

DOWNLOAD PDF DO AN OUTING WITH A TOPOGRAPHIC MAP AND COMPASS

Chapter 1 : How to use a Compass - Compass and Map interaction

That set consists of a topo map and compass. Reading Topo Maps Topographic maps may look like a jumble of colored lines and symbols, but for those in the know, they accurately portray an area's geographic features.

The following are several videos that I found on REI. Transferring Bearings Map To Compass 1. Identify your position and your objective on the map. Connecting those two points creates a line on the map which you can either visualize or physically draw on the map. Align the edge of your compass with that line. This means the actual bearing have been captured at the front of the compass. Take the compass and turn your body until the magnetic needle lines up with the orienting arrow on the compass. At point, you will be facing the direction that will lead to your chosen objective. You can rearrange the process and use a compass to take a bearing off a real-world object one that is known to be on your map and transfer that information to the map to identify your location even if you are uncertain of your whereabouts in the field. A companion video illustrates these steps: Transferring Bearings Compass To Map 1. Hold the compass level and aim the front of it at an object. Rotate the bezel until the magnetic needle is aligned with the orienting arrow of the compass. Locate the object on the map and place the edge of the compass on that object. With the edge still tight against the object, and without touching the dial, turn the entire compass until the orienting lines within the bezel line up with the orienting lines on the map. The edge of the compass forms a line on the map, and you now know you are somewhere along that line. Triangulation Triangulation is a technique that involves a map, a compass and 2 separate landmarks. It can pinpoint your position on your map even if you have no idea where you are. Pick 2 distant landmarks that you can easily identify on your map. Take a bearing off of each object. Transfer those bearing to your map. Each bearing will form a line. Where the lines cross marks your location. Magnetic Declination The magnetized needle of a compass points toward magnetic north abbreviated MN , but topo maps are oriented toward true north or polar north, sometimes represented by a star symbol. This difference is called declination. Our goal is to align the compass with true north, using the needle which points to magnetic north. Use the index degree lines on the edge of the bezel. The compass must then be adjusted to account for the declination. Find the declination degree on your compass bezel. You may wish to mark this point with tape or a marker. If you have an adjustable compass, you can move the orienting arrow here. As you navigate, ensure that your needle is not pointed at true north, but to magnetic north, the declination degree.

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Chapter 2 : Topographic Map Reading

A Topographic Map includes contour lines drawn to represent changes in elevation. When you follow a path on a topographic map that crosses these contour lines, you will be either climbing or descending.

Declination values at a given location are usually printed on topographic maps. Declination Indicator San Francisco has a current declination value of about 14 degrees east. New York City has a current declination of about 13 degrees west. But not very quickly. So if your topographical map is is not too old, you are probably fine. This is one of the reasons maps have a date printed on them. The declination animation gives you an indication of how magnetic fields have changed over time. Magnetic Field Changes A map from the San Francisco Bay area from will show a declination of 17 degrees, yet in is only 14 degrees. Depending on how far you are traveling, being off by 3 degrees can be quite significant. Before you give up completely, remember all this really means is that you need current information to make the appropriate correction between your magnetic compass and true north. A great resource to help you determine your declination is: How do I correct for Declination? You have two choices: Physical Offset If your compass has a declination adjustment it might be a screw or dial setting you can look up your current declination and set your compass. Declination offset to 15 deg East The declination setting simply offset the compass orienting arrow the appropriate number of degrees from the rest of the compass dial. In this first example, declination correction has been set for 15 degrees east. In other words, the orienting arrow points 15 degrees to the right of the cardinal point North. Declination Offset to 15 deg West In this next example, the declination correction has been set for 15 degrees west. In other words, the orienting arrow points 15 degrees to the left of the cardinal point North. Once you have the compass physically adjusted, every time you line up the needle with the orienting arrow, the actual degrees and cardinal points will have been corrected for your location. Declination set, but compass not oriented Example: In this example, the declination has been set to 15 degrees east appropriate for say San Francisco. To orient the compass with the actual surroundings, so the cardinal points and degrees are pointing in the right direction, you rotate the compass until the magnetic needle aligns with the offset orienting arrow. Declination 15 East, Oriented Once the compass has been rotated and the arrows aligned, the compass is now oriented. When using a compass which has been corrected for declination, you have to get used to the fact that the needle may look slightly off. Just remember it is aligning with the local magnetic field, and not pointing to true north. You must remember to reset your magnetic compass declination anytime you significantly change locations. To make the appropriate corrections, you will need to manually add or subtract the declination value. Although the magnetic needle appears to be pointing north, it is actually off by the declination value. Using the examples from before, if you are in a region with a 15 degree west declination say somewhere on East Coast of US the needle is actually pointing 15 degrees further west than true north. To correct, you need to move back 15 degrees towards the east. To find true north, you need to add 15 degrees. Since north is zero 0 degrees, true north would be what appears on this compass as 15 degrees half way between 0 and 30 degrees. If however, you are in a region with a 15 degree east declination say somewhere on the West coast of US the needle is actually pointing 15 degrees further east than true north. To correct, you need to move 15 degrees toward the west. To find true north, you need to subtract 15 degrees. Since a compass represents degrees, north can be thought of as zero 0 or By subtracting 15 degrees from degrees, you find that true north would be what appears on this compass as degrees half way between and Take a Bearing Pointing direction of travel at target A bearing is the angle of direction to a target, usually in degrees. To take a bearing, you point the arrow of direction towards the target, and then orient the compass by aligning the orienting arrow with the compass needle. The bearing angle can then be read off the compass along the direction of travel. Target bearing of degrees For example, in a region where the declination is 15 degrees west, the direction of travel is pointed at the target. Orient the compass, by turning the dial until the orienting arrow aligns with the compass needle. Once aligned, you can read the bearing degrees aligned with

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the direction of travel, which in this case is degrees. If you are using a compass which does not have a declination correction, you will need to manually add or subtract the declination value, as we saw before.

Orient a Map Orienting a map is the process to correctly align it relative to the local surrounds. In other words, an oriented map will have the top part of the map pointing true north, and the right side pointing east. To orient a map using a compass, first turn the compass dial so north is aligned with the direction of travel. Ignoring for now the direction of the magnetic needle, place the compass on the surface of the map so the direction of travel is pointing to the top of the map. Holding both the map and compass together, slowly pivot your entire body until the compass needle and the orienting arrow are aligned. **Oriented with Map** If successful, the compass needle should now be aligned with the orienting arrow, and the N on the compass dial should still be aligned with the North on the map. When all these conditions are met, the map is correctly oriented. Remember, if your compass does not correct for declination, you will need to manually do so. Some people do this by aligning the compass not with true north, but rather with the magnetic north indicator on the map.

Process to identify a location on a map by plotting overlapping bearings. The bearings may be from multiple locations to a single location, such as park rangers in towers calculating the location of a visible fire, or they may be from a single location to multiple landmarks, such as rescuer figuring out her current location from multiple known mountain peaks.

Compass Reading Review After completing this section you should be able to:

- Identify the cardinal direction points
- Identify the basic parts of a compass
- Identify and correct for magnetic declination
- Orient a map with a compass
- Take a bearing

Select the review quiz icon to take the **Compass Skills Quiz**:

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Chapter 3 : Going From Point A to Point B using a Compass

How To Use a Compass with a USGS Topographic Map Method #1. These directions assume your orienting arrow lines up with the North indicator on your compass dial, meaning the compass has NOT been adjusted for declination.

Plastic cracks, glass screens shatter, circuit boards fry, batteries lose their charge. And it all starts by learning your way around what many might assume is an outdated technology: To start your search, check out caltopo.

Understanding Topo Map Contour Lines

What makes topographic maps so helpful for hikers, mountaineers, or anyone navigating through varied terrain, is the addition of contour lines. By connecting all points on the map sharing common elevations, contour lines create a visual representation of real landscape features – peaks, valleys, lakes, etc. Other important things to know about contour lines: Most topographical maps particularly the well-loved USGS 7. Contour lines that are close together indicate a quick change in elevation implying a steep slope, whereas lines that are spread out suggest a more gradual incline. The unit of measurement you use can be anything, but for convenience, most maps provide a small diagram that shows how many miles on the ground are represented by one inch on the map. This provides valuable insight in the field when calculating distances and estimating travel times. However, by calculating magnetic declination, which is the difference in degrees between true north and magnetic north from your current location on the globe very important, you can adjust your compass to compensate for the difference, allowing you to follow the magnetic needle on your compass as if it were pointing to true north.

Meet Your New Backcountry Companion: The Compass

For serious navigation, you need a compass with a few important features that your run-of-the-mill compass might lack. First, you must be able to adjust the declination of your compass. Compasses lacking this feature can still be used for navigation, however, the magnetic declination must be compensated for manually each time you take a bearing – a very time-consuming process. At least one side of the base plate should have a straight edge for taking location bearings and tracing lines on the map when triangulating your location. Other important components of a proper navigation compass: Orienting lines – Help you align the compass bezel with your map when taking a bearing. Orienting arrow – Located within the bezel, the orienting arrow perfectly outlines the magnetic arrow when orienting the map. Direction of travel arrow – Indicates which direction to aim the compass.

Orient Your Map Okay.

While standing up, hold your map open flat and position your compass on top of the map so that one of its straight edges matches up with the edge of the map. Make sure the direction of travel arrow is pointing straight ahead toward the top edge of the map then rotate the compass bezel until the North marking is pointing the same way. Keeping the map and compass in the same position, slowly turn on your feet until you see the magnetic needle line up with the orienting arrow.

Take a Location Bearing

With your map oriented, you should be facing true north and ready to cut tracks to your next destination – an alpine lake you want to check out, a new campsite, the nearest road, etc. But in order use your compass for guidance, you must first take the bearing of your destination, a process that involves a small learning curve at first, but becomes second nature with practice. In simple terms, a bearing tells the direction of travel to reach a specific destination. With your map properly oriented, position your compass on the map with the straight side of the base plate touching both your current location and destination location.

How to build a survival fire!

To follow that bearing to your destination, simply leave the bezel at the bearing mark, keep the direction of travel arrow pointing straight ahead, then spin your body until the magnetized needle is framed by the orienting needle. Time to start hiking!

Take a Bearing from Landscape Clues

Beyond basic point-to-point navigation, the real value of bearings comes to light when you need to figure out where you are on the map. This is done by taking a bearing from a real landscape feature – the more prominent the better. Point your compass toward the peak out in front of you with the direction of travel arrow straight ahead. While keeping the compass aimed toward to the peak, look at the face and rotate the bezel until the orienting arrow frames the magnetized needle. Capture your bearing by reading the degree number marked by the index line. To transfer this bearing to the map for interpretation, place the

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compass on the map with the front edge of the base plate touching the peak location on the map. Draw or trace a line along the edge of the compass, intersecting the peak location on the map – your position is somewhere along this line. To triangulate your location, you simply repeat the process above for taking a bearing from a landscape feature and repeat it two more times with other features. The peaks, lakes, or whatever landmarks you choose to reference should be at least degrees apart, but closer to degrees is preferred for accuracy. After capturing the bearings, transferring them to the map and drawing their corresponding lines, a small triangle will be have been formed by the intersecting lines. If your readings were correct, your location should be somewhere inside that triangle.

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Chapter 4 : Training: How to Navigate with a Compass | calendrierdelascience.com

Topo maps list it, but the value varies over time. So check the map's revision date or, better yet, consult the National Oceanic and Atmospheric Administration (NOAA) magnetic declination. The way you adjust for declination varies with different compass brands (some use a small tool) and you'll need to follow the provided instructions.

When you follow a path on a topographic map that crosses these contour lines, you will be either climbing or descending. A path running parallel to contour lines is relatively flat. Shaded relief added to a topographic map makes it more realistic and helps visualize the real landscape. For example, see how the mountains and canyons stand out on this map: What is the elevation of Mt. You can see another Index line of 2, feet. There are 4 Intermediate lines between and so each intermediate line represents a foot change in elevation. Counting up from 3, feet, there is , , , and the top line is actually the next index line. So, both peaks are over feet and it looks like Mt. Tripyramid is possibly almost feet high. This example of a very simple topographic map shows many common features. Keep your eyes open to see these features on other maps and you will start to understand how a topo map works. Even without elevation numbers, clues that 1 is a hill include streams converging away from the hilltop, contour lines pointing sharply towards the hilltop indicating draws , contour lines pointing widely away from the hilltop indicating rounded ridges. Using contour lines, you can tell a lot about the terrain, including steepness, ruggedness, and ground cover. On the image above, look at point A. There are no contour lines around this location so it is relatively flat here and a good place for a campground by the lake. You can tell from the elevation listed at marker that the campground is at feet. You can also tell the elevation change between each contour line by looking at the Index lines. Notice that the Index line near point B is labeled feet and the one due north of it is labeled feet - that is a difference of feet. Between these two Index lines are two more Index lines so each index line represents a change in feet of elevation - , , , and Count the lines between two index lines and you should see there are 4 lines which cause the feet between the two index lines to be divided into 5 intervals, each one being 80 feet in elevation. So, now we know that on this map every contour line represents 80 feet of elevation change. If you follow a single contour line, your elevation remains constant. For example, starting at point X and following the Index line to the NorthEast, around, and down South to point Y, you would stay at about 10, feet. When you cross contour lines, you are either hiking up or down. Look at the two routes to get to the peak at point B - the red route and the blue route. Each path reaches the top, but the blue route is three times as long as the red route. That means it covers more distance to gain the same elevation so it is a more gradual slope - and probably an easier hike. Going up the red route may require a lot of scrambling and hard work. Using the map above, pretend you are camped at the Grandview Campground but you heard there is great fishing in Willow Creek at point C over the mountain to the SouthEast. How could you get there? Well, a straight line to the SouthEast would be shortest on the map, but would include a climb of over feet! Instead, heading East from camp and circling the north side of the mountain will result in a longer distance covered but only about feet in elevation! That may be a much better hike. One other thing to take into consideration. Notice that the ground is colored green up to about the 10, foot index line. The white area above that is open ground while the green area is forested. This can be good or bad. The forest can offer shade and coolness, but on the other hand it may be thick and difficult to navigate. What do you call a map of the prison system?

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Chapter 5 : OA Guide to Map and Compass - Part 1

A good compass (and map) will enable you to navigate without the high tech. Map reading and navigation by map in this modern day-and-age of GPS is apparently seldom used by hikers, hunters, campers, etc.. who instead rely on GPS trackers.

Compass Parts and Terms: Index Mark--This is where you read your bearing. These lines do move with the whole dial, though. Declination Adjustment Scale--the degree lines located on one half of the inner part of the dial. North Orienting Arrow--the red arrow that can move to adjust for declination. This arrow, made up of two parallel lines, is often referred to as "the shed. This needle is often referred to as "Fred. Now, think of the earth as a huge magnet with two poles -- magnetic North Pole and magnetic South Pole -- with invisible, magnetic lines connecting them. The compass needle points along those magnetic lines, but the magnetic pole is separated from the geographic North Pole by more than 1, miles. So one has to adjust for this difference in order to use the compass with a map. The angle between the magnetic North Pole and the geographic North Pole from a certain place is called declination. And declination changes from place to place as well. Be aware that certain things can interfere with the compass needle, causing deviation from magnetic north. These circumstances include the presence of steel and some local ore deposits. Even a steel wrist watch can cause such deviation, as will current-carrying, high-voltage wires. Strong magnetic fields can permanently affect the accuracy of a compass, so be sure not to store your compass near magnets or devices that can cause magnetic fields. In order to use compass bearings back and forth from a map true and the field magnetic and vice versa, an adjustment must be made. If this adjustment is NOT made, your compass work will likely be very inaccurate. Be aware that a one degree error can put you off course by about feet in one mile. The easiest method to take declination into account is to buy a compass with a declination adjustment. Declination is said to be either easterly or westerly, depending on which side the magnetic North Pole is from a particular area, with respect to the "line" drawn towards the geographic north pole. The zero declination line runs from the west coast of Florida up to eastern Minnesota at the Canadian border. To find the declination on a USGS topo map, look in the lower margin. Keep in mind, however, that declination does change over time, so note the date the map was made or last updated. One source of this information is the National Geophysical Data Center. Here in Flagstaff, Arizona, declination changes at a rate of about 4 minutes west each year. Magnetic Declination In The U. For example, you may be able to see your destination or a prominent feature you know is close to or on the way towards your destination while standing on a high ridge. Here are the steps First, sight the feature along the direction-of-travel arrow on the base plate of your compass, keeping the compass horizontal while doing so. Once red Fred is in that shed, your bearing is set. Each time you re-check your direction of travel, red Fred goes back in the shed. Now that you have your direction of travel -- a bearing -- you can begin to follow it. To do so, choose a prominent target in that direction -- it may be a distinct tree, a boulder, a post, anything you can keep track of and recognize even if you look away from it -- and walk towards it without looking at your compass. When you get to that target, get your bearing again, choose a new target, and repeat. Orienting your map to true north Obtaining a travel direction from a map Using an intersection to determine the location of a distant feature on a map Using resection to determine your exact location on a map Using the compass as a protractor Orienting a Map to True North Again, this assumes you are using a compass already adjusted for declination. To properly read a map in the field, you should first orient it, meaning that the details on the map should correspond to the landscape. And you should keep your map oriented while traveling along your route. To orient your map, first find true north. Set the compass bearing to north at the index mark. Next, lay the side edge of the compass along the map edge or neat line. The direction of travel arrow on the base plate must point north on the map. Keep the compass in this position while rotating the map and compass together until the magnetic needle Fred is aligned with the orienting arrow the shed. In other words, "Put red Fred in the shed. Your map is now oriented to true north. First, place

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the compass on your map so that the long edge of the base plate connects your starting point with your destination. Of course, the base plate likely will not be long enough to actually connect these two points, but an extended line drawn along this edge should connect the two. You can use a pencil to actually draw this line on your map. Next, make sure that the direction of travel arrow is pointing from the starting point to the destination. Next, hold the compass out in front of you, making sure to keep the base plate horizontal and the direction of travel arrow pointing straight ahead. Remember, this is called boxing the needle. The direction of travel can now be read along the direction of travel arrow. Just as described above under "Using A Compass Alone," choose a prominent target in that direction and walk towards it without looking at your compass. Also, re-orient your map from time to time and look around to double-check your progress. Things you can do to account for these challenges are: Using the map, pre-plan the route to avoid these obstacles in the first place, if possible; If you can see around or past this obstacle, take your bearing on a prominent feature on the other side of it, then go to it however you can. Just be sure that you can identify that target once you get there. Use degree bearings to pace around the obstacle. Take note that this will not put you exactly back on your original bearing, so you may want to re-orient your map and yourself and take a new bearing to your destination. At night, you can do this by using a flashlight. To answer this question, you will need to take two different bearings towards the feature in this case, the peak, so you will need to move from one location to another. Mark your location on the map, then put down the map and take a true field bearing to the feature. Now pick up your map again. Without changing the bearing, set the compass on the map with a back corner of the base plate on your location. Make sure the direction of travel arrow is pointing from your location towards the feature. The orienting arrow in the capsule should point generally north on the map. From the back corner of the base plate that is still on your marked location, draw a line along the edge of the compass. This is a line of position, and the feature you want to locate on the map is going to be somewhere along this line. Now move to a different location, but be sure you can identify and plot it on the map, just as you did the first time. Repeat steps 1 through 4 above from this new location. To be even more accurate, you can repeat these steps from a third location. This would be called triangulation. You must know your exact location on the map when you take the two bearings. Your location and the feature of interest must be on the map. **Compass To Map - Only one bearing is taken in this example.** See the basic steps of taking a bearing with a compass and transferring it to a map. **Resection With a Compass Where am I on the map right now?** To answer this question, take two field bearings using two prominent features you can see, then to plot those bearings on your map by drawing a line. Where the lines cross is where you are. From your current location, take two field bearings to features you can easily see and then identify on the map. They should be about 90 degrees apart for the best results. Place the first bearing on the map by putting either front corner of the base plate of your compass on the mapped feature. Be sure to keep that base plate corner on the mapped feature. Draw a pencil line along the edge of the compass. You now know you are somewhere along that line--a line of position. Repeat steps 1 through 4 for the second bearing to the second feature in the field. Your position is at or at least close to the point of intersection of the two lines you drew on the map. By identifying terrain features you see around you and comparing them to your map, you should be able to pinpoint your exact location. Again, as in "intersection," a third bearing would make this a triangulation and be even more accurate. You do need to have a rough idea of where you are to begin with, and your location and both features that you use for plotting bearing must be on your map. The further away the sighted features are, the greater the potential is for sighting and map plotting errors. To answer this question, use your compass as a protractor on the map and then project the same bearing in the field. You must know your exact location on the map to begin with, and the feature of interest must also be on the map. Plot your current location on the map. Take a map bearing to the feature of interest, using the compass as a protractor and ignoring the compass needle for this step. So lay the compass on your map, laying the edge of the compass along a line from your location to the feature, with the direction of travel arrow pointed towards the feature. Hold the compass in front of you, keeping it horizontal, and rotate your body until red Fred is in the shed. You and the compass should now be facing the feature of interest.

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Look for it in the field.

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Chapter 6 : Quiz: How well can you use a map and compass? - RIVIERA SCOUTING - Torrance, CA

This is the most effective type of map and the one you should seek out. On a topo map, contour lines do what they sound like and trace the contours of the landscapes features. How To Use A Map.

I am not covering map reading here, guess you would have to consult other sources for that, but the lesson will be useful if you have a sense of what a map says. First, a quick summary of what you will learn in this lesson: Align the edge of the compass with the starting and finishing point. Rotate the compass housing until the orienting arrow and lines point N on the map. Rotate the map and compass together until the red end of the compass needle points north. Follow the direction of travel arrow on the compass, keeping the needle aligned with the orienting arrow on the housing. Here is our compass again: The principles are much the same as in lesson 1 but this time, you are using the map to tell you which way is correct instead of your intuition. Take a map. In our first example, we look at a map made for orienteering, and it is very detailed. We look at a fictitious map I drew myself, but never mind. You want to go from the trail-crossing at A, to the rock at B. What you do, is that you put your compass on the map so that the edge of the compass is at A. The edge you must be using, is the edge that is parallel to the direction of travel arrow. And then, put B somewhere along the same edge, like it is on the drawing. At this point, some instructors say that you should use a pencil and draw a line along your course. I would recommend against it. First, it takes a lot of time, but offers no enhancement in accuracy of the method. Second, if you have wet weather, it may destroy your map, or if it is windy, you may lose it. But most important is that any drawings may hide important details on the map. Time to be careful again! The edge of the compass, or rather the direction arrow, must point from A to B! So take a second look. Beginners often make this mistake as well. Keep the compass steady on the map. What you are going to do next is that you are going to align the orienting lines and the orienting arrow with the meridian lines of the map. The lines on the map going north, that is. While you have the edge of the compass carefully aligned from A to B, turn the compass housing so that the orienting lines in the compass housing are aligned with the meridian lines on the map. There are a number of serious mistakes that can be made here. Be absolutely certain that you know where north is on the map, and be sure that the orienting arrow is pointing towards the north on the map. Normally, north will be up on the map. The possible mistake is to let the orienting arrow point towards the south on the map. And then, keep an eye on the edge of the compass. When you are sure you have the compass housing right, you may take the compass away from the map. And now, you can in fact read the azimuth off the housing, from where the housing meets the direction arrow. The final step is similar to what you did in lesson 1. Hold the compass in your hand. The mistake is again to let the compass needle point towards the south. Hold the compass in your hand, with the needle well aligned with the orienting arrow. Then aim, as careful as you can, in the direction the direction of travel-arrow is pointing. Fix your eye on some special feature in the terrain as far as you can see in the direction. Hopefully, you will reach your target B when you do this. At this time, you may want to go out and do some training, so you could check out some suggested exercises. Unfortunately, sometimes, for some quite often, it is even more complicated. There is something called magnetic declination. And this is the issue for lesson 3.

Chapter 7 : UF-SFRC : 4-H : Map and Compass

Navigation Using a Compass and a Map posted on August 22, Today's digital reliance on GPS navigation has all but relegated compass and map use to hardcore outdoor enthusiasts, orienteering clubs, and geography buffs.

Chapter 8 : Map Symbol Legend

That act of figuring out where you are in relation to a map is called triangulation, a long-winded term for using at least

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two recognizable landmarks to pinpoint your own position. To triangulate properly you will need a compass, a ruler and a pencil or pen.

Chapter 9 : The Basics: How to Use a Map and Compass | SkyAboveUs

After all, the sun was out, the day was nice, the trail is clear, the scenery beautiful and you did take a map and compass along. But it's in the pack somewhere, and hard to get to, so you didn't check it. And, the point was to get out in the woods and relax, and who can unwind when you have to.