

Navigating: Orienteering



Winneshiek County Conservation Equipment and Recommendations:

- **Who:** 7th grade and up
- **What:** 12 compasses
- **Where:** Schools, any park or outdoor area, or Lake Meyer Park. Orienteering can be integrated with activities in multiple disciplines. Call 563.534.7145 for more information.

Introduction

Compass skills and knowledge are valuable to people of all ages. The use of a compass improves map skills, enhances the enjoyment of outdoor experiences, and may one day enable the user to find his or her way if lost. There are several kinds of compasses available, depending on how you would like to use them.

Many organizations and parks set up orienteering courses to encourage orienteering skills. The Iowa DNR includes orienteering skills in the Youth Hunter Education Challenge as well as Today's Bow Hunter Course.

A Brief History

It is thought that a Chinese general initially used a piece of lodestone for the first compass. Since lodestone always points in a north-south direction if allowed to freely rotate, a piece of lodestone placed on a piece of wood floating in bowl would point north just like a modern compass needle. It is documented that military commanders during the Han dynasty (206 BC to 220 AD) used compasses.

Primitive compasses became more accurate when the idea of a compass needle was applied. A thin strip of metal or needle was magnetized by stroking it with a permanent magnet. Balancing this needle on a pivot allowed for free rotation. After settling, the needle pointed to the north.

Main Compass Uses

Compasses allow you to:

- Tell which direction you are traveling (your heading)

- Tell which direction an object is from you (its bearing)
- Keep following a straight line of travel
- Orient a map (a map with the actual land)
- Plan routes (determine directions and distances to travel on a map)

How a Compass Works

A compass needle will point north since the Earth acts as a very large magnet with two poles, the magnetic North Pole and the magnetic South Pole. Invisible magnetic lines of force exist between and connect these two poles. The magnetic needle on a compass aligns itself with these magnetic lines of force that surround the Earth. This is why you can determine the direction of north with a compass. At rest, the needle points to magnetic north.

The best type of compass for use with maps to navigate outdoors is an orienteering compass. This compass is designed for use with topographic maps and is inexpensive and durable. An orienteering compass can be used to find direction from a topographical map. You also can set your direction of travel onto the compass dial. Ruled scales along the base plate of the compass can be used to determine scale distances from a map.

compass housing – main part of the compass; usually a round plastic container filled with liquid; has the compass needle inside and a turnable ring around it with degree markings (also called azimuth ring)

direction-of-travel arrow – marked on the base plate; point this the way you will be traveling

compass needle – magnetized piece of metal that has one end painted red to indicate north; sits on a fine point that is nearly frictionless so it rotates freely when the compass is held fairly level and steady

orienting lines – series of parallel lines marked on the floor of the housing and the base plate

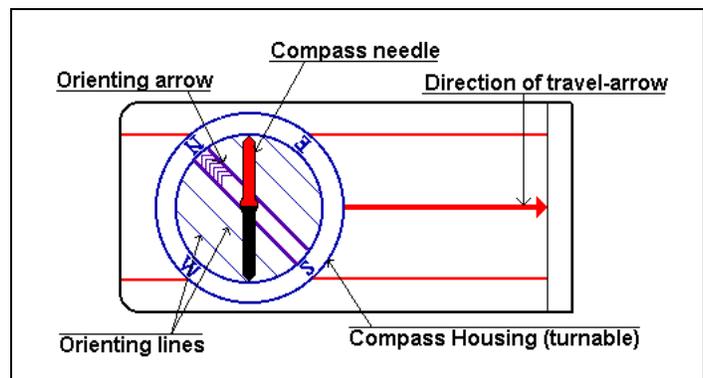
orienting arrow – marked on the floor of the housing; rotates with the housing when the dial is turned; used to orient a compass to a map

baseplate – hard, flat surface on which the rest of the compass is mounted; usually has a ruler on its edge for measuring distances on maps

index pointer – back end of the direction-of-travel arrow; ends at the edge of the dial and is where you take degree readings

magnifier – for seeing small map features better

scales – each edge of a compass may have different rulers for use with different map scales



Terms & Definitions

bearing – degree number used to designate the direction an object or location is from you

cardinal directions – north, south, east, and west

compass directions – read in degrees. 0 or 360° (north), 180° (south), 90° (east), 270° (west), etc.

declination – the difference between magnetic north and geographic (true) north which may result in a discrepancy between your compass and map; depending on where you live on Earth it can be anywhere from a few degrees, up to 20–30° degrees

heading – direction you are traveling

true north and south – true north is the direction along the earth's surface towards the geographic North Pole which is different from magnetic north or the direction of the magnetic North Pole.

Skills & Strategies

Basic Tips:

- Hold the compass level. If the compass is tilted, the needle will touch the clear lid and not move correctly.
- Hold the compass directly in front of you, not at an angle, and directly face the object to which you are measuring a bearing.
- Hold the compass close enough so you look directly down on the face of it.
- Read the correct end of the needle. (Red end points north.)
- Keep the compass away from metal objects. Even a knife, flashlight, belt buckle, or keychain can cause a false reading if too close to the compass.
- Use common sense, such as knowing that if you are facing the setting sun, you cannot be heading east.

Finding North

The red end of the magnetic needle points to north when the compass is held in a level position. To face north, turn your body while holding the compass until the compass needle is lying along the *direction of travel arrow*. If you rotate the compass housing until the needle is lined up with the red *orienting arrow* you will also be able to find the other directions. To travel north, use the *direction of travel arrow*, sight a landmark that is in the same direction, and walk toward it. Check the compass to make sure that you continue in the north direction as you walk.

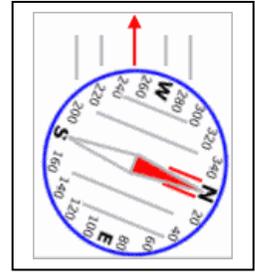
Going a Different Direction

If you want to go northwest, find northwest (half way between north and west) on the compass housing. Then turn the compass housing so that northwest on the housing comes exactly where the large *direction-of-travel arrow* meets the housing. Hold the compass flat in your hand. Then turn yourself, including your hand holding the compass until the compass needle is aligned with the orienting arrow inside the compass housing (**red in the shed**). Do not turn the compass housing! The magnetic needle should be pointing north. Follow the *direction-of-travel arrow* and you should be traveling northwest. Again, you will want to sight a visual landmark to head towards.

Setting a Bearing

By simply moving your compass with your body and using the N-E-S-W markings, you can get a good idea which way you are going. This is often all you need from your compass. But, you've probably noticed on your compass, there are also numbers and tiny lines. These represent the 360 degrees in a circle that surrounds you no matter where you are.

When you need to find your way from one particular place to another, you need to use these numbers to find out the **bearing** to that remote place. The direction you are traveling is called your **heading**. Heading and bearing are close to the same thing. The image to the right is a heading of about 250 degrees.



Practice using your compass and taking a few bearings. Move your body until the direction-of-travel arrow points at specific objects outside and then turn the dial until "RED is in the Shed". Then, read the bearing at the Index Pointer.

Safety

If you are taking a long hike in unfamiliar terrain, you should always carry a good map that shows the terrain, especially if you are leaving the trail. It is the interaction between map and compass, where the compass becomes really valuable. Be sure that you let someone know where you are going and when you plan to return, and always carry emergency supplies.

Extensions

Science: magnetism, GPS, satellites, gravity, astrology

Math: triangulation, orbit, geometry

Resources

- Polk County Outdoor Skills: Lesson Plan for Geocaching and Orienteering. <http://www.conservationboard.org/default.aspx>
- Forestry Suppliers: Orienteering Lesson Plans. http://www.forestry-suppliers.com/s01_pages/lessonplan_pdf/2005%20Orienteering%20122805.pdf
- Today's Bowhunter: Outdoor Preparedness Compass Training and Activities: <http://www.bowhunter-ed.com/iowa/>
- Compass Dude: Compass and Map-reading skills. <http://www.compassdude.com/map-skills.shtml>