MACCABBEE BUSHCRAFT

Land Navigation Course

LESSON 3 GETTING YOUR PACE COUNT

Learning Objectives:

3-1. Determine your individual pace count

3-2. Identify what can affect your normal pace

3-3. Understanding the need for steering marks.

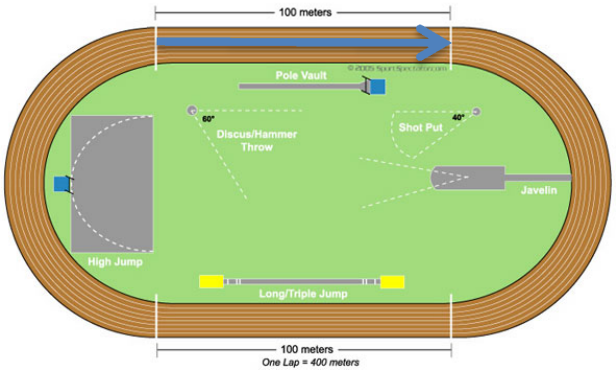
3-4. Understand how to bypass obstacles.

3-5. Understand how to calculate time, distance, and rate

3-1. Determine Your Individual Pace Count

In order to have an accurate pace count, we have to establish this by recording how long it takes to cover a ground distance of 100 meters so we can use it to establish a number of paces there is needed for record purposes as you will need to use any particular one do to the terrain you will be traveling on, on foot. In doing so we will be able calculate how many paces are needed to get there. Later we will also learn how to estimate the time it will take to travel to those locations based upon our pace count. This can be accomplished in many different ways. But for this example, we will merely only use two simple ones that should be easy to duplicate.

1) Using a high school track and field, walk 100 meters or using a long measuring tape mark out 328 ft, or walk 110 yards total on a football field one time and document that pace, then do it again two more times and individually write down those numbers as well, divide that grand total of all three paces you walked and this will give you a strong rounded average of what you pace count actually is.



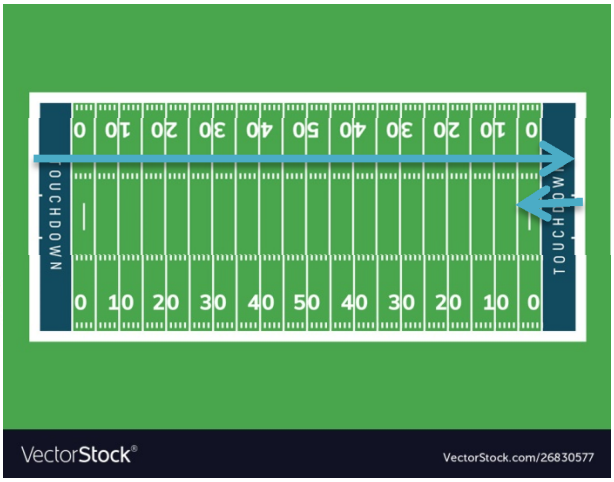


Fig 3.1

3-2. Determining Your Individual Pace/Stride

How large is ones pace? The manner in which you accomplish this, is to begin by placing your feet together then take your first step using your right foot first, so that every time you step forward again on your right foot you will begin to count each time your right foot hits the ground/deck creates a new pace till you finish walking 100 meters.

Since everyone paces is going to higher for shorter people and smaller for taller people note some important facts here. A person's individual pace or stride is equal in distance from the pit of one's

arm till the end of his fingertip, which is the same distance of the front of one's right foot before lifting and moving forward to the heel of your right foot once placing your right foot forward down. Back in the ancient times this method was how distance was determined as being used to record the measure of walking distance or pace. Thus a cities distance was thought to me so many paces away from another based upon a number of walking paces use to record the distance.

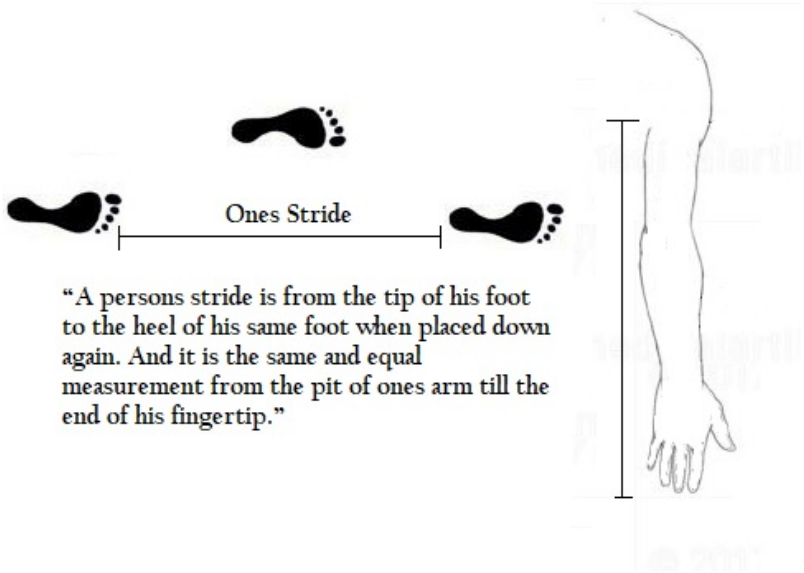


Fig 3.2

3-3. Identify What Can Affect Your Normal Pace

Something to note because not all terrains are the same notating these different possible terrains issues, and writing down all these possible differences and their paces counts in a small field journal will be useful for when you encounter them later by taking your average and having the ability to know what your pace count will be in those possible environments. A great way to keep track of this is best if walking in different environments and under different circumstances.

Stride/Pass	No Pack	Pack 30lbs or less	Pack 30lbs or more
Slow Tired Walk			
Normal Stride			
Fast Stride			
Incline Slope			
Decline Slope			
Wind Conditions			
Clothing			
Physical Stamina			
Thick Vegetation			

The better you understand your map and the terrain features you will be encountering, will only help eliminate at times your need to use a pace count. If you're not concerned about the distance nor the time it will take for you to travel there, as long as you are well aware of your terrain features around you, you will be able to quickly locate your position on your map with the use of your compass and your terrain association and even using a two point resection method which we will learn later on can be used to determine your location.

How To Make A Pace Count Average:

Measure out 100 Meters distance and walk it 3 times and count each total of paces and divide by 3 = Pace Count

When we want to know how many paces it will take to get to a specific location we use what is called a Pace Formula. The Pace Formula is used when we know both the distance we need to travel, as well as our pace count but we do not know how many paces it will take to get there.

A valuable tool to have on you is an up to date record of your known distance you walked, and the time it took to do so, so that you can take that average time you recorded with the known distance so as to predict the possible time it would take to go a certain length of travel.

PACE FORMULA:

Distance divided by 100 meters times Pace Count = Number of Paces

Distance = How Far Do I Need To Travel

Pace Count = How Many Paces It Takes To Walk 100 Meters

Number Of Paces = The Amount Of Paces Need To Travel

3-4. Understanding the Need for Steering Marks.

When traveling using steering marks doing so helps with keeping your direction, these features must be visible at all times when your direct view of your destination is not always visible. In order to orientate yourself well through the use of land features, manmade objects, and these features should be distinguish in its self from that of ordinary land marks which could cause you to lose the ability to remain on course, do to confusion, caused by things of similar shape or look to interfere. Using intermediate steering marks, land features, and or manmade objects, will help keep your direction and

movement from veering off course. So make sure the land mark or feature stands out and is unique to the surrounding area and will not later become obscured when approaching it. If land marks or manmade objects are not so easy to use due to nigh fall setting in, we will we will discuss this particular topic in the section concerning navigating at night.

Using the color of an object, its size and shape will help keep some distinctions and uniqueness's separate from that of the surrounding area. As you must keep in mind that a steering mark needs to be visible for the most part at all times. If this is not possible taking another object that can be used till the object returns back into your visible line of sight will be needed.

Problem solving is one of the biggest points to focus upon here as there can be many different types of issues that one could incur.

What if you are alone and there are no visible steering marks before you present?

Using a back azimuth as your reference point, landmark wise, can be used to keep you on track.

What if you are alone and there are no visible steering marks behind you present?

Create one so it is visible when taking your back azimuth degree reading. In doing so you can use a mound of rocks or a tripod stand or anything that is in the needed line of sight so as to make sure your forward movement has not veered off course when using the back azimuth to verify ones position.

The main thing to remember is always keep your direction of movement toward the object and relook at your compass for your degree reading and direction so as to not veer off course and if need be retake your back azimuth when needed to keep your direction from veering away, do so.

What if you are traveling with a partner and there are no visible steering marks present?

Using the buddy system as to keep your degree reading on track is crucial as he can walk before you as you steer him to walk as far as visible/audibly as possible, even better if radio communication is available to be used to communicate even longer distances can be used to guide him to the degree reading you are heading in. Just keep in mind the distance variables as we layout below.

How bodies appear at ranges and different distances:

(1) 100 Yards. At 100 yards/meters, the object/person can be clearly observed in detail, and the ability to distinguish facial features.

(2) 200 Yards. At 200 yards/meters, the object/person can be clearly observed, but with a loss of facial detail. A persons equipment is still identifiableas well as their skin.

(3) 300 Yards. At 300 yards/meters, the object/person their body outline will remain clear, as well as determining face color, but other remaining details will appear blurred.

(4) 400 Yards. At 400 yards/meters, the body outline is still clearly visible, but other remaining details will appear blurred.

(5) 500 Yards. At 500 yards/meters, the body shape will begin to taper at the ends, and the head will become indistinct from the shoulder line.

(6) 600 Yards. At 600 yards/meters, the body will appear wedge-shaped with the inability to visible see a distinct head.

3-5. Understand How to Bypass Obstacles.

Sometimes there is no getting around that you need to deviate from your course of travel due to obstacles, now what that obstacle might be size wise, might only mean you need to veer off course for a short moment. At all cost, the best thing to do would be merely go around the object then return back to the area you were on the opposite side, and continue forward. However, larger obstacles may present more of a challenge. In case you will need to reroute by making a new temporary azimuth to bypass the obstacle. Note anytime you have to change your direction its best to always have a writing pad and writing tool on you so you can notate these things so that you are able to follow the

your original intended path. And it's best to use 90 degree points so as to steer yourself around something so that you if need be create a 90 degree box so you can get back on track onto your azimuth. However, there are times things require you to make a detour and here we are going to discuss what procedures are needed here.

What if you encounter vegetation type obstacles?

If a huge tree has fallen down and is in your way mark the center of that tree where your degree reading points to and once you have been able to reach the other side use that marker to point you back in the direction of your movement by checking your compass and setting the correct degree reading aiming forward and continue to move toward your initial reading.

What if you encounter large obstacles and need to use steering marks to get around it?

There are times when a body of water or some impassable land feature is just in the way. And the need for steering markers is a must in order to get back on track toward your destination. But note the most important facture here which is vital to completely follow is, only use a steering marker that will not by any means be confused with some other object, it must be completely distinguished from all other objects surrounding the area at the destination you are needing to continue at on the other side of the river, swamp, or any impassible land mass. Always leave some mark, or sign, or blaze of some sort to keep from being confused. Then proceed without your compass and find your way around the object until you have reached the other side then plot your course forward and remember to subtract the distance you estimated you would have had to travel had the land mass been passible. If you are unable to simple put your compass away and merely find a way to pass through you might need to plot an alternate course that will get you back on your path and use those areas to pass through.

What if you encounter large obstacles but don't have a steering mark to use on the other side but you have an object on the side you're on?

In this case you need to first use your back azimuth for record and will have to find a way to cross over onto the other side, and once this is accomplished, and you can find the object you used on the side you were once on. Use your compass to get that object into view take the opposite of the back azimuth you used to find it and you're now right back on track.

What if you encounter large obstacles but are able to steer around it using 90 degree angle off-set?

Here we are dealing with a problem in which we are not able to go through an area on the map, but we do have the ability to steer around the area and use another crossing point further down the river. In this case we will employ the 90° off-set technique. Using the map below, we will illustrate this. If our degree of travel is at 200° for example and although we cannot pass over the river or perhaps the area in which we want to travel is pointed into a dense forest or lake or swamp, and might have too many problems if we crossed over. The river may be too high in this area? The swamp maybe impassible, the lake to deep or maybe it's a dense forest and there are concerns it may be too hard visibly to stay close in contact group wise and the possibility to loose others in the trek is too high. All these could play a huge role in how it might affect the need to use an alternate way around these terrain features. And using the 90° bypass technique is the way to go about this. Here the need is to take a bearing 90° from my current azimuth. If my current azimuth is 200° my new degree reading needs will 90° more thus making it 290° to steer away from my current location toward my newly plotted point. I will also need to calculate the distance of all my steering points. Once I have arrived there I will face again at 200° and continue forward until I again must turn so I can head back to my initial line of position. Here I will have to subtract 90° and head towards 110° till I reach my last steering point. Once I have reached my plotted point I will just continue heading on my old azimuth of 200° and continue my forward movement.

Fig 3.3

3-6. Understand how to calculate time, distance, and rate

In this section we will be focusing upon using a method to calculate the time it will take to get from point (A) to point (B), the amount of distance we need to cover to get from point (A) to point (B), and lastly the speed by which your moving from point (A) to point (B).

If I Know An Average Distance and The Pace:

If I know my average distance and pace, I can right away estimate how long of a time it will take to get from point (A) on the map to point (B) buy using the Time Formula as we will discuss below in more detail.

Example: Say I know it takes me 21 minutes to walk a mile and I know the average of a consistent 7 mile trek will take me 2.5 hours to complete. Because I know my average distance and rate I can easily estimate my time. To determine a three mile trek from my own data I have kept of myself I can estimate my speed and arrival time by using the time formula which in this case is 1 hr and 3 minutes, on flat terrain.

Time, Distance and Rate Equations

Time: (How long you have been traveling)

Distance: (How far are going to travel)

Rate: (The distance you travel per. hour)

Understanding How to Write Out Your Calculations For Time:

Convert everything into hours but if minutes are involved as well ÷ by 60, for example take 1 hr 14 minutes then take the 14 min and calculate (14min ÷ 60 = .23 min) now rewrite your answer as 1 hr .23 mins or 1.23 min it will not work if you convert the answer to 74 min by x 60 again, so keep this in mind .23 x 60 = 14 min (even though its actually 13.8 you need to round to the nearest minute)

Understanding How to Write Out Your Calculations For Distance/Rate: Distance/rate can only be written as a whole number or a decimal fraction thus 1 ¼ miles = 1.25, 2 ½ miles = 1.5, 2 ¾ miles = 2.75 or for rate 3 ¾ kph = 3.75, 2 ½ kph = 2.5 and so on……

TIME FORMULA- Distance ÷ Rate = Time *or* **T = D/R**

Time: This equation is used when I know my average speed and the distance I am going to be traveling, but want to know how long it will take to get to my destination.

Example 17 km/m ÷ 2.5 kph/mph = 6.8hrs

Distance (How far are you going to travel) ÷ **Rate** (The distance you travel per. hour) **= Time** (How long you have been traveling)

DISTANCE FORMULA- Time x Rate = Distance *or* **D = T x R**

Distance: This equation is used when I know how much time as elapsed and the average rate I have travel per hour but I am not aware of the amount of distance I have traveled.

Example 2 kph/mph x 6.5 hrs = 13 km/m

Time (How long you have been traveling) **x Rate** (The distance you travel per. hour) **= Distance** (How far are going to travel)

RATE FORMULA- Distance ÷ Time = Rate *or* **R = D/T**

Rate: This equation is used when I know the distance I have traveled and how much time there is I need to get there to be there in that amount of time.

Example 5km/m ÷ 3 hrs = 1.6 kph/mph

Distance (How far are you going to travel) ÷ **Time** (How long you have been traveling) = **Rate** (The distance you travel per. hour)

Remember

(**P**ace **C**ount) ÷ (100 Meters)= _____ x (**T**otal **P**aces **N**eeded) = **D**istance

65 (**PC**) ÷ 100 m = .65 x 2,340 (**TPN**) = 1,521 km (D)