Student Exploration Guide:

Finding Your Way…

Learning to Use Orienteering Skills

No road signs here!

nassau BOCES
Board of Cooperative Educational Services

Outdoor and Environmental Education Program

(516) 396-2264
www.nassauboces.org/outdoors

Get Ready to Explore!

This guide will prepare you for your field trip to study orienteering skills – using a compass and map – that will help you find your way. It's a great skill to have. As a bonus…you'll discover many types of amazing animals and plants during your stay with us.

What will happen on your Field Trip?

Your bus will arrive at one of our Nature Centers and you will be assigned to a group. You and your classmates will be working together with one of our naturalists.

Caumsett Environmental Center

A naturalist is an outdoor educator who has studied many topics about the outdoors and they know lots of great ways to help you understand the subjects you may be learning in school. But now, you will get to see it first hand - not just from a book. It's a great and fun way to learn!

Brookville Environmental Education Center

Don't forget to dress for the weather and the season! Dressing in layers is the best way to make sure you will enjoy your day. And bring along your good observational skills and a questioning mind!

What is Orienteering?

Orienteering is a sport using a map and compass to find your way along a set course. The actual term "orienteering" was first used in 1886 at the Swedish Military Academy. It explained how to cross unknown land with the aid of a map and compass. It became a competitive sport in 1893 when the first competition was held for the Swedish military. The first public competition was held in Norway, in 1897.

After World War I, orienteering was seen as a way to interest young people in athletics. The sport became even more popular in the 1930s when better compasses were developed. and after World War II, it became popular world-wide.

The International Orienteering Federation is working on getting it included as an Olympic sport!

What is a Compass?

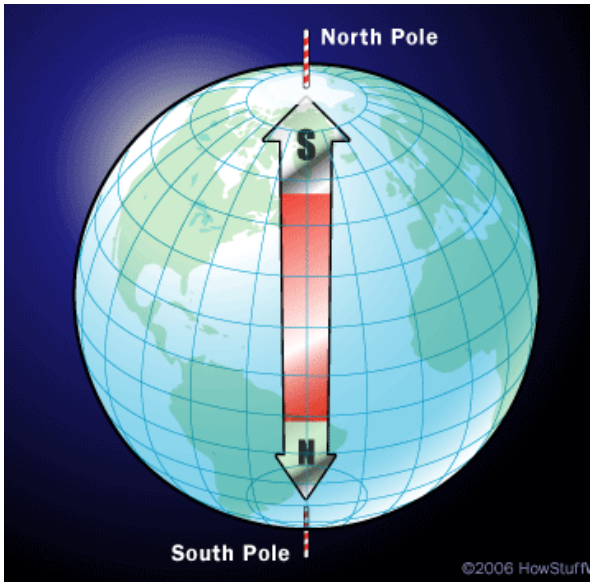
Early Chinese compass with a lodestone spoon handle that pointed north

One of the most familiar navigational tools in the world is the compass and it can be used as a tool to find direction on land, at sea, and in the air.

Compasses were first used by the Chinese, perhaps as early as 206 BCE and by the 1st Century CE, the compass became the navigational tool used by explorers around the globe.

With little understanding of how the compass needle worked or the science behind it, the compass was thought to be a source of magic or witchcraft. Some ship captains were forced to hide their compass!

How do Compasses Work? (Text and graphic from ***How Stuff Works***)

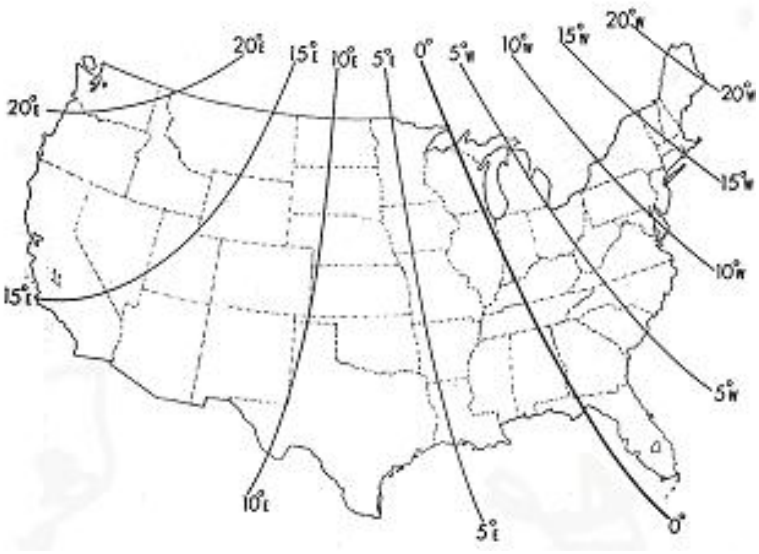


Think of the Earth as having a gigantic bar magnet buried inside. In order for the north end of the compass to point toward the North Pole, you have to assume that the buried bar magnet has its south end at the North Pole, as shown at right.

If you think of the world this way, then you can see that the "opposites attract" rule of magnets would cause the north end of the compass needle to point toward the south end of this imaginary buried bar magnet. So the compass points towards North.

But which North? The Earth's magnetic field attracts the compass needle to point toward the **Magnetic North Pole**. But this is not the same as **True North** or the **Geographic North Pole**. Magnetic North is located 1,400 miles south of the geographic North Pole off the northern coast of Canada.

This is because the magnetic core does not run exactly along the Earth's axis. It is shifted slightly off center and this shift is called the **declination.** Most good maps indicate what the declination is in different areas (since it changes a little depending on where you are on the planet).



The declination map at left shows that on Long Island, the declination is 14 degrees West. This difference is not important unless you are using both a map and compass to find your way. When using both, the simplest method is to orient the compass along the map's magnetic north lines.

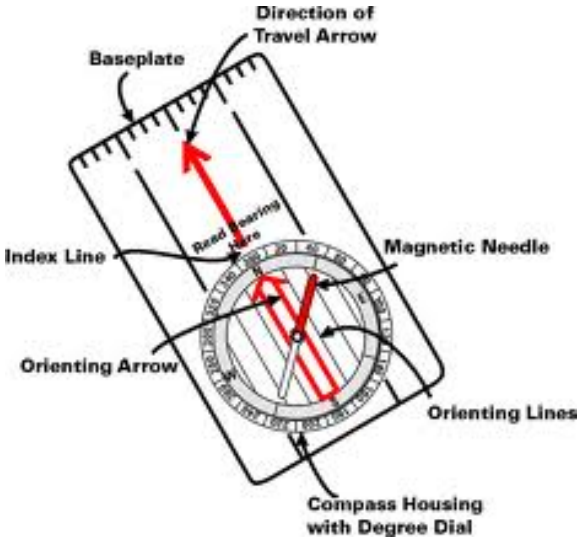
So to find True North, you would subtract the number of declination degrees (14°) from 360° (compass bearing for North) to equal 346°. The compass is now pointing to True North!

What will you do during your field trip?

Your naturalist will guide you through the different steps to teach you how to use the compass. The first place to start is to know the parts of the compass.

Parts of the Compass

There are three basic parts to an orienteering compass: the magnetic needle, the compass housing, and the transparent base plate.



1. The **magnetic needle** is suspended in the housing and can swing freely if the compass is held parallel to the ground. The north end of the needle is painted red.

2. The **compass housing** has a dial that can be turned clockwise or counter-clockwise. It is marked along its outside rim with the initials of the four "cardinal points": N, E, S, W. It is also divided into degree lines. Each line on the housing represents two degrees, with every 20 degrees marked by a number. On the inside bottom of the compass housing, there is an "orienting-arrow." Whenever the red, north end of the magnetic needle lies over the orienting-arrow, pointing toward the letter "N" on the rim of the housing, the compass is "oriented," to the Magnetic North Pole.

3. The **base plate** is attached to the compass housing. It is transparent so that you can read a map through it. has a direction line and a direction-of-travel arrow. The side edge and front edge are marked for measuring.

Your naturalist may have some fun ways to help you remember the compass parts and how to use it correctly. You will probably hear many different "shortcuts!"

Now that you know the parts, the next step is practicing to get compass bearings. A bearing is given in degrees and represents your forward direction. The simplest ones to find are for the four Cardinal points:

N = North: 0° or 360° E = East: 90°
S = South: 180° W = West: 270°

This compass is set to a bearing of 310°

Your naturalist will give you lots of different bearings to practice "dialing in."

The next step is learning to hold the compass correctly - the student in the photo at left is holding it so that the Direction of Travel arrow is pointing toward the direction he wants to travel.

And finally, you'll need to know how ***far*** to travel! Your Naturalist will show you the correct way to count paces instead of steps. A pace is a double step and a common way to count a pace is: "And 1 …and 2…and 3…" Those 3 paces actually equal 6 steps

Depending on the type of Orienteering program your teacher has selected, you are now ready for a course (Orienteering I).

If your teacher has selected our Orienteering II program, you'll now need to know how to orient your compass to a topographic (topo) map.

Orienteering II: Map and Compass

Orienteering combines the use of a topographic (topo) map and compass to determine the distance and direction of travel from one point to another. A topo map is one that uses contour lines to show elevation or depressions in the land and different shadings to show dense woods or open fields. Understanding the Legend on the map will help you to determine the easiest path to follow. Following a winding trail or road may actually be faster and easier than hiking a straight line through dense woods or up a steep incline.

Try this! To better understand contour lines, imagine your knuckles are a mountain chain and the back of your hand is a sloping valley. Draw contour lines using a washable marker and then flatten out your hand – you have now made your 3-D hand into a 2-D topo map version!

Orienting the Map to your Location

Set your compass on 360°North. Place the compass on the Declination Diagram located in the lower margin of the map. The direction-of-travel arrow and the side edges of the base plate should be parallel with the Magnetic North line of the diagram. Then rotate the map, keeping the compass aligned until the red magnetic needle lies above the orienting arrow. The map and compass are now oriented for use.

Determining Direction and Distance

Now that the map is oriented, DO NOT MOVE IT until you have determined your direction of travel.

Place the compass so that its side edge touches both your starting point and your destination. Orient your compass. ("put Jack in the shack!"). The number on the rim of the housing, which touches your direction, will be the bearing you should follow.

Using one of the map scales located in the lower margin of the map, measure the distance you must travel to reach your destination.

Reaching Your Destination

Once in the field, hold the compass in front of you with the direction-of-travel arrow pointing straight ahead. The compass should be set on the degree bearing in which you are to proceed. Rotate your body until the red magnetic needle lies above the orienting arrow. Proceed in this direction for the determined distance until you reach your destination.

You can measure distance in the field by pacing. As described earlier, a pace is a double-step - you count only every time your left (or right) foot touches the ground. The length of the average adult's pace is approximately five feet. To determine the length of your pace, lay out a step course 200 feet long. Walk it twice and then divide the number of steps into the 400 feet covered.

The skill of using a compass and map is only one of the many ways to "find your way."
Using GPS and natural observations – such as the positions of the sun and stars, moss on trees, etc. can all help you in your journey!

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