Hi there,
Are you a unit leader who has little to no experience with using a map and compass to navigate? Are you new to Orienteering? Have you been surprised to find that there are 2 Scouts BSA rank requirements that require map and compass skills?
If you answered yes to any of those questions, know that you are not alone and this guide was written for you!

I started in Scouting in 2013 with my son. He was a Tiger and his Pack had traditionally run a station at our local Klondike derby for Webelos, that required scouts to repeatedly set a bearing on their compass and follow it across a circle, taking note of the letter on the markers that they were directed towards.

I had no idea how to do this but Leaders were needed to run the station. It turned out that very few of the other scouts and leaders knew how to do it either! That started my fascination with all things map and compass. I educated myself and my fellow leaders in the Pack on Cub level compass navigation and when my son moved up to the Troop level, I expanded my map and compass knowledge with Orienteering. I became an Orienteering merit badge counselor and also became the go-to leader for The Second and First class rank requirements involving map and compass skills because, as it turns out, Troop leaders didn't necessarily have those skills either!

Again, seeing a need for better leader education, I am writing this all in one guide to cover the basics from Cubs to Troops so Leaders don't have to break into a cold sweat when they see a map and compass skill event at a Cub event, or when a scout asks for help with Second Class rank requirements 3a & 3b, and First Class rank requirement 4a.

This guide covers the basics and should be sufficient to get you through teaching your scouts what they need to know. If you're anything like me, it may just even spark an interest to deepen your knowledge and gain a new outdoor hobby

Michelle Joyce
SM Troop 1920 Plymouth.

Setting a bearing:

Cub scout leaders should start the Scouts out with just the most basic compass skill, setting a bearing. Troops should also make sure that their scouts understand this concept first because it is the cornerstone to understanding how to keep yourself safe.

Before we get into that, to better understand how to use a compass, you need to understand how a compass works. It is really very simple. The Earth is a giant magnet. Because magnets interact and align themselves in specific ways in relation to each other, we can use that alignment to figure out where we are relative to the North pole of the Earth. It really is that simple!

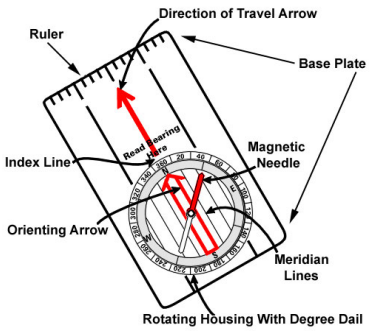
The more sophisticated your compass use becomes, the more things you'll have to pay attention to, like declination, but for the basics of using a compass over short distances, that is the whole ball of wax!
This is helpful when you're teaching Cub Scouts how to set a bearing and follow it. That's as deep as the conversation should be, because there are a lot of steps for elementary school kids to learn to follow a bearing.
If you are consistent with the steps, they become a kind of dance that anyone can learn, even your most excitable Tigers!

The dance steps, in their most basic form are:

- Spin the dial until the number you want is where you want it
- Hold the compass flat in your hand so the guiding arrow points directly away from you.
- Turn your entire body to put the red needle in the shed

That's it! You can assist Tigers with these basic steps and get them used to following a bearing you set for them if you'd like. As your scouts become older, you can move into the proper terms for the parts of the compass, have them set the bearing, and help them learn the lingo.

The important compass parts to know are:
The **degree dial**
The **Index line**
The **direction-of-travel arrow**
The **magnetic needle** and the **orienting arrow**



So the dance with the proper lingo becomes:

- You spin the degrees dial until the bearing # you are looking for aligns to the index line.
- You hold the compass flat in front of you with the direction of travel arrow facing away from you
- You turn your whole body until the magnetic needle (red needle) aligns with the Orienteering arrow (aka the shed, which is always North)

***The only tricky part is that you follow the direction of travel arrow, NOT the orienteering arrow**
(You'll ALWAYS walk North if you follow the orienteering arrow instead of the direction of travel arrow!)

If parents want to buy a compass for their scout, they need to be looking for an orienteering compass. In my years of teaching map and compass skills I've seen scouts show up with everything from zipper pull compasses all the way up to military issue compasses.

A basic Silva orienteering compass runs from $10 to $20 and can be found at the Scout Shop, Walmart, or Amazon just to name a few places. Take note, on some compasses the "shed" can be a red shed, or a set of dots next to each other. Just make sure the dial turns and the rest is semantics.

(There is a one page flyer is at the end of this document that you can hand out to your scouts)

Troop Skills:

From the most basic skill of following a bearing, you can expand your skills by understanding a few simple concepts:

- Declination
- Orienting a map
- Thumbing a map
- Orienting a compass to a map

Declination is the difference between true North and magnetic North. Depending on where you are on the planet, you'll have to adjust to the East or the West. For us in the Northeast we adjust West, which means you ADD that # to your bearing. The popular mnemonic "*West is best, East is least*" cues you to add West declinations and subtract East declinations. In my hometown of Plymouth, we adjust 14 degrees to the West, thereby adding 14 to any bearing we are given. Some compasses let you set the declination by adjusting the bearing dial via a small set screw under the base. *Beware though, because if you travel to an area with a different declination, you'll have to remember what you set initially and readjust.

If you're wondering if it matters, the answer is that it might! The further the distance you're traveling, the more off target you'll become if you don't adjust your bearing based on the declination of the area. If you're traveling short distances, with a small declination, you won't notice the difference. But the further you roam, the more off course you'll become.

For example, over the course of 300 feet, with a declination of 10 degrees you can be about 35 feet off course, but at that same distance, with a declination of 20 degrees you can actually be 90 feet off course!

Where you're heading also comes into play. If you're heading to a road, you might be ok, BUT if you're heading to a structure, being 90 feet off course could lead to getting lost pretty quickly.

One last fun fact, declination has been shown to change over time, so make sure you double check the current adjustment before you head out if it has been awhile between adventures or you have an old map!

Orienting a map is ALWAYS the most important thing you can do!
Maps are most useful when they are oriented in the same direction as the terrain around you. It is super easy to get lost if the structure on your right is not there on the map when you look down at it. Take a moment and look around, turn the map so the landmarks you can see around you are in the same direction/orientation on the map. Sometimes you need to use 2 landmarks to figure that out (like when you're in the woods) but if you look around, you should be able to sort out where you are with some time, observation, and patience.

Thumbing the Map:This is exactly what it sounds like. Once your map is oriented, hold it in a way that your thumb falls where you are. As you move, periodically relocate your thumb on the map. It will help you keep your map oriented which will help keep you from getting lost. Recheck your orientation at branches in trails and changes in direction to avoid getting lost.

Orienting a compass to a map: This dance has a few different steps, but with methodical practice, it becomes just a slightly more complex dance than setting a bearing, but it's a dance nonetheless.

The steps are:

- Align the edge of the compass with the map, ensuring the direction of travel arrow is pointing from where you are to where you're going
- Spin the dial to align the compass North with the Map North, using the meridian lines on the map and compass
- Hold the compass and turn your entire body to Put the Red in the Shed
- Follow the direction of travel arrow and thumb the map to keep your map oriented to your surroundings.

Let's look at each step:

Align the compass: Use the edge of your compass to connect where you are, to where you are going *MAKE SURE YOU POINT YOUR DIRECTION OF TRAVEL ARROW* ***TOWARDS*** *WHERE YOU ARE GOING*. The more carefully you do this, the more accurate you'll be when you arrive. If you have the direction of travel arrow pointing towards where you are, you'll be walking away from where you're going once you get moving.

<u>Spin the dial</u> to align the compass *meridian lines* with the Map North's lines. This is how you ensure that your map and compass are in agreement with overall direction. You are basically aligning North on your compass with North on the map so when you separate the two they are both aligned in the same direction. If you do this backwards, (Aligning the meridian lines with North on the compass pointing south on the map) you will be essentially setting North on the compass with South on the map, so when you put the red in the shed you're aligning North on the compass with South on the map. This will cause you to head off in the wrong direction. Also, If you don't take care aligning the lines as parallel as possible, you will veer off course.

<u>Put the Red in the Shed</u> Turn your whole body to align the red magnetic needle with the orienteering arrow (aka the shed). As you walk, keep checking to ensure that the red stays in the shed. If it isn't, you're losing your alignment with North and you will veer off course.

<u>Follow the direction of travel arrow</u> Once the red is in the shed, look up and pick a landmark ahead of you to walk towards. Walk towards that landmark and thumb the map to keep your map aligned with the world around you, checking the compass to ensure you're still on track. DO NOT walk with your head down looking at your compass, that's a sure fire way to get injured tripping over a root or stepping in a hole!

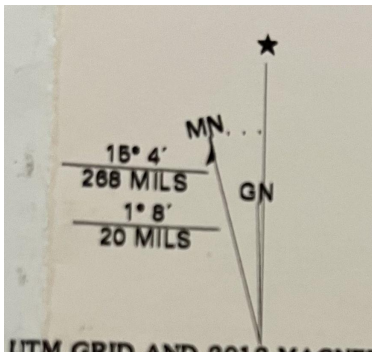
- Frequent checks of the map help to make sure what you're seeing in the environment correlates with what the map says you should be seeing to confirm you're on track
- Frequent checks of the compass alignment (keeping the red in the shed) also ensures your course is true. The compass will bring you to a general area, not a pinpoint location like a GPS. Use your eyes and the map to help zero in on your destination.

That covers the basics of using a map and compass together. The more you do it, the easier it gets! Just make sure to be methodical with the steps of the dance, be mindful with your alignments, and you'll find it's actually quite easy.

Next up, we need to talk about **map symbols**. The first thing you should know is that most maps have a key (aka a Legend) so don't sweat it!

If you're not sure about the symbol on the map, just look at the Legend. Different maps use different symbols to depict the landmarks. Roads are usually solid lines and paths are usually dotted, BUT it is important to familiarize yourself with the map you'll be using before you head into the woods! Topographic maps are the map of choice for orienteering and land navigation in the woods.

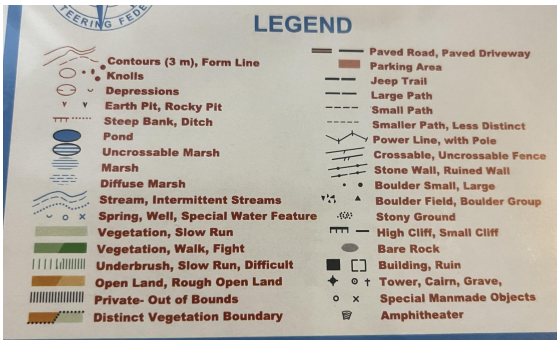
<u>Map Symbols</u>: Everyone should know how to find North on a map. It's pretty easy. Orient the map so you can read the words and North points up to the top. How your map chooses to depict that is unique to each map. It can be a simple Compass rose or some fancy graphics. How your map indicates North will depend on the specific intention of the map.

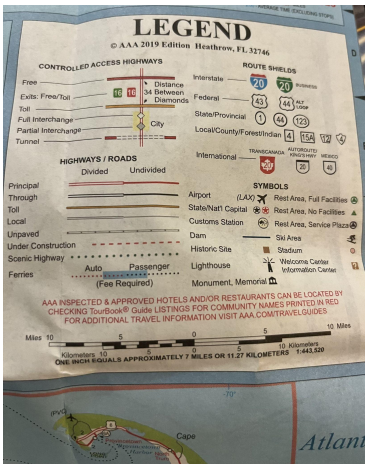


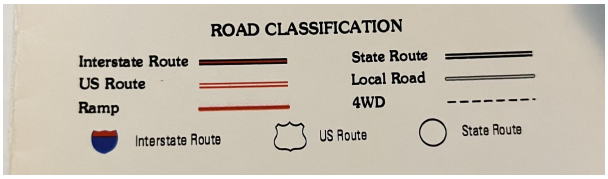
If you notice, the symbol on the left indicates declination is figured into the meridian lines on the map, the second says nothing about declination (it came from a road map) and the third notes both magnetic North (MN) and Geographic north (GN) (it came from a topographic map).

The map you want to use for map and compass work is a topographic map or, if you're orienteering, the course organizer should provide you with an orienteering map which is a specialized topographical map. Topo maps show contour lines that depict hills and valleys so you will know the 3D terrain on a 2D map. The simple explanation of a topographic map is the closer the contour lines are together, the steeper the incline. For basic orienteering, don't get too caught up in reading contours beyond that, because most destinations will be on or beside a walking path.

Legends: Legends will also differ by the intended use of the map. Here are some examples.







Again, depending on the map type, the legend will differ. The legend on the far left is from an orienteering map, the middle is from a road map,and the far right is from a topographic map. The important lesson to learn here is that the map has a built in answer key. Look at the legend to help you make sense of what is depicted on the map. It's not supposed to be a secret. The map is not trying to test or trick you, it literally gives you everything you need to know, you just have to know where to look.

The last skill I will cover is orienteering.

Orienteering is a sport that is the combination of all the skills we have discussed so far. Orienteering uses a participant's knowledge of map and compass skills and puts it to the test. You are given a map and tasked to find a series of numbered controls (aka checkpoints) along the course.

They can be low tech flags (aka kites) with letters on it, it may have hole punches attached, (like in the middle picture) or high tech bases called electronic punches that beep when you place your transponder next to it to record your arrival. (like the picture on the right)

If you are at an orienteering competition, you may see people running, stopping to look at their maps and then sprinting off as fast as they can. You may also see specialized thumb compasses that competitors use to shave a few steps off of the dance to better their times. There are many different types of orienteering events and there can be many levels at each event. Don't let that intimidate you! The beautiful thing about orienteering is that everyone can participate at the level they are comfortable with and all have fun. Events can be on foot, on bikes, or even skis!

At a scout orienteering event, you'll likely see some people walking and some people running. It's all based on their level of comfort with the task and the course type they are on.

Luckily, Orienteering events usually have a variety of courses set up so participants at different levels can all enjoy the day. Courses are graded from easy to hard by a standard color code. At most Scouting events you'll find 3 course designations:

- White course- easiest, for the beginner. Controls are on or beside a walking path
- Yellow Course -- for the experienced beginner. Controls are just off a walking path
- Orange Course -- for the intermediate orienteer. Controls are not linked to a walking path

Beyond those beginner course classifications come the more competitive course designations:

- Brown Course -- shorter course for the advanced orienteer.
- Green Course– medium-distance course for the advanced orienteer.
- Red Course -- longer course for the advanced orienteer.

Don't get overwhelmed by the lingo, it all boils down to using a map and a compass to navigate in the woods.

Orienteering maps can be overwhelming to look at at first. They are very colorful and very detailed! Both of these characteristics are purposely used to make it easier to find your way. It gets easier the more you work with them.

Orienteering map Characteristics:

An orienteering course is marked on a map with purple (or magenta) shapes and lines. The start is a triangle, the controls are in the exact center of circles (which are also numbered), and the finish is two concentric circles.

When you are aligning your compass, it is important to aim to the center of the control circle.

The map scale will tell you the distance between the contour lines to help you sort out how steep the terrain is, and it will also tell you the map scale so you can estimate the distance you'll have to travel between controls. It is important to note distances so you'll know if you may have passed a control or not as you walk.

The colors on the map correspond to different terrain characteristics and are intended to make it easy to decode the map at a glance.

Let's look at 2 important things you need to know before you take on your first course (besides how to use a map and compass together).

- Pace
- Map Colors

Pace: In its simplest form, your pace is the distance you cover with one full step. You measure your pace by walking a straight, measured 100 foot course. Most orienteering events have a marked area so you can recheck your pace before heading out.

- Attempt to walk with your normal gait for the measured distance and count the number of paces you take. *A pace is measured on 1 leg*, i.e. the number of times your left or right foot hits the ground, not each step you take with both feet.
    - It doesn't matter if you pick left or right, you just need to only count the number of times that particular foot hits the ground.
    - To improve accuracy, you should do this in both directions, and multiple times until you get a consistent number.
- When you have this number, divide 100 by your number of paces to find how long your pace is.
    - Ex. It takes me 21 paces to travel 100 ft. So I divide 100 feet by 21 (100/21 = 4.7). You would estimate your pace at about 5 ft per pace.
    - Remember this is an *estimation*, it will not be exact. It will just help you guesstimate when you have gone too far or still need to keep walking.

- In this particular example if I want to travel 400 feet I would take 400/5 = about 80 paces, give or take
    - Keep in mind, your pace will vary if going uphill (shortens), downhill (lengthens), when tired (shortens) so it IS NOT an exact measure. It is only an estimation. Use your map and your view of the surroundings to help figure out if you might be beyond the control you are looking for.

Map Colors are very important for orienteering maps. They can make orienteering maps look intimidating but, once you understand the basics, they make reading the map much easier. Fortunately, they are pretty easy to learn because they are reasonably intuitive.

Brown : features relate to topography. (Contours, pits, depressions, and knolls)
Blue : indicates water features. (Creeks, rivers, dams, marshes)
Black :Indicates rock features (boulders, cliffs, rocky ground) *and* man made features (tracks, roads, building, fences, powerlines)
White : runnable forest. *Take note if you're competing at a higher level!
Yellow/Orange : grass, open land
Green : various shades – slow forest to impenetrable (bushes and possibly thorns!)
Olive Green : out of bounds (houses, garden beds, sensitive vegetation, etc)
Purple Stripes : temporarily out of bounds (revegetation, building site, etc)

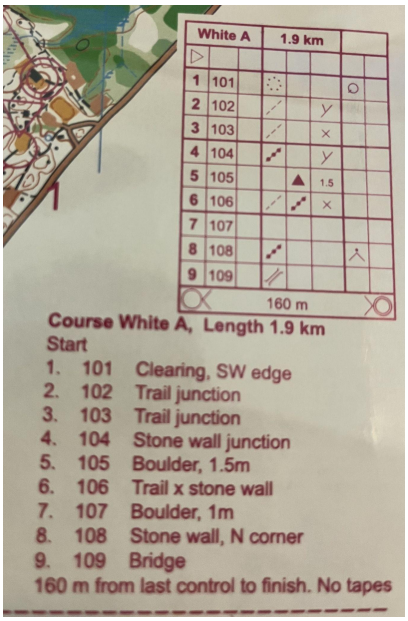
Many of the colors are designed to show how passable the terrain is. This is important to know so you can make the best route choice at higher difficulty levels.

There is a lot of information on an orienteering map. Some is contained in the topographic contour lines, some in the map colors, some is in the actual course outline.

Finally, there are 2 other very important pieces of information on an orienteering map that will help keep you on course and safe:

- The Course control Legend
- The safety bearing.

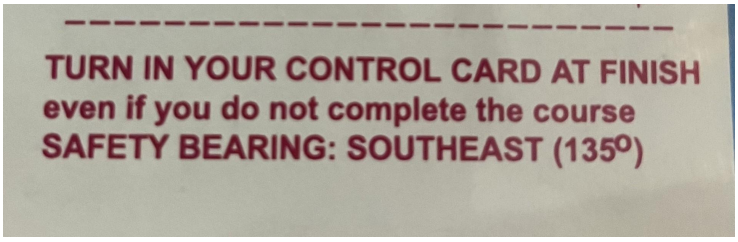
Control legend: This is a description of what you are looking for in the area of the control. Each control is listed by its number on the course (first column), the number found on the flag itself (second column), and symbols also indicate the physical location of the control (third through eighth columns. If the control is at a fork in the path, by a stone wall, or a bridge a corresponding symbol will be in those columns). Because speed can be the name of the game depending on the level you are competing at, it could be beneficial to memorize what each symbol means, but if you're just beginning or out having a fun walk, the descriptions should also be just below the control grid.



*On higher difficulty courses the descriptions may be just the symbols without a written explanation.

It is important to note that there is an international standard for control symbols so no matter where you go, the symbols do not change. There are always 8 columns of information but not all of the columns have to be used.

Safety bearing: This is quite possibly the most important piece of information on an orienteering map, It is the bearing you set on your compass and follow if you get lost. That was the first skill covered in this manual for a very good reason! It is a basic skill but is very important if you get lost while orienteering. It will lead you back to civilization and allow you to find prominent environmental features that can help you find your way back to safety and or the starting area.



That covers the basics of map and compass use in Scouting. I hope this helps you, as a leader, feel more confident and comfortable with teaching map and compass skills.

If you want to dig deeper, the New England Orienteering club is a great resource full of helpful volunteers who can help you take your skills to the next level. I have learned a lot from them in my map and compass journey and I look forward to their events every year.

https://newenglandorienteering.org/

I will leave you with a sage piece of advice from our Council Training Vice-Chairman:

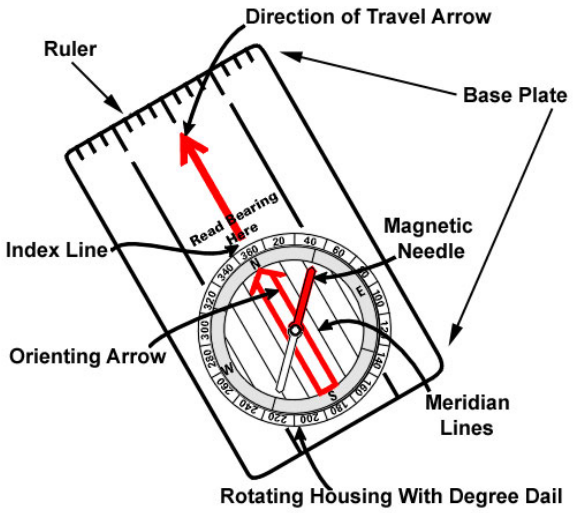
“Always take a deck of cards when hiking so if you get lost you can play solitaire…before long someone will look over your shoulder and point out a move you missed”

-Kevin Radford

How to follow a bearing:

*Make sure you have an **orienteering compass** like this one that has a moveable housing with degree markings on it.
(Silva compasses are good quality and basic ones cost $10 to $20)

Parts of a compass:



When you start on the course, you will be given a bearing to set on your compass. Let's say you are told "set your compass to 215 degrees."

1. Turn the housing degree **dial** on your compass until the degree you want (215) matches up with the **index line.**

2. Hold the compass flat in your hand so the **direction-of-travel arrow** points directly away from you.

3. Turn your entire body until the north (red) end of the magnetic needle rests squarely in the red **orienting arrow**. (aka Put the Red in the Shed)

*__DO NOT__ twist your hand to orient the compass, you MUST turn your whole body for accurate bearing determination.

Congratulations!

You are now facing 215 degrees. Keep the red in the shed and walk forward to the next landmark and proceed as directed.