



# Orienteering I

*This class was previously called Circle Compass Course.*

## **Program Purpose:**

The purpose of this course is to introduce compass work to students in a team setting.

**Length of Program:** 1 Hour

**Ages:** Grades 3<sup>rd</sup>-5<sup>th</sup>

**Maximum Number of Participants:** 20

## **Objectives:**

After completion of this course students will be able to:

- Name the parts of a compass.
- Describe how the parts of a compass are used.
- Work together to complete an introductory level orienteering course.

## **Wisconsin Standards:**

**D.8.1** Identify and describe attributes in situations where they are not directly or easily measurable (e.g., distance, area of an irregular figure, likelihood of occurrence)

**D.8.3** Determine measurement directly using standard units (metric and US Customary) with these suggested degrees of accuracy (e.g. angles to the nearest degree)

**E.8.1** Participate in a variety of health-related activities in both school and nonschool settings in order to maintain a record of moderate to vigorous physical activity

**F.8.6** Work cooperatively with a group to achieve group goals in competitive as well as cooperative settings

## **Preparation:**

Before the class arrives:

- Locate the Circle Compass Course Box.
- Make sure there are enough course sheets for all the students.
- Make sure there are enough golf pencils in the box.

## **Basic Outline:**

*Background Information optional*

- I. Compass Parts. (5 min)
- II. Walk a Straight Mile. (10 min)
- III. Square Course. (10 min)
- IV. Circle Compass Intro. (5 min)
- V. Circle Compass Course. (25 min)
- VI. Clean Up. (5 min)

## **Materials:**

- 20 Compasses
- Large Teaching Compass
- 10 Visors with bandannas attached
- Course Slips
- Golf pencils
- Course Answer Key
- 10 Clip Boards

## **Background Information**

The information below can be included to the extent appropriate based on age of the students, time allotted for the class, and specific educational objectives of the group. First introduce yourself and give them a general idea of what the class will contain.

## **History of a Compass**

The earliest known examples of a compass were invented by the Chinese as early as 2600 BC. They used lodestone (a mineral containing iron oxide which aligns itself in a north-south direction). Magnetized needles were used as early as the 8th century AD in China for navigation.

## **History of Orienteering**

Orienteering began in Scandinavia in the 19th century. It was primarily a military event and was part of military training. It was not until 1919 that the modern version of orienteering was born in Sweden as a competitive sport. Ernst Killander, its creator, can be rightfully called the father of orienteering. In the 1930's, the sport received a technical boost with the invention of a new compass that was more precise and faster to use. The Kjellstrom brothers, Bjorn and Alvan, and their friend Brunner Tillander, were responsible for this new compass. They were among the best Swedish orienteers of the thirties, with several individual championships among them. Bjorn Kjellstrom brought orienteering in the US in 1946. Orienteering was first done on cross-country skis; it was soon adapted to foot, which is now the most popular variety. Orienteering is now done on all inhabited continents.

The standard type of foot orienteering is a point-to-point orienteering. A course of controls (checkpoints) to be found in a specific order is laid out. Lengths vary from a few kilometers (a mile or two) for beginners to ten or fifteen kilometers for experts. Longer distance orienteering events and short 'sprint' events are also done. Beginner courses are on trail; expert courses are cross-country with intricate navigation. Ski orienteering

is done on cross-country skis. It involves careful route choice through a large trail network. ROGAINE is a long distance variety of the sport origination in Australia. It takes place over large areas and longer periods, usually 12 to 24 hours. Teams of two or more navigate over often-rugged terrain, eating and sleeping on the clock.

### **How a Compass Works**

A great way of demonstrating how a compass works is with a bowl of water, a magnet, a needle, and something that floats (a milk cap or leaf). Take the bowl and set it on the ground or a table, being careful not to place it on anything metal. Using the magnet, magnetize the needle by stroking the needle 10-20 times in the same direction with the magnet. Place the floating object on the surface of the water and gently place the magnetized needle on the floating object. If there is no wind blowing, the needle should slowly turn to face north-south.

Ask the students what surrounds the entire Earth that causes the magnetized needle to turn- a magnetic field! So if you stand in the middle of Wisconsin, where will the needle point? How about South America? Africa? China? IT ALWAYS ALIGNS IN A NORTH-SOUTH DIRECTION, parallel to the magnetic field of the Earth. Ask the students why the magnetized needle always points north. It is because the strongest pull is at the North Pole. If you think about the earth having a great bar magnet in the middle, then the 'opposites attract' rule applies because it's a magnet. The North Pole would have to have a south pull to it, therefore all compasses always point north. No one knows for sure what's going on, but there is a theory of why this works. The Earth's core is thought to consist largely of molten iron. But at the very core, the pressure is so great that this super hot iron crystallizes into a solid. Although it's liquid metal, it moves around through a process called convection. The movements of the metal in the core cause the **liquid iron** to move in a **rotational pattern**. It is believed that these rotational forces in the liquid iron layer lead to weak magnetic forces around the axis of spin. The magnetic field is very weak, since the Earth is over 8,000 miles in diameter, so something like a nail or even some electric wires overhead could affect the compass from reading correctly. The magnetic field is also responsible for the Aurora Borealis (Northern Lights).

For older students, you may want to point out that magnetic north is not true north. Why is this? It is because the Earth is tilted on its axis. The difference is called declination. Depending on where you are in the world, the difference can be so significant that additional math must be done before a compass can be used accurately. Declination is calculated by the angle made between true north and magnetic north.

### **WISCONSIN DELLS WISCONSIN**

**Latitude: 43° 37' 38.9" N**

**Longitude: 89° 46' 15.5" W**

Magnetic declination: -2° 15' WEST

Declination is **NEGATIVE**

### **How to Use a Compass:**

Have the students form a semi-circle and pass out the compasses.

- First, demonstrate the proper way to hold a compass. This should be done with the large demonstration compass. To properly hold a compass you should have the compass level in your hand a few inches from your body. The 'that-a-way' (Direction of Travel, a.k.a. "Fred") arrow should be facing the same direction as your nose and the smart cord should be attached to the side closest to your body. It is important to make sure all students are holding the compass level or the needle will not move properly.
- Second, explain "Fred" (Direction of Travel) arrow and its purpose. Fred is the painted on arrow that is located on the plastic plate in front of the dial. This is the arrow that you will follow every time you take a bearing. Make sure they know this is the arrow that will be pointing the correct direction when all of the following steps are done correctly.
- Third, Point out "Red" (the north arrow) and explain that is drawn magnetically to the north. It is a very common mistake to follow Red and get lost so make sure you emphasize that red is a liar. Ask the students which direction Red will take them. Is that is the direction they always want to walk? You cannot emphasize enough that Red is pointing the wrong direction 99% of the time.
- Fourth, show the students where the "Shed" is. Shed is located inside of the dial. Shed is painted on and only moves when the dial is turned. It can be located easily by looking at the dial and finding the N. Shed is always pointing at the N. Shed and Red are friends and always want to be together so you should turn you compass so Red and Shed are together. This means the north arrow should be directly on top of Shed. ("Put Red in the Shed and Follow Fred.")
- Fifth, show the students the dial. Ask the students how many degrees are in a circle. Explain that there are 360 degrees in a circle and 360 degrees on your compass. The students should know that each white dash line on their dial represents two degrees so the odd degrees are located in between the even degrees and do not have a white dashed line.
- Sixth, hold up your demonstration compass and point out the bearing notch. This is a small white line under the dial. It can be found by looking at Fred and following it back to the dial. The bearing notch never moves and is always directly lined up with Fred.

Now that the students know the parts of the compass you can show them how to use them to set a bearing.

*To set a bearing:*

1. Turn your compass until 200 degrees is directly on top of the bearing notch. Walk around to each student to check.
2. Make sure the students are all holding their compasses in the proper form.
3. All students should now turn their bodies until Red is on top of Shed. Make sure the students do not turn the compass, just their bodies. It may help to tell them their noses should always be pointing in the same direction as Fred and their necks cannot turn.
4. Red is now on top of Shed, so ask the students to point in the direction of Fred. Go around to all students that are pointing the wrong direction. The most common problem here will be that they are pointing north, so just reiterate that Red is a liar and show them Fred again so everyone is pointing the same direction.

You should do this until all of the students are confident in setting a bearing. This will probably take three to five tries.

*Walk a Straight Mile*

*This activity is used to show students that they need to keep their heads up and not stare at their compasses.*

*Professional foresters use target trees. A target tree is an object (usually a tree) that is stationary, easily identified, and located exactly in the direction you are traveling. Without a target tree you are compelled to walk to the right and your compass is not made to compensate for this natural draw to the right.*

*To demonstrate this point, have the students get a partner. The students should be lined up facing each other with about fifty yards between them (the sandlot is the safest place to do this). Have one of the partners point Fred at their partner. Now have them turn the dial until Red is on top of Shed. Have them read the bearing and make sure all of the students have about the same bearing. The student who set the bearing should be given a visor with attached bandana and instructed to put it over their head and compass. They will now walk forward using only their compasses until they reach the other set of students and see how close they came to their partners. It probably won't be very close. For safety, have all of the adults in the group go out and help to avoid collisions. Have each partner do this once.*

*Square Course*

To do the square course: have the students mark a spot on the ground; they can put a hat on the ground or make an X with their foot. Have the students stand directly on their spot and instruct them to take five steps at any

bearing you choose. Now add 90 degrees to that bearing and have them take another five steps. Do this two more times and the students should be standing on their original spots again. Try the course three or four times making the square larger and larger each time to make it more challenging.

*Example Bearings*

100,190,280,10  
50,140,230,320  
90,180,270,360  
250,340,70,160  
25,115,205,295  
160,250,340,70  
310,40,130,220

**Circle Compass Course Intro:**

Show the students the course sheets and point out any of the posts you can see. For the course sheets, you should first make sure everyone is clear where the starting point is located on the course sheet. The starting letter is located in the upper right hand corner of the sheet. When they are clear on where to start, it is important to make it clear exactly what they should do. From their starting points, they need to set the first bearing and follow that bearing until they reach another post. When they reach that post they should write the letter on the post next to the first bearing. Now set the second bearing and their starting point is the second post. This is repeated for all of the bearings.

**Circle Compass Course:**

The circle compass course is a series of posts set up in a circle around a central point. Each post has a letter on it and the students will be going from post to post according to the bearing that is on their course sheets. After arriving at each post, the students should write down the letter they find on each post.

For the actual course, you will start out by helping the groups find any posts they can't locate. If you see a group having trouble, it is easier to help them in the beginning than after they have completed the course. The answer key is in the circle compass course box (which should be brought out with you) and is used to see if the student did the course correctly. Have the groups do several courses until the time is up.

**Wrap Up:**

Ask for any questions or comments from the students. Talk about careers that will use a compass (such as surveying, cartography, forestry; most branches of the military (i.e. army, navy), and also recreational activities that involve the use of a compass (such as hunting, off trail backpacking or hiking, etc.).

**Clean Up:**

Make sure all the course sheets have been collected so they don't become litter. Make sure you have all the compasses, golf pencils and clipboards. The CCC box should be returned to the workroom.

**References:**

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