in the line of the V-sight on the cover. While keeping your eyes on the object, lower the compass.
- Reconfirm the object, noting anything that makes it unique. Pace or measure to the selected object. Remember that fewer, longer shots are better than more, shorter shots.

See video 4:3, *Getting Direction with a Compass*, and video 4.4, *How to Navigate with a Compass*, on the Alabama Extension website at www.aces.edu/go/ForestInventoryBasics.