

How to Choose a Compass

Even in this era of high-tech, satellite-assisted navigation, a compass remains one of the [10 Essentials](#) of wilderness travel. True, you may hike for days on a trail and never even look at it, yet if you take a wrong turn or a whiteout blows in, a compass (in tandem with a map) suddenly becomes one of the most important tools in your pack.



The ability to navigate with map and compass is a crucial wilderness skill, especially if you travel off-trail. Take the time to learn it; some day it may save your life.

QUICK READ

1. Inexpensive [basic compasses](#) are quite adequate for wilderness travel; a specialized feature such as a declination adjustment, though, is worth a little extra money to experienced backcountry explorers.
2. Basic and specialized compasses share many [features](#); more sophisticated models offer a sighting mirror, a declination adjustment, a magnifying lens and other extras.
3. A compass and a [GPS receiver](#) are complementary instruments; a GPS unit, however, does not replace a compass.
4. Metal, magnets and electrical fields can affect the [accuracy](#) of a compass.

Types of Compasses

Accessory Compasses: The type found on keyrings or watches, or small round compasses with no base plate. They accurately point toward magnetic north, but are designed more for fun and quick reference than serious navigation.

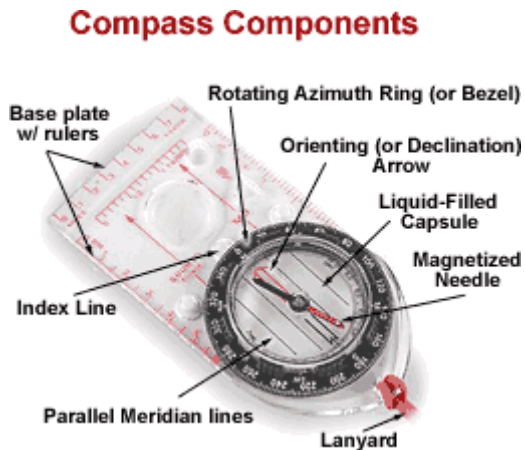
Basic Compasses: Inexpensive, yet quite sufficient for wilderness travel; well-suited for beginners. They have all the essential components but lack some bonus features, such as a declination adjustment or a mirror. Example: Suunto A10 Partner II.

Specialized Compasses: Full-featured models with many extras (a mirror, magnifier, et al.). Well worth the added cost if you are a regular wilderness explorer, particularly one who regularly travels off-trail. Example: Silva Ranger Type 15 CL.

Basic Compass Features

Backpackers customarily use what is known as a "base plate" or "orienting" compass. ("Orienting" refers to the act of determining your exact position; "navigation" is the process of determining your destination and guiding yourself toward that objective.)

The standard features of a compass include:



- **Magnetized Needle**—Usually the red end of a pivoting compass needle. This end points to the strongest magnetic field, which is usually the **magnetic North Pole**. "Magnetic north" is different from "**true north**"—the geographic North Pole, where all longitude lines meet. Magnetic north, one of earth's two magnetic poles, lies in an island chain within the Canadian Arctic. True north and magnetic north are separated by more than 1,000 miles.

Note: When working with a map, you must compensate for the difference between true and magnetic north. This can be accomplished in various ways. See "Declination Adjustment" for some tips or our [navigation clinic](#).

- **Liquid-Filled Capsule**—The housing (or dial) that contains the needle, the needle's bearing (or pivot) and damping fluid. The fluid protects the needle from jarring and minimizes needle movement during readings.
- **Rotating Azimuth Ring (or Bezel)**—A ring marked with degrees from 0 to 360 (preferably in 2° increments) that encircles the outer edge of the compass capsule. The "azimuth" is your direction of travel (expressed in degrees) between two points. Azimuth and "bearing" have come to mean the same thing.
- **Base Plate**—A rectangular, plastic, preferably transparent base where the capsule sits. Better compasses have rulers (in inches and centimeters) etched into the "straight edges" of the plate. These are helpful when measuring distances on a map. Try to select a compass that offers scales you are likely to use. Common scales are 1:24,000 and 1:25,000.
- **Orienting Arrow and Parallel Meridian Lines (or, North-South Lines)**—Located on the bottom of the compass housing. The non-magnetic arrow's directional end is usually red and, coupled with the meridian lines (which you align with the north-south lines on a topographic map), helps orient your line of travel on a map.
- **Index Line or Direction-of-Travel Line**—Located at one end of the base plate.

Specialized Compass Features

- **Declination Adjustment**—A more sophisticated orienting arrow, one that can be aligned to reflect the "magnetic declination" in your area of travel. (This is the difference between true north and magnetic north.)

In many cases a tiny adjustment tool, usually connected to the lanyard, is used to turn a small screw on (or near) the compass housing. When adjusted, the orienting arrow is no longer parallel with the north-south lines; instead, it will be offset for the difference you dial in. This should correspond to the area

you are planning to traverse. Then, when the north-south lines are aligned on a map, the adjusted arrow will accurately point toward magnetic north, indicating the angle of declination. New adjustments can be made for each trip.

A fixed orienting arrow, meanwhile, requires you to "do the math" and make manual adjustments for each new measurement. (Some people use a piece of tape to mark the angle of declination on an inexpensive compass.) An adjustable arrow, though, allows you to "set it and forget it," a very nice convenience.

A note on magnetic declination: In parts of the central United States, magnetic declination has nearly zero impact on compass readings. In parts of Washington state, meanwhile, magnetic north can make a compass needle lean east of true north by as many as 20°. In northern Maine, the needle may swing west of true north by 20°. In northern Alaska, the angle of declination can exceed 30°. Maps sometimes include an angle-of-declination "pie" in their legend. The newer the map, the more reliable the angle shown in the pie. This is because the rotation of the earth causes magnetic north to shift roughly 1/10 of 1 degree each year.

- **Magnifying Lens**—A small lens mounted into the base plate; handy for reading tiny map symbols.
- **Sighting Mirror**—A fold-out surface that can improve accuracy when gauging readings on distant landmarks. It also doubles as a signaling/personal mirror.
- **Luminescent Indicators**—These are good to have on your magnetized needle, on both sides of your orienteering arrow, even on the azimuth ring's four cardinal points.
- **Clinometer**—Allows you to measure the angle of a slope; helpful for assessing avalanche hazard and the heights of objects.
- **Lanyard**—A piece of string that allows you to attach a compass to a belt or pack.

Which One Is Right for You?

Basic Compasses: These models are great for **beginning adventurers**, unless the beginner is an especially ambitious person who intends to progress rapidly to an advanced level. People who almost always stick to trails (experienced dayhikers, recreational backpackers) can easily get by with an inexpensive model. The extras found on specialized models (mirrors, magnifiers, declination arrows) are nice but not essential for casual explorers.

Specialized Compasses: Anyone who makes frequent compass checks knows the value of an adjustable declination arrow. For those who have owned a compass with this feature, there is no going back; a declination adjustment is a must. If your travels regularly take you **off-trail**, seriously consider spending the extra money for a model that includes this feature. Some less expensive models, such as the Suunto M-2D, offer it. A sighting mirror is a nice bonus, too.

Can a GPS Receiver Replace a Compass?

A compass and a satellite-based Global Positioning System receiver are complementary tools. A compass does one thing a GPS unit cannot—point toward magnetic north. GPS units equipped with an electronic compass are gradually coming to market. Still, GPS receivers are battery-powered devices that potentially could run out of power. A compass, relying solely on the earth's magnetic forces, has no such limitations. Thus, even if you own a GPS unit, you will always want to carry a compass as well.

GPS receivers are splendid devices. They are designed to **measure direction of movement** by calculating the difference between your current position and last position. They can also tell you your position without relying on visible landmarks for bearings, which is necessary for a compass must. On days of snow or heavy fog, that's a big plus.

Another GPS advantage: When following a bearing via compass, obstructions sometime cause you to stray from your ideal line of travel. This requires you to keep careful track of any deviations you take from your bearing, to the point of counting the paces you take while sidestepping the obstacle. Once past the obstacle you

might need to adjust your compass bearing, but key landmarks may no longer be in view. With a GPS unit, however, you can easily obtain a new bearing and reset your compass with a revised line of travel.

Bottom Line: When you want to know which direction you are facing—an important piece of knowledge—you must have a compass. Learn more about [GPS receivers](#).

Compass Tips and Terminology

- **Metal** can distort a compass reading, so be sure to take bearings away from your car, camera or other metallic objects. Metallic interference can easily alter a compass reading by 20 to 60 degrees. So, if you are plotting bearings at a picnic table, check to see if your compass is being exposed to metal bolts or brackets that may affect its accuracy. Electrical fields (a running car engine, for example) can also throw off the accuracy of a compass.
- Be careful **where you store a compass**. For example, do not store a compass on top of a stereo speaker, which is equipped with a powerful magnet, or a place exposed to strong electric current. Over time, such exposure could demagnetize the needle. A compass responds to the dominant polar source in its vicinity; you want it to be the earth.
- Compasses not only need to be held level to "swing" properly, they need to be appropriate for the latitude. In general, the earth has 5 different magnetic "**dip**" zones. These areas can cause a compass needle to point up or down, affecting the accuracy of a bearing. Fortunately, all of the contiguous United States fall within the same magnetic dip zone.

Note: Most compasses correct for dip by slightly unbalancing the needle. This works fine as long as you stay near the same latitude. If you visit a place with a much different latitude (the Southern Hemisphere, perhaps), your compass may not work properly. Some compasses (e.g., the Suunto Global Compass) are specially designed to work anywhere on the planet.

- The 4 principal directions shown on a compass—north, south, east, west—are known as **cardinal points**. The face of a compass is sometimes referred to as a **compass rose**.
- A **bearing** (once known as an azimuth) refers to the direction of travel—expressed in degrees—you follow to arrive at a destination. Traditionally, bearings have been measured from the north or south points of a compass. A bearing of N60°E (angling to the east-northeast) has an azimuth of 60°. A bearing of N90°W (due west) has an azimuth of 270°. Such a nuance is irrelevant to most compass-users, though there is a distinction that advanced navigators will wish to consider.

Note: To avoid confusion when communicating with others, it is helpful to express all bearings with the north references. For example: 30 degrees true; 10 degrees magnetic.

Navigating With a Compass

Compasses enable the user to perform four basic functions:

- Take bearings in the field.
- Follow bearings in the field.
- Measure bearings on a map.
- Plot bearings on a map.

These procedures are explained in detail in our [navigation clinic](#). We encourage you to grab a compass and a map and check it out.

Ultimately, there is no substitute for practice when your goal is to improve your navigational skills. Here are some additional steps you can take:

- Study an instructional book on navigation and practice its principles on day hikes, short-haul trips, even during city strolls.
- Take a trip with a navigation-savvy friend and learn all you can.
- Attend a navigation seminar or wilderness route-finding course (offered periodically at REI stores) or enroll in a class (often available at local colleges or through local branches of national organizations).
- See if any orienteering clubs exist in your area. Orienteering, popular in Scandinavian countries, adds a sporting element to map-and-compass navigation. Part endurance race, part treasure hunt, part mental puzzle, orienteering events are hosted regularly by regional clubs throughout the United States and Canada. Contact the [U.S. Orienteering Federation](#) for information.

Bottom Line: A compass remains an essential tool for safe wilderness travel. Strengthening your grasp of map and compass skills through practice and field work will make you a more self-assured backcountry traveler.

Product	Price	Weight	Dimensions	Analog or	Increments	Declination adjustment	Declination scale	Liquid filled	Sighting Mirror	Clinometer	Magnifying lens
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				Digital							
Brunton 8099 Eclipse Compass 	\$70.00	3.6 ounces	4.25 x 2.5 inches		1 degree	Yes		Yes	Yes	Yes	Yes
Brunton Classic 9020G Compass 	\$10.00	1.1 ounces	3.5 x 2.5 inches		2 degrees	Yes		Yes	No	Yes	No
Brunton Eclipse 8097 Compass 	\$35.00	1.9 ounces	4.7 x 2.7 inches		1 degree	Yes		Yes	No	No	Yes
Brunton Nexus Avalanche 26DNL Compass 	\$20.00	1.2 ounces	2.75 x 2.3 inches		2 degrees	Yes		Yes	Yes	Yes	No
Brunton Star 7DNL Compass 	\$10.00	1 ounce	3 x 2 inches		2 degrees	Yes		Yes	No	No	No
Dakota Digital Compass 	\$40.00	2.5 ounces	2.75 x 2.5 x .87 inches	Digital	1 degree	Yes	No	No	No	No	No

Product	Price	Weight	Dimensions	Analog or Digital	Increments	Declination adjustment	Declination scale	Liquid filled	Sighting Mirror	Clinometer	Magnifying lens
Highgear Adventure Tool Plus 	\$20.00	1 ounce	4.25 x 1.5 x 0.75 inches		10 degrees	No		Yes	No	No	Yes
Highgear SmartLatch Compass/Light 	\$12.00	2 ounces	3.62 x 1.06 x 0.5 inches		5 degrees	No		Yes	No	No	No
Highgear TerraTech 	\$65.00	1.5 ounces	3.25 x 2 x 0.75 inches		1 degree	Yes					
Highgear Trail Drop 	\$50.00	1 ounce	3.5 x 1.87 x 0.62 inches		1 degree	Yes		No	No	No	No
REI Mini Compass 	\$7.00	0.3 ounce	2 x 1.1 inches		10 degrees	No		Yes	No	No	No
Silva Forecaster Compass 	\$9.00	1 ounce	2.5 x 1.5 inches		5 degrees	No		Yes	No	No	No

Product	Price	Weight	Dimensions	Analog or Digital	Increments	Declination adjustment	Declination scale	Liquid filled	Sighting Mirror	Clinometer	Magnifying lens
Silva Guide Graphite 426 Compass 	\$20.00	1.2 ounces	2.75 x 2.5 inches		2 degrees	No		Yes	Yes	No	No
Silva Polaris 177 Compass 	\$10.00	1 ounce	2 x 3 inches		2 degrees	No		Yes	No	No	No
Silva Ranger CL Compass 	\$55.00	3 ounces	4 x 2.5 inches		2 degrees	Yes		Yes	Yes	Yes	No
Silva Sportsman's Tool 	\$5.95	0.8 ounce	3.2 x 1.2 inches		10 degrees	No		Yes	No	No	Yes
Suunto A-10 Partner II Compass 	\$10.00	0.8 ounce	3.5 x 2.25 inches		2 degrees	No		Yes	No	No	No
Suunto M-2D Locator Compass 	\$20.00	1.2 ounces	3.5 x 2.4 inches		2 degrees	Yes		Yes	No	No	Yes

Product	Price	Weight	Dimensions	Analog or Digital	Increments	Declination adjustment	Declination scale	Liquid filled	Sighting Mirror	Clinometer	Magnifying lens
Suunto M-3D Leader Compass 	\$29.95	1.6 ounces	4.8 x 2.4 inches		2 degrees	Yes		Yes	No	No	Yes
Suunto MC-2G Navigator Compass 	\$70.00	2.6 ounces	3.9 x 2.5 inches		2 degrees	Yes		Yes	Yes	Yes	Yes
Suunto MCB Amphibian Compass 	\$24.95	1.4 ounces	5 x 2.5 inches		2 degrees	No		Yes	Yes	No	No
Timex Expedition Compass Watch 	\$94.95			Analog							
Timex Expedition Compass Watch - Stainless 	\$99.95	.58 ounces	(face) 1.75 x 1.5 inches	Analog		Yes	Yes	No	No	No	No