



## Program Purpose:

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

**Length of Program:** 1 ½ hours

**Ages:** Grades 3<sup>rd</sup>-12th

**Maximum Number of Participants:** 25

## Combined Materials List (not used in every activity):

20 Compasses  
Large Teaching Compass  
10 Visors with bandannas attached  
Laminated Course sheets, cards & sample card  
Water & paper towels  
Vis-à-vis Wet Erase markers  
Course Answer Key & Map  
10 Clipboards  
2 Hula Hoops  
Compass Bearing relay race cards

## Objectives:

After completion of this course students will be able to:

- Explain what the parts of a compass do.
- 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 non-school 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:

- Consider the age and experience level of your group, as well as your own comfort level with compass work. Select activities in this plan that are a good fit for the time frame and age of the group.
- Set the laminated cards at each numbered location on the course, using the map as a reference.
- Check the “Circle” course for obstacles or hazards and remove any blocking the path (wheelchair accessible course).

- If necessary, clean the laminated course sheets

**Basic Outline:** This lesson plan includes some guidelines for a starting and ending discussion, facilitation instructions for a variety of activities, and estimates for how long each activity will take. You will not have time to do everything, so pick the activities you think are the best fit for you and the group.

At a minimum, you should include the parts of a compass, how to use a compass, pace measuring, siting/obstacles, and have youth attempt one or more of the cabin hill courses. The talking points are a helpful guide, not a script; modify according to your own teaching style.

## *Activities included in this lesson plan:*

- I. **Introduction (5 minutes)**
- II. **Parts of a compass (10 Minutes)**
- III. **How to use a compass (10 minutes)**
- IV. Quickdraw McGraw (5 minutes)
- V. **Pace measuring (10 min)**
- VI. Shapes game (10 min)
- VII. **Siting & Obstacles/Walk a straight mile (10 min)**
- VIII. **Cabin Hill Compass course (25 min)**
- IX. Compass Bearing relay race (15 min)
- X. **Conclusion (5 minutes)**

## **INTRODUCTION (5 minutes)**

Begin the class by asking students what sorts of tools they use to find their way, or navigate, their own environments. Many students will probably mention a cell phone or GPS. Although these tools can be useful, there are times when lack of reception or interference can make them unreliable. Explain to the students that today, they are going to be practicing navigating with an older method, using a compass. Ask youth to rate with their thumbs how comfortable they currently feel using a compass. Reassure youth that if they can repeat the phrase, “Put Red in the Shed and follow Fred,” they can use a compass successfully and you will teach them how.

## **PARTS OF A COMPASS (10 Minutes)**

Begin by giving each student a compass and instructing them to place the string around their neck to prevent damage to the compass. (Swinging the compass by the lanyard creates air bubbles and interferes with the normal functioning of the compass; instruct youth to **not do** this). Ask them to observe as many things as they can about the compass as you identify them using the **large demonstration compass**. Although individual compasses will look slightly different, all models will

have these four basic parts.

**Baseplate:** (#10) Clear plastic foundation of the compass. This is the part youth “plug in” to their front chest or stomach area with the “Direction of Travel arrow” pointing away from them and keeping the compass flat and level.

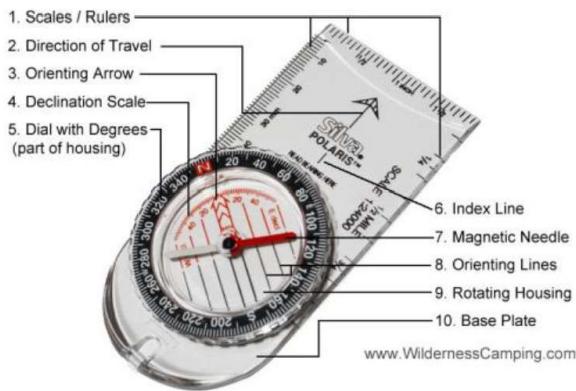
**Direction of Travel arrow, “Fred” (#2):** With correct compass use, it shows you the direction to travel, or which way to go. “Read Bearing Here” is printed on the baseplate below this arrow.

**Housing or Dial:** (#5) Moveable circular dial mounted on the baseplate; there are 360 degrees corresponding to the degrees in a circle.

**Index Line:** (#6) When setting your compass to a bearing, turn housing/dial until the desired degree lines up with this point.

**Magnetic needle, “Red”:** (#7) The floating red half of the needle that always points to magnetic north.

**Orienting Arrow, “Shed”:** (#3) Located in the center of the housing/dial; when the magnetic needle, “Red,” and orienting arrow, “Shed,” are lined up, follow the direction of Travel arrow, “Fred,” to your destination.



“Put Red in the Shed and follow Fred.”

#### HOW TO USE A COMPASS (10 Minutes)

- First, demonstrate the proper way to hold a compass with the large demonstration compass. “Plug in” the compass to your front chest or stomach area with the “Direction of Travel arrow,” or “Fred,” pointing away from you and keeping the compass flat. The arrow should be facing the same direction as your nose and the compass should be level or the needle will not move properly.
- Second, ask for a volunteer to pick one of the whole numbers they see on the dial. These numbers correspond to the number of degrees in a circle from 1 to 360 (also 0). The degree number is called the “bearing.” Instruct the youth to turn

their dials until that number of degrees, the bearing, is lined up with the Index line inside the housing and “Fred,” the direction of travel arrow. Once the dial is set so that Fred is at the desired bearing, they should NOT touch the dial again until they need to change directions.

- Third, youth should turn their **ENTIRE BODY, not the compass**, until the magnetic needle Red is lined up, or stacked on top of, the orienting arrow, or Shed. Youth should now point in the direction of Fred. (“Put Red in the Shed and follow Fred.”) They have just successfully taken their first bearing.
- Walk around to check that all youth are pointing in the same direction, correcting where necessary. Common mistakes will include turning the compass in their hands while standing still, or pointing where the red needle is (north).
- Fourth, ask all youth to observe the four letters (N, E, W, S) on the compass and what they stand for (north, east, west, south). What are the bearings for each? (North = 0 or 360; East = 90; South = 180, West = 270.) These are called the **cardinal directions**. Ask for another volunteer to pick one of the cardinal directions and have all youth orient themselves towards that bearing.
- Walk around to check that all youth are pointing in the same direction, correcting where necessary.
- Fifth, prompt them to look at the ‘hash marks,’ or vertical lines, in between the numbers. They will note that all the numbers on the dial are multiples of 20. Ask what the longer hash marks are in between the numbers (10 degrees, 30 degrees, 50 degrees, etc.) Ask how many short hash marks are between the white numbers on the dial and the longer hash marks (4). Ask then how many degrees do the shorter hash marks represent? (2). Ask how many degrees the spaces in between the short hash marks represent? (1) Ask for another volunteer to pick an odd number bearing.

#### QUICKDRAW McGRAW (optional) - (5 Minutes)

A fast but fun review of compass bearings. Give the first bearing and ask all youth to point in the direction of that bearing. The first student to point in the correct direction names the next bearing, and so forth.

#### PACE MEASURING (10 Minutes)

Knowing the correct bearing is just the first step in using the compass; the second is pacing. Youth will have to travel a given distance following a particular bearing to reach a destination point. Roll out the 100' tape measure to about 50 feet. Explain that a reasonably close way to measure distance when navigating is to keep track of paces. A pace is simply two steps. When someone knows how much distance one of their paces covers (the distance covered in two steps), that person can measure distance accurately by keeping track of the number of paces they

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take. Demonstrate this along the 100 ft tape measure. Take a regular step with one foot, saying “AND”, then a regular step the other foot, saying, “one.” Demonstrate again two more steps with, “and...two,” continuing for a few paces. To check for understanding, start over and silently walk a number of paces, then stop and ask youth how many paces you walked.

Ask all youth to line up at the start of the tape measure. Explain that each individual’s pace is different based on how far their steps are (or the distance traveled in one complete wheel rotation for those in a wheelchair). To be most accurate in navigating with a compass, it is important to know what your own personal pace measures. Youth will be counting out the distance of their own paces by counting the number of steps (or wheel rotations) they take from the end of the tape to 20 feet.

The next step is to do some math. Ask the youth to take 20 and divide by the number of paces they took.

*Example:*

- Youth 1 traveled 20 feet in 5 paces.  $20 \div 5 = 4$  feet. Her pace is four feet.
- Youth 2 traveled 20 feet in 7 paces.  $20 \div 7 = 2.8$  feet. His pace is 3 feet (round any decimals to the nearest whole number).

Demonstrate that now instead of counting “and 1 and 2” every time they walk, they should count off by the number they figured out for their pace. Student 1 should count “and 4 and 8 and 12,” etc. In three paces, she has traveled 12 feet. Student 2 should count “and 3 and 6 and 9 and 12,” etc. In four paces, he has traveled 12 feet.

Once each youth has figured out how much ground they cover in one pace, you can have them practice travelling set distances. Pick multiples of 5 or 10 and see how close the students can come to hitting the distance. The standard pace for professional orienteering is 5 feet. Most adults have a pace close to this standard, but most youth have a smaller pace.

### ***SHAPES GAME (optional) (10 Minutes)***

Ask each youth to find something that can be used to mark a place for standing. Have them spread out and place those items on the ground where they are standing.

Explain they will be tracing out some shapes with their feet. As long as they start and end at the same place (marked by the item they placed on the ground) they have correctly marked out the shape. You will read both a direction to travel in, and a number of paces to take in that direction.

Use the shapes key from the orienteering supplies, and progressively use more and more difficult shapes. If time allows, you can have students try and create their own shape to trace out.

### **Key for shapes game Square (10 paces)**

45, 135, 225, 315

### **Triangle (10 paces) 30, 150, 270**

### **Hexagon (10 paces)**

40, 100, 160, 220, 280, 340

### **Isosceles Triangle**

0 (10 paces), 150 (10 paces), 275 (5 paces)

### **SITING/OBSTACLES (5 minutes)**

Many times youth will not be able to see their final destination from the starting point. In this case, youth need to use an object to walk towards other than their final destination. 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 in the direction of your hand dominance and your compass is not made to compensate for this natural draw.

Additionally, youth may encounter an obstacle while traveling to their destination. When this occurs, youth should hold out one arm at a right angle (90 degrees) from their bearing heading. They should side step, counting the number of steps, just far enough to clear the obstacle, then pick up the pacing count, traveling just far enough to pass the obstacle. Then youth should hold out the opposite arm at a right angle (90 degrees) from their bearing and side step the same number of steps. The obstacle should now be directly behind them. They should then recheck the bearing, site a new object directly in line with the bearing, and pick up the pace count to continue towards the destination.

### ***WALK A STRAIGHT MILE (optional) (10 Minutes)***

This activity is used to show youth that they need to keep their heads up and not stare at their compasses. To demonstrate this point, have the youth each get a partner. They should be lined up facing each other with about fifty yards between them (the playing field 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 youth 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 youth and see how close they came to their partner (it probably won’t be very close). For safety, ask all of the adults in the group go out and help to avoid collisions. Ask each partner to do this once.

### ***CABIN HILL COMPASS COURSE (25 Minutes)***

Gather all youth near the Pelican; this location represents the start and end of each course. Show students the laminated course sheets. Each course is represented by a shape (square, triangle, etc.) There are open shapes (black outline, white inside) and filled shapes (all black).

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\*\*\*The Circle course is the wheelchair accessible course.

The first bearing and distance is given on the course sheet. When they reach the first point, they will encounter a set of laminated cards (show the sample card). They should find the card with the same shape (open or filled) as their course. They should write down on their course sheet in the table:

- The number of the point;
- The next bearing;
- The distance they should travel; and
- The beginning of the quote in the quote box

Every time they reach a destination, they should follow the same procedure. If they completed the course correctly, they will have a full sentence quote that will make sense and will learn who said it.

Ask the youth to partner up and hand out course sheets. You may ask which partnerships are feeling more confident (give them a more challenging course according to the Master Location/Difficulty Key, or an easier course). If partners finish one course, give them a second to try.

### **COMPASS BEARING RELAY RACE (optional) (15 Minutes)**

*Materials: Cones, Hula hoops, bearing cards*

-Divide the youth into two teams, and place a hula hoop several yards in front of each team. Designate a starting area and have each team stand there. Give each team a set of bearing cards, and make sure that each student gets at least one.

-For the compass bearing relay, each team will send one member up at a time. That member will run to the center of their team's hula hoop. In the hoop, they will orient themselves to be facing the direction on the card, and then place the card on the outside of the hoop in the direction they are facing. When the card is placed, the student runs back to their team, and the next person in line will go. This repeats until every card is placed.

-The end effect of this is that the cards will be placed around the hoop in order from 0 to 360. Essentially, the students are turning each hoop into a giant compass dial, and if done correctly, the cards will line up where those actual bearings are if the center of the hoop is used as a starting point.

-When the game is complete, go to each hula hoop and use your own compass to check the accuracy of the team's placement. It will not be exact, but it should be close to count as correct. Also, the cards should be in order: for example, no 70, 110, 90. If time allows, play the game again for extra practice.

### **CONCLUSION (5 Minutes)**

Ask the youth to rate with their thumbs how confident they feel in using a compass now compared to what they felt at the beginning. Tell the youth that there are more advanced

ways to use a compass, such as in competitive orienteering when participants are given a map with destination points and they must determine the bearing using the map and compass. There are "Amazing Race" type competitions that utilize this style of orienteering. Ask if they can think of situations or reasons why sometimes compasses are better than GPS, or vice versa.

### **Clean Up:**

Ask youth to clean the laminated cards using the spray & paper towels. Recollect course sheets, clipboards, wet erase markers & compasses. Return materials to the kit if the course is not immediately being taught again.

