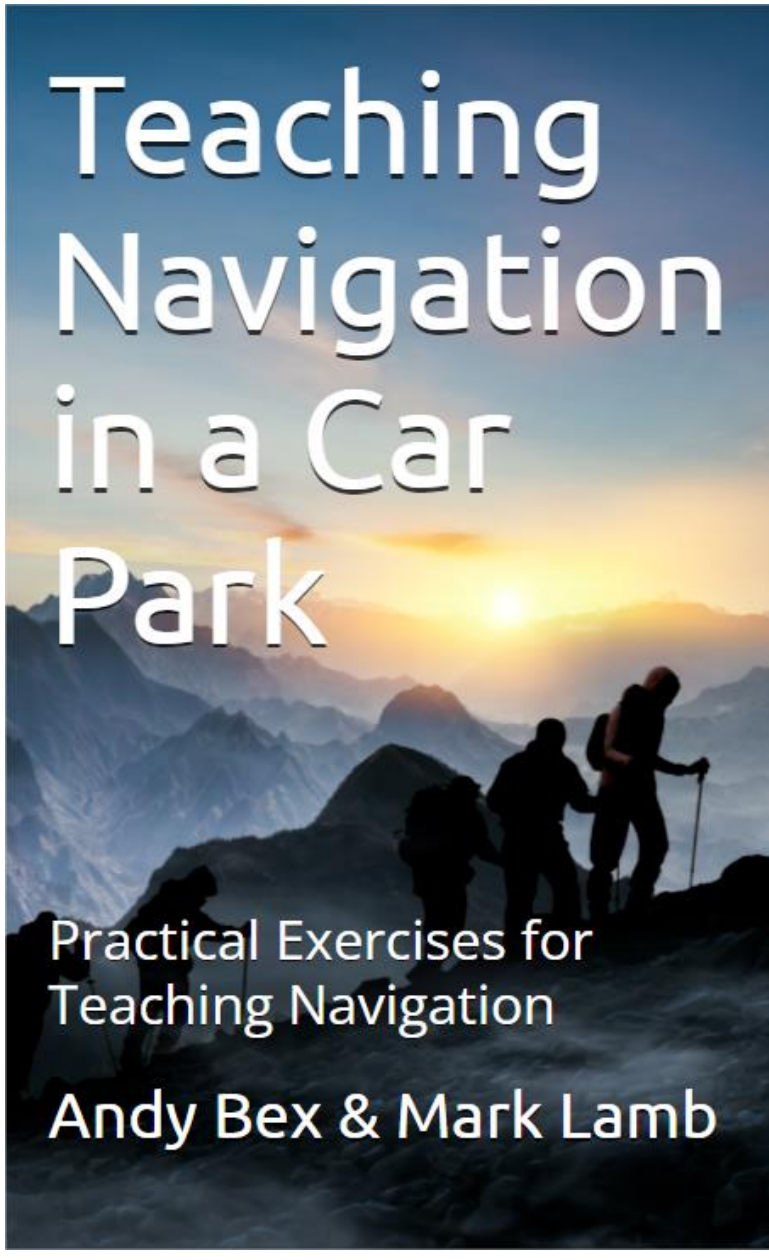

Teaching Navigation in a Car Park
Practical Exercises for Teaching Navigation
Andy Bex & Mark Lamb

## Contents


**1 How to use the Exercises 4**
1.1 Overview 5
**2 Beginner 8**
2.1 Simon Says 9
2.2 Hand Hill 11
2.3 Glove Hill 13
2.4 Bergen Mountain 15
2.5 Maze Runner 17
**3 Intermediate 20**
3.1 Nav Runner 21
3.2 Square Dance 23
3.3 X Marks the Spot 25
3.4 Treasure Hunt 27
3.5 Resection 29
3.6 Back Bearings 31
3.7 Hill Running 33
3.8 Attack Point 35
**4 Advanced 38**
4.1 Chain Gang 39
4.2 Minefield 41
4.3 Micro Navigation 43
4.4 Blind Man's Bluff 45
4.5 Box It Off 47
4.6 Room with a View 49
**5 Teaching Navigation 52**
5.1 Build Confidence 53
5.2 There's too much Maths 54
5.3 Things We Don't Need to Teach 57
5.4 Tabletop Navigation 58
**6 Assessing Students in the Field 60**
6.1 Planning 61
6.2 Routes 63
6.3 Assessing Navigation 64
**7 Appendix 68**
7.1 Resources 69
7.2 Technology 70
7.3 UK Army Cadet Forces 71
7.4 Credits 73

## Diagrams, Images, and Cards


| | |
|---|---|
| Hand Hill Diagram | 11 |
| Example Exercise Cards | 17 |
| The Nav Runner Answer Table | 22 |
| Sample Card | 22 |
| Rope Game Answers | 24 |
| X Marks the Spot Setup | 25 |
| X Marks the Spot Legs | 26 |
| Sample Card | 26 |
| Treasure Hunt Plan | 28 |
| Bearings Table Example | 31 |
| Setup | 31 |
| Attack Point Example | 36 |
| Minefield Setup | 42 |
| Micro Navigation Route showing Dummy Cones and Card | 43 |
| Room with a View Example Picture: | 49 |
| Timing/Pace Table | 55 |
| 4Ds Assessment | 65 |
| Navigation Progression Schematic | 72 |


# 1 How to use the Exercises

An overview of the aims, approach and kit needed to deliver the exercises in this book.

## 1.1 Overview

Most navigation is not taught in the hills – it's taught in scout huts, cadet detachments, classrooms, and car parks. This environment is well suited to knowledge-based learning, like map symbols; but it is challenging to teach skills, like walking on a bearing.

This book solves this challenge by:

- ✓ supplying a set of fun, hands-on, skill-based exercises
- ✓ that can be delivered in a limited space
- ✓ using an inexpensive and easily acquired toolkit

This book has been produced '**Not for Profit**,' the cost that you paid is the printing costs from Amazon. A free PDF of the book and a separate PDF of the cards are available on the website.

https://www.navinacarpark.co.uk

It is hoped that any youth organisation will find this a useful resource for helping their students enjoy, learn, and appreciate navigation.

### 1.1.1 The Knowledge-Based Teaching Cycle

Delivering skill-based navigation (i.e. bearings and pacings) when not in the outdoors is challenging; so inevitably, instructors tend to teach knowledge-based activities (i.e. map symbols). Navigation competency can easily, but wrongly, be measured by the student's understanding of map symbols, but as Peter Cliff accurately stated in his book "Mountain Navigation":

**As a mountaineer, I have not yet found it necessary to be able to distinguish between a church with a tower, one with a spire, or one with neither.**

When we only use knowledge-based teaching it has several negative and cyclic impacts:

- ✓ Students think of navigation like a school class and generally don't enjoy it
- ✓ Students lack confidence in their skills when in the outdoors
- ✓ Students become instructors and repeat the same knowledge-based training
- ✓ Instructors, who have mostly been taught and teach knowledge-based navigation, lack the confidence to deliver skill-based navigation.

This book's purpose is to help break this cycle.

### 1.1.2 Approach

A few thoughts about our approach:

- ✓ It is assumed that the reader is already a competent navigator, if not, please refer to other training materials first (see Resources at the back of the book). Like all things, you don't know what you don't know, so some useful information is included in the Instructor Notes.
- ✓ These exercises are intended to be used as ADDITIONAL training aids and should not be used to replace any of the student's syllabus. Use the exercises as:
    - Alternative 'fun' sessions
    - Practice sessions
    - Confirmation sessions
- ✓ The tool kit and book are small, so keep them with you, always ready to do a quick navigation session.
- ✓ Paces and Steps: The book specifically refers to steps and paces as different things. Steps count each leg as they hit the floor, paces count every other leg. Paces are taught quite late in navigation, so all the earlier exercises use steps.

### 1.1.3 The Format

Each exercise has a two-page description with the following parts:

- ✓ Title: A catchy title
- ✓ Subject: What subject does the exercise support
- ✓ Aim: What are we going to achieve
- ✓ Overview: Time needed, audience and resources.
  All sessions are for up to 8 students and last for 30 minutes, but can be extended to 60 minutes.
- ✓ Method: How the activity should be run.
- ✓ Student Briefing: What to say to the students. This is just a guide. The guide has highlighted text with additional points for the instructor.
- ✓ Instructor Notes. Additional tips or ideas to run the session; like how to stretch the more competent students.

## 1.2 Navigation Kit

All these exercises can be delivered using a small kit. This is important as it ensures that:

- ✓ Every instructor can have their own set
- ✓ It's easy to carry and should always be available

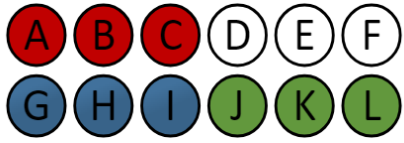
Some additional items are used, but they are readily available.

The kit has been designed to be lightweight, cheap, and easy to get hold of. The kit should contain the following.

- ✓ Drawstring Bag
- ✓ Teaching Navigation in a Car park book
- ✓ 12 Labelled Cones
- ✓ Navigation Cards

### Cones

The cones should be labelled as follows:




A set of cones is available from the website. To set these up do the following:

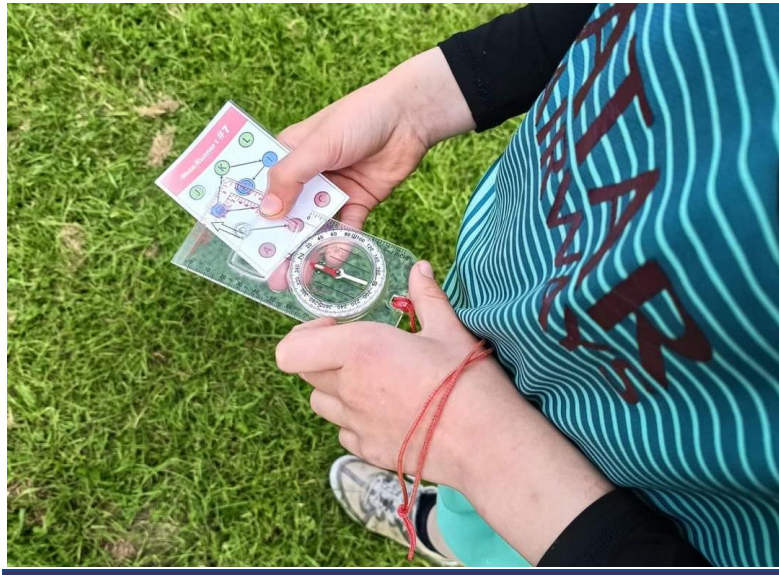
- ✓ Download the PDF
- ✓ Print the 12 sheets in colour
- ✓ Cut out the cones from the sheets
- ✓ Laminate the cut-out cones
- ✓ Cut the cones out again – leaving a small border.

Cutting the cones out, laminating and then re-cutting will make the cones waterproof.

### Cards

Some of the exercises require cards, you can download them from the website (https://www.navinacarpark.co.uk). They are already set up for nine cards per page.

- ✓ Print them in colour
- ✓ Laminate them
- ✓ Cut them out



# 2 Beginner

This is a set of exercises designed for beginners and includes cardinal points, handrailing and relief.

## 2.1 Simon Says

### 2.1.1 Overview

**Subject:** Cardinal Points and Bearings

**Aim:** To develop a student's understanding of the Cardinal points and bearings.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students

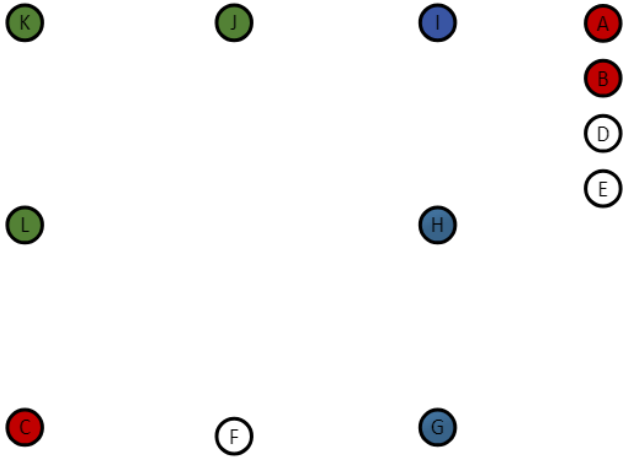
**Resources**

- ✓ Cones

### 2.1.2 Method

Setup the cones as shown below, with A, B, D, and E representing a compass needle pointing North. This does NOT need to be orientated with North. Use all the paces available, up to the size of a tennis court.

The instructor will shout out Cardinal points and the students must run there. It gets progressively more complicated and competitive.




### 2.1.3 Student Briefing

You can see I have set up four cones that represent a compass needle – with the red cones being North.

I will shout out a direction and you run there, the last one there is out.

We will have a few practice goes first.

### 2.1.4 Instructor Notes

The intention is NOT to have a competition but to keep most of the students in for most of the time.

Use your judgment for when to change levels, add fun components, start a new round, etc.

- ✓ Practice Round. Call out randomly, North, East, South, West – no one is knocked out of the round.
- ✓ More Points: Add NE, NW, SE, SW.
- ✓ Bearings: Add 90, 180, 270, 360
- ✓ More Bearings: Add 45, 135, 225, 315 and Zero.

Fun components:

- ✓ Simon Says – the students only carry out a command when you say Simon Says.
- ✓ Add in some movements, i.e. Skip to North:
  - Salute
  - Turn around
  - Touch the floor
  - Lay down
  - Jump
  - Skip to
  - Hop to
- ✓ Change the Compass Direction, i.e. make north the opposite direction.

# 2.2 Hand Hill

## 2.2.1 Overview

**Subject:** Relief

**Aim:** To introduce the 'hand' as an excellent navigation training aid.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with hill features

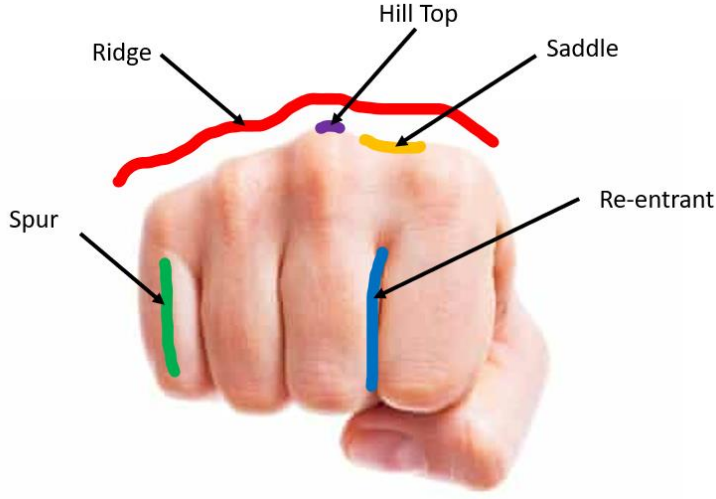
**Resources**

- ✓ None

## 2.2.2 Method

Looking at Relief and Hill Features on the hand.

Hand Hill Diagram




## 2.2.3 Student Briefing

A hand is an excellent training aid for understanding relief.

Demonstrate clenching a fist with the knuckles at the top.

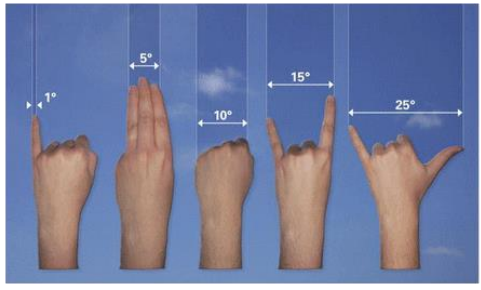
Point out and discuss the following relief features:

- ✓ Hill
- ✓ Hilltop
- ✓ Ridge
- ✓ Saddle
- ✓ Convex slope
- ✓ Concave slope
- ✓ Re-entrant
- ✓ Spur
- ✓ Valley (two hands)

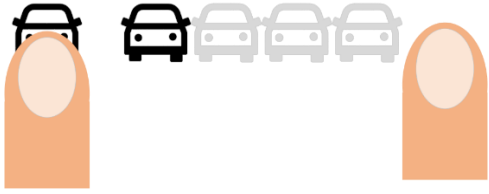
### 2.2.4 Instructor Notes

You might also show how the hand can be used to measure angles and distances. All of these are arm's length:

Using the index finger – if a standing person is the sideways width of the index finger, then they are roughly 100m away.




Stereoscopic Ranging:



Let's say that you can see the back of a car, which you estimate is 2m wide. Look through your dominant eye and line up your thumb with the car. Now close your dominant eye and open the other. Your thumb will have 'jumped' off the car. Now estimate how many times the car will fit into the gap, let's say it is four times, so the gap is 8m.

Multiply this gap by ten and you work out the distance, which in this case is 80m.

# 2.3 Glove Hill

## 2.3.1 Overview

**Subject:** Relief

**Aim:** To use the 'hand' to help understand contour lines.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students

**Resources**

- ✓ White Latex Gloves (1 per 2 students)
- ✓ Sharpie Pens (1 per 2 students)

## 2.3.2 Method

This exercise uses the hand (with a latex glove) to accurately draw on the correct contour lines. The hand can be removed to show a 2D version, then put back in to show 3D. This helps the students to visualise the contours in 2D.

## 2.3.3 Student Briefing

We are going to map our hands to help you understand contour lines.

### Demonstrate the full activity

We will now go through the activity as a group.

- ✓ Put a latex glove on the left hand.
- ✓ Put your hand flat on the table then raise your knuckles keeping your thumb and finger on the table.
- ✓ We are going to draw contours on the back of the hand.
- ✓ Using a Sharpie pen that is lying on a flat surface, draw a line around the clenched fist.
- ✓ Repeat this process each time raising the pen 1 to 1.5 cm. The aim is to get 5 or 6 contour lines on the glove. This can be achieved, by either using a stack of books or placing the pen on the index finger, then two fingers, etc.
- ✓ Be careful to complete all contour lines, particularly around the knuckles.

### Discuss how the contour lines look with the hand in and out of the glove.

Now repeat with your partner.

### 2.3.4 Instructor Notes

Ensure that the contour lines are accurate and not just lines going around the hand.

Check that contours around the knuckles are completed – these will require to be drawn on after going around the outside.

The hand should be set up as follows making sure that the little finger is flat on the table. The area we are interested in is the back of the hand, highlighted with the red line.

# 2.4 Bergen Mountain

## 2.4.1 Overview

**Subject:** Relief

**Aim:** To develop a student's understanding of hill features.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with hill features

**Resources**

- ✓ Several Rucksacks (or other bulky items)
- ✓ 1 Sheet (Poncho/Basha/Tarpaulin)

## 2.4.2 Method

This is a team exercise where the students create relief features by carefully placing the Rucksacks and then covering them with a sheet.

## 2.4.3 Student Briefing

In front of you are several daysacks and a sheet. You have 20 minutes to build several hill features by stacking the Rucksacks and then covering them with a sheet.

### Nominate a leader

The first task is to build:

- ✓ Hill

### Nominate a new leader for each of the following

- ✓ Valley
- ✓ Hilltop
- ✓ Ridge
- ✓ Saddle
- ✓ Convex slope
- ✓ Concave slope
- ✓ Re-entrant
- ✓ Spur
- ✓ Cliff

## 2.4.4 Instructor Notes

This session can be run by the instructor first to demonstrate all the different hill features.

If a team completes the task quickly, then discuss the following points using the hill model as a reference.

### Beginner

- ✓ Use string to show one or more contour lines
- ✓ Discuss the symbols that might be seen on the map: contour lines, bog, streams, paths, etc.
- ✓ Cliff: discuss the difference between a cliff, outcrop, boulders, and scree on the map.

### Intermediate

- ✓ Where would the wind be strongest (ridges, hilltops)
- ✓ Where would the wind be weakest (another side of the hill, re-entrant)
- ✓ Where is the ground likely to be dryer (ridge) or wetter (re-entrant)?
- ✓ Discuss different route selections: fastest/safest/easiest based on weather, visibility, and ground. For example, in poor visibility follow the clearest path and avoid dangerous features like cliffs.
- ✓ Tactical: Discuss dead ground and Silhouette (Military only)

### Advanced

- ✓ Discuss contour walking
- ✓ Discuss accurate location by taking a bearing down a slope (slope aspect)

# 2.5 Maze Runner

## 2.5.1 Overview

**Subject:** Map Orientation and Handrailing

**Aim:** To orientate a map from a handrail

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students

**Resources**

- ✓ Cones
- ✓ Maze Runner Cards

## 2.5.2 Method

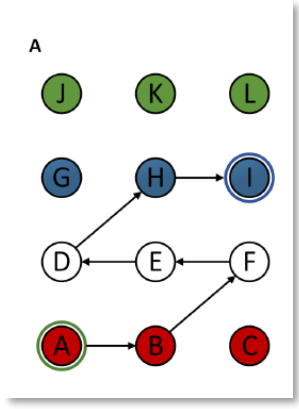
Maze Runner uses cones and cards to get the students to orientate a map, and follow a route whilst keeping the map orientated

Instruct the students to set up the cones as seen on the card below, this gives them an immediate understanding of the layout.

The cones should be initially set up at 2 paces apart.

For this exercise, the cones **DO NOT** require aligning North/South.

Example Exercise Cards




## 2.5.3 Student Briefing

Nominate a leader

Set up the cones as seen on Card #1; the gaps are to be two paces apart.

Check that the cones are set correctly and that the distances are left to right and up and down are reasonably accurate.

We are going to practice aligning a map and then following a simple route.

Using card #1, go to one corner of the course and demonstrate setting the map using the ground features, showing the three 'wrong' orientations, each time rotating the map 90 degrees.

Demonstrate using card #1 – follow the route, ensuring that the students see you keep the correct map orientation.

Pass out the eight cards one per student/pair

- ✓ In pairs or solo follow routes
- ✓ I will confirm accurate navigation
- ✓ Swap cards and repeat, until each pair has used all the cards
- ✓ Ensure you keep your map orientated at all times

### 2.5.4 Instructor Notes

- ✓ Re-run the exercise with increased gaps between the cones. The larger the spacing the longer the exercise will take and will be more difficult for the student. Try to use all the space available, even up to the size of a football pitch.
- ✓ Discuss how this would work with a real terrain. What might the cones represent? (junctions, corners of walls, woods, etc)
- ✓ Try removing 3 or 4 cones and repeat the exercise – what did we learn? You can still see patterns even if the cones are missing.

Discuss and demonstrate:

- ✓ Thumbing a map – keeping your thumb on the map at your current position and pointing in the direction of travel. This means that the student instantly knows where they are on a map. (I teach this using the top right corner of the compass.)
- ✓ Keeping 'map contact' – when walking regularly check in with the map so you are updating your 'thumb' position.

# 3 Intermediate

Exercises for the Intermediate navigator, including bearing, resections, back bearings, attack points and pacings.

# 3.1 Nav Runner

## 3.1.1 Overview

**Subject:** Bearings

**Aim:** To introduce the students to moving around an area using bearings.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students

Resources

- ✓ Cones
- ✓ Nav Runner Cards
- ✓ Compass – 1 per student

## 3.1.2 Method

- ✓ Setup the cones before the session, which **MUST** be aligned North-South with Green Cones at the North
- ✓ Initially, the cones should be two steps apart.

## 3.1.3 Student Briefing

We are going to practice moving around an area using bearings.

Demonstrate setting a bearing on a compass.

Can everybody set a bearing of 225 and face in that direction?
[Confirm]

Decide if the group will work solo or in pairs (put them in pairs).

Each cone is labelled with a letter and is a different colour.

The instructor goes to A users the A Card

Set the first bearing shown on the card in the Nav Runner section and walk to the cone that it points to. Continue through the bearings.

Demonstrate

Hand out the cards, one per student/pair.

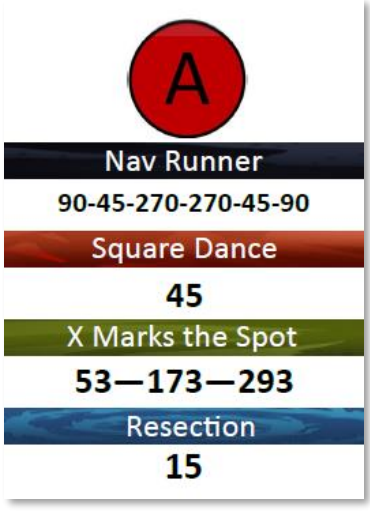
Take one card and repeat until you have finished. When you get to the last cone tell me the card number and I will tell you if you are correct. If you did not get the right answer repeat the exercise.

When you get it right, swap cards with someone else. Try to do all eight cards.

The Nav Runner Answer Table

| Card # | End Position |
|---|---|
| A | I |
| B | D |
| C | L |
| D | H |
| E | G |
| F | E |
| G | C |
| H | F |

Sample Card




### 3.1.4 Instructor Notes

The routes are the same as the route cards from the Maze Runner.

Ensure the map stays orientated as the student moves around the route.

## 3.2 Square Dance

### 3.2.1 Overview

**Subject:** Bearings

**Aim:** To develop the student's understanding of bearings.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

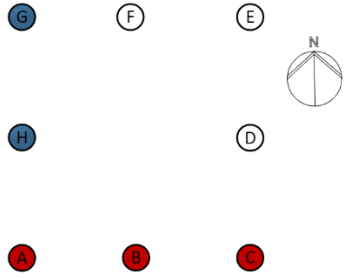
**Resources**

- ✓ Cones
- ✓ Square Dance Cards
- ✓ 1 Compass per student

### 3.2.2 Method

The students set a bearing and walk until they hit another cone.

Place the Cones – as shown, ensuring that the bottom (ABC) cones align accurately from West to East and that the left (AHG) rope aligns from South to North.




- ✓ Hand out one card to each Student
- ✓ Each Student stands next to a cone.

### 3.2.3 Student Briefing

We are going to practice walking on bearings.

Just as a refresher, set a bearing of 270° and turn your body to face in that direction.

### Confirm

### Hand out cards

Go to the cone that matches your card.

Set the bearing on your compass as shown on the card in the Square Dance section and then walk until you meet another cone.

When you get your cone, tell me your starting and ending cone and I will tell you if you are correct.

When you have finished the first one, repeat until you have done all eight.

## 3.2.4 Instructor Notes

You might want to run this an assessment, in which case, get the students to write down their answers.

You can score 2 points for a correct answer, 1 point if they are one out, and nothing for any other number.

### Rope Game Answers

| Cone | Bearing | Answer |
|---|---|---|
| A | 45° | E |
| B | 315° | H |
| C | 331° | F |
| D | 270° | H |
| E | 241° | H |
| F | 135° | D |
| G | 119° | D |
| H | 0° | G |

## 3.2.5 Back-Snaps

When the students have finished; explain back-snaps (quick back bearings).

When a student reaches a cone – line the white end of the compass needle on the north – the compass will now show the OPPOSITE bearing and should now point at the cone that the student started from.

Discuss why this is useful in the field.

## 3.3 X Marks the Spot

### 3.3.1 Overview

**Subject:** Bearings and Pacings

**Aim:** To develop a student's understanding of accurately walking on a bearing.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

**Resources**

- ✓ Cones
- ✓ X Marks the Spot Cards
- ✓ One compass per student

### 3.3.2 Method

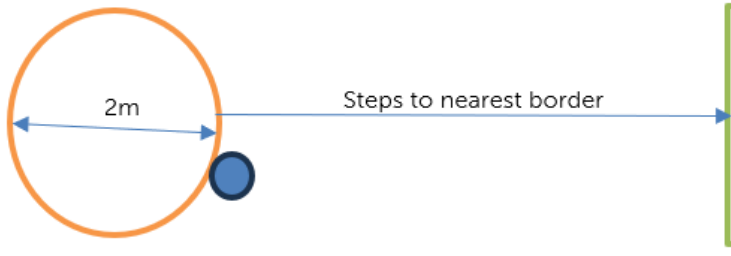
Place eight cones, in a circle with a 2m radius

Each student will have a card with three bearings for each cone. They will walk leg one from a cone on a bearing for ten steps, then leg two with the same number of ten steps, then leg three with 10 steps, at which point they should finish back at the cone that they started. Each student is walking an equilateral triangle.

In a small training area choose the number of steps based on the space available, i.e. go to a cone and count the steps to the nearest border around your area.

Note, that we are using normal steps – not paces.

X Marks the Spot Setup



### 3.3.3 Student Briefing

**Hand out a card to each student.**

Go and stand next to the cone listed on your card.

The three bearings we are using are listed in the X Marks the Spot section.

I want you to walk ten steps on the first bearing given, then walk ten steps on the second bearing, then finally 10 steps on the third bearing. You should finish where you started.

This is an exercise for you to practice walking accurately on a bearing.

Once you have done the first card, swap with someone else, until you have done all eight.

### 3.3.4 Instructor Notes

The eight cones are set up to help prevent the students from falling over each other.

D WILL NOT return the student to the starting place. If any students point this out – just say it must be a mistake with the cards. Then, at the end of the exercise discuss the importance of accuracy and confidence – everyone should have called out the wrong leg. When navigating for real, the students will regularly have doubts, and their technical skills should not be one of them.

X Marks the Spot Legs

| Cone | Leg 1 | Leg 2 | Leg 3 |
|---|---|---|---|
| A | 53 | 173 | 293 |
| B | 262 | 22 | 142 |
| C | 205 | 325 | 85 |
| D | 281 | 71 | 161 |
| E | 95 | 215 | 335 |
| F | 170 | 290 | 50 |
| G | 73 | 193 | 313 |
| H | 21 | 141 | 261 |

Sample Card

## 3.4 Treasure Hunt

### 3.4.1 Overview

**Subject:** Bearings

**Aim:** Develop confidence with bearings

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

**Resources**

- ✓ Cones
- ✓ Compass – one per student
- ✓ Paper and Sharpie

### 3.4.2 Method

Setup as follows:

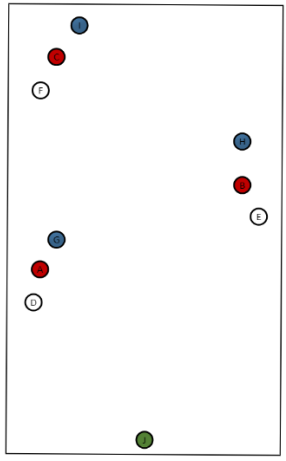
- ✓ Choose an appropriate area, as large or small as the ground allows. It does NOT have to line up North-South.
- ✓ Place the cones as shown on the diagram.
- ✓ From a Cone J, decide which cone is correct from the group (A, D or G) and take an ACCURATE bearing to it. Write the bearing down and put it in under Cone J.
- ✓ Repeat for remaining groups, but always put the written bearing under the RED cone.

Each leg has three potential cones on similar bearings – only one is correct.

The students navigate to a cone and writes down the letter of the cone. The next leg always STARTS from the RED cone. A piece of paper under the cone has the bearing to the next cone.

Finally, the students from Cone C take a bearing back to Cone J and walk back.

Treasure Hunt Plan



### 3.4.3 Student Briefing

You can see in front of you a series of cones.

Starting one at a time, you start at Cone J where you will find a bearing. Set that bearing and walk to the cone that it points to and then write down the letter on the cone.

Regardless of which cone you are on, go to the nearest Red cone, where you will find another bearing. Walk on that bearing until you come to the next cone and write that down.

Repeat until you are at the last Cone.

Finally, take a bearing from the last Red Cone – C. to the starting Cone J. Write it down and follow it back to J.

So, each bearing will point at a Cone, but you always start the next leg from the Red cone.

You will finish up with 3 letters and a bearing – we will check these when you finish the course.

### 3.4.4 Instructor Notes

Set the students off in pairs or solo, depending on how confident they are.

# 3.5 Resection

## 3.5.1 Overview

**Subject:** Bearings

**Aim:** To develop the student's understanding of resections on a handrail.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

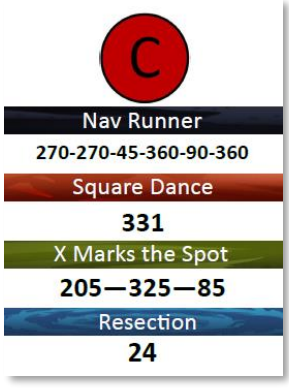
**Resources**

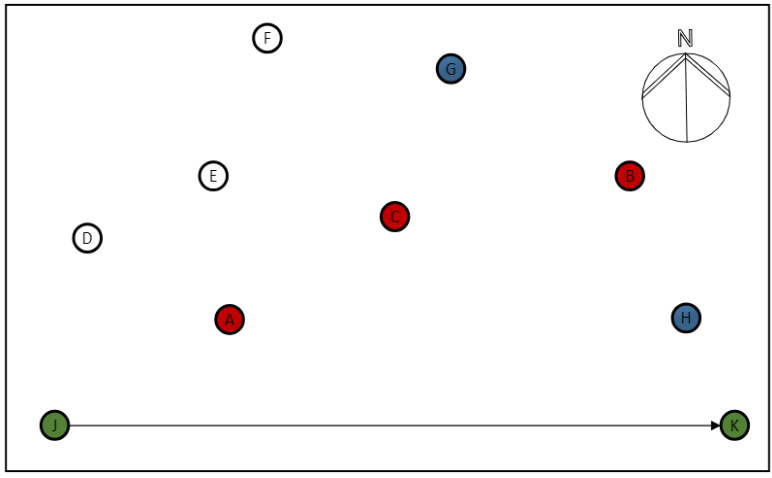
- ✓ Cones
- ✓ Resection Cards
- ✓ Compasses per Student

## 3.5.2 Method

This exercise is a practical demonstration of pinpointing a position on a handrail by using a bearing from another feature. At the South of your area, set Cone J and K, with K being on a bearing of 90°, using the full area. Set the remaining cones, in these positions. Check that the bearings work and adjust the cone positions.

The students will then use the following bearings to pinpoint their position on the J-K line.






### 3.5.3 Student Briefing

When moving along a linear feature like a road or wall, it is possible to pinpoint your location by taking a bearing from another feature, like a building or a corner of a wood. This exercise helps you to understand the concept.

You can see Cone J and Cone K; this represents a road.

Cone A has a bearing of 270° and there is only one position online J-K where this can be true.

Set a bearing of 270° and move along the line until your compass points at Cone A.

#### Demonstrate

When navigating, this works the other way around – from where you are you take a bearing and pinpoint your position on the map.

Now repeat each for each Card using the bearing on Resection.

### 3.5.4 Instructor Notes

This exercise should first be run with pairs; and then repeated solo.

Let the students have a couple of turns. Discuss:

- ✓ Ask the students for more examples of Linear features and more features that could provide a bearing.
- ✓ Explain transit lines using A and F. (i.e. when two features line up and therefore give an accurate location)

# 3.6 Back Bearings

## 3.6.1 Overview

**Subject:** Bearings

**Aim:** To develop the student's understanding of back bearings

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

**Resources**

- ✓ Back Bearings Cards
- ✓ Cones
- ✓ 2 Compasses

## 3.6.2 Method

This is a team exercise where the students use two bearings to accurately identify the next location.

For each position, the student uses two bearings for the last two positions to triangulate to the correct position. They then put a cone down and continue the exercise.

Bearings Table Example

| From | To | Bearing |
|---|---|---|
| C | A | 160° |
| C | B | 118° |
| D | B | 158° |
| D | C | 276° |
| E | C | 214° |
| E | D | 135° |
| F | D | 206° |
| F | E | 276° |
| G | E | 180° |
| G | F | 119° |
| H | F | 161° |
| H | G | 253° |
| I | G | 120° |
| I | H | 92° |
| J | H | 67° |
| J | I | 148° |
| K | I | 118° |
| K | J | 233° |

Setup

### Setup

At the South of your area, set Cone A and B, with B being on a bearing of 90°.

The exercise will go North 3 times the length from cone A to B. So, if you have a 20-metre area, set A and B 6 metres apart.

This exercise should first be run with pairs (if you have enough students). One student sets one bearing, whilst the other student sets the other bearing. The pair can then wander around until they find the correct location – without re-setting the compass.

## 3.6.3 Student Briefing

### Standing to the North of the Cones

When navigating, particularly for micro navigation, we can use bearings to pinpoint our position; this is called back bearings. This exercise helps you to understand the concept.

You can see Cone A and Cone B.

Cone C should be placed on a bearing to Cone A of 160° and Cone B of 118°. There is only one position that both these bearings can be correct.

Working in a pair, one of you set a bearing of 160°, and the other set a bearing of 118°. You can move around until you are both in the same place.

### Demonstrate

Now repeat each step swapping out one of the pair with another student.

To test your accuracy, the final Cone K should be 180° from Cone A

## 3.6.4 Instructor Notes

The exercise can then be run with each student doing one or more legs.

Let the students have a couple of turns.

You can discuss:

- ✓ How this would work with one bearing whilst on a linear feature.
- ✓ This technique is used a lot at sea – can you think of some examples?

# 3.7 Hill Running

## 3.7.1 Overview

**Subject:** Pacings

**Aim:** To develop an understanding of pacing over different conditions.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with pacing and practised 100m pacings.

**Resources**

- ✓ Cones

## 3.7.2 Method

This is a simple pacing exercise to demonstrate how pacings are affected by:

- ✓ height gain
- ✓ tiredness
- ✓ load-carrying
- ✓ broken ground

**Setup**

Set up three cones, A, B and C. in a L shape with 10m between each cone. It does not need to align with north-south.

## 3.7.3 Student Briefing

You have all done pacing and understand that you can measure the distance walked by counting your paces.

Ask the students what their pacing counts are, i.e. 60

Demonstrate how to pace, walk normally, and count only the right foot strikes, along the 10m from A to B.

Now, we are going to count our steps from A to B. Each of you walks and counts your paces.

Repeat several times

Explain that paces will change due to:

- ✓ load-carrying
- ✓ height gain

- ✓ tiredness
- ✓ broken ground

Load Carrying

Confirm students are fit for the activity

To represent load-carrying we will piggyback another student.

Get the students to repeat the activity 2 or 3 times and confirm that they are taking more short paces.

Ensure close supervision to avoid injury.

Tiredness

Discuss how being tired is like carrying weight. The length of each pace will shorten and so more paces will be taken to cover the same ground.

Height Gain

Now repeat the exercise but simulate a hill by walking from A to C.

Explain that the distance to walk is now further (like a diagonal on a grid square). Repeat a couple of times getting the cadets to count their steps.

Explain that it is harder to walk uphill, so piggyback another cadet on the diagonal line. Repeat a couple of times getting the cadets to count their steps.

### 3.7.4 Instructor Notes

Discuss how the following would change paces:

- ✓ Broken Ground
- ✓ Down Hill
- ✓ Down Steep Hill

You might like to discuss the Lambex method, at the end of this book.

# 3.8 Attack Point

## 3.8.1 Overview

**Subject:** Attack Points

**Aim:** To develop an understanding of attack points

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Competent with bearings

**Resources**

- ✓ Compass (1 per pair/student)
- ✓ Cones

## 3.8.2 Method

The students will walk on a bearing and pace to find a specific location. They will then mark this with a token (like a coin). They will then move to a second cone, that is much nearer to the location than the first coin and repeat the process. They should find that they finish in a slightly different place.

**Setup**

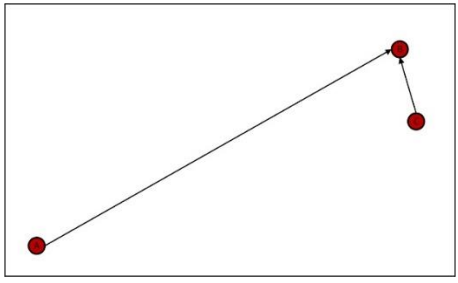
The instructor will set up four tasks (red, white, blue, green) as follows:

- ✓ Place cone A at one end of an area and cone B at the other. Measure the bearing and the distance from A to B. i.e. 45° and 5 paces
- ✓ Setup a much nearer cone C and measure the bearing and distance, i.e. 330° and 1 pace.

| From | To | Bearing | Distance |
|---|---|---|---|
| A | B | 45° | 5 Paces |
| C | B | 330° | 1 pace |

- ✓ Remove Cone B
- ✓ Write down the bearing and distances
- ✓ Repeat for white, blue and green cones

Attack Point Example



### 3.8.3 Student Briefing

Attack points are used to find very exact locations, like buried treasure. Sometimes you might have a bearing with a long distance and try to walk straight onto the location, but it is more accurate to walk a shorter distance from an attack point. It is also easier to quickly get to the attack point and then use Micro navigation just for the short leg.

- ✓ Go to Cone A and walk the bearing and distance indicated. Mark the location with a token (stone, coin, etc)
- ✓ Go to Cone A again, just walk to Cone B, then walk the distance and bearing given from Cone B
- ✓ You should find that the top RED cone gives you a more accurate location

Demonstrate

### 3.8.4 Instructor Notes

This exercise can be delivered at different scales like a small room to a football pitch. If you have the room, you can make them progressively bigger.

Discuss what features the cones might represent.

Discuss using Macro (Course) navigation to get to the attack point and then using Micro (Fine) navigation for just the last leg.

# 4 Advanced

Advanced exercises putting it all together including pacing on bearings, dead reckoning, and boxing.

# 4.1 Chain Gang

## 4.1.1 Overview

**Subject:** Bearings

**Aim:** To develop the student's understanding of navigating in poor visibility.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with bearings

**Resources**

- ✓ 1 Compass per student

## 4.1.2 Method

This is a fun team exercise where the students mimic poor visibility by forming a physical chain.

The instructor identifies a starting position, places a cone, and assigns a suitable bearing to walk on.

Students work in groups of three or more. If space is limited, then use smaller groups.

Run the exercise as follows:

- ✓ Position the first student – the rest form a line by holding hands.
- ✓ The first student lines up the 'chain' on a bearing.
- ✓ The last student stands still. The first student walks to the last student, dragging the chain, which rolls forward
- ✓ The last student is now the first student and the process repeats.

When the chain has reached the limit of the ground, then take a bearing on the cone, it should be exactly 180° from the original. So, if the original bearing was 90°, the back bearing should be 270° (i.e. 90° + 180°).

## 4.1.3 Student Briefing

When you want to walk on a bearing, set the bearing on the compass, identify a distant object on the bearing, put your compass away and walk towards that object.

Demonstrate

Let the Students have a practice.

However, in poor light, thick woods, or in fog you can't do this. Instead, you get one of your team to walk out to the edge of where you can see – then line the team member upon the bearing. You can then move to the person and repeat. This is a difficult and time-consuming task.

Demonstrate

To mimic navigating in poor visibility we are going to play a fun game.

Place the first Student on the cone

Everybody, hold hands and form a straight line

Tell the first student to line them up with the bearing

When it's done, get the first student to drag the line around to the last student and get the last student (now the first) to line the line-up.

Now keep going until you reach the edge of our area.

Check the back bearing at the end for accuracy.

### 4.1.4 Instructor Notes

Re-run the exercise a few times.

## 4.2 Minefield

### 4.2.1 Overview

**Subject:** Bearings, Pacings

**Aim:** To develop accurate walking on the ground.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Competent with bearings and pacings

**Resources**

- ✓ 'Blank' Map (1 per pair) - (from the website)
- ✓ Compass (1 per pair)
- ✓ Cones
- ✓ Pen

### 4.2.2 Method

This exercise is designed to increase students' confidence in their ability to accurately walk on the ground. The exercise is more like navigating at sea or in a desert.

The student will be given a starting and an endpoint, these are accurately mapped on a Blank map. The student will accurately follow a bearing and distance to the given point. However, they must follow the 'safe passage,' shown by the cones. This will require the student to accurately mark on their BLANK map a bearing and a distance.

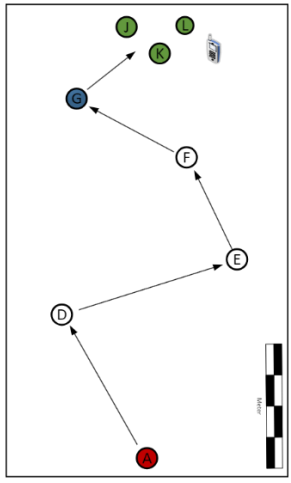
The scale of the exercise is subject to the space available, so it can be done in a classroom or on a field.

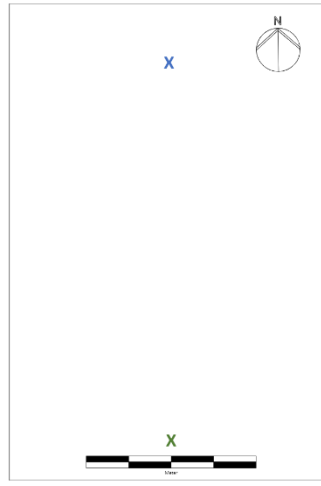
**Setup**

Setting the exercise requires:

- ✓ You require a north orientated area approximately 10 meters long, by 6 meters wide.
- ✓ Set up A cone at the middle of the South of the area. Place J cone 9 meters on a North Bearing.
- ✓ Mark an accurate 2-meter scale – for the students to measure their steps against.
- ✓ Place the rest of the cones – these do not have to be accurate.
- ✓ An accurate template is available on the website.

Minefield Setup




## 4.2.3 Student Briefing

You are stranded in a desert and there are no features to help you navigate.

You know your current location and the location of a radio with which you can organize a rescue. These are both marked on a blank map, but it is accurate to scale and to bearings.

Unfortunately, there is a minefield between you and the radio. Some sappers have marked a safe passage through the minefield using cones. You start on the Red and navigate to the Phone via Cones D, E, F and G.

The cones are not marked on the map, so to successfully find the radio you must accurately mark each cone you visit using the bearing and distance moved.

At the end you must choose one of the Green cones, that you think is nearest to the phone position.

## 4.2.4 Instructor Notes

This exercise is scalable and can be doubled, quadrupled, etc. in size.

On the template the scale is 1 meter per block with a distance of 9 meters to the phone, if the scale is double it 2 per block and 18 meters, quadrupled 4 meters per block and 36 meters long.

# 4.3 Micro Navigation

## 4.3.1 Overview

**Subject:** Bearings and Pacings

**Aim:** To develop confidence with bearings and pacing.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with pacing and bearing
- ✓ Recently measured pacing

**Resources**

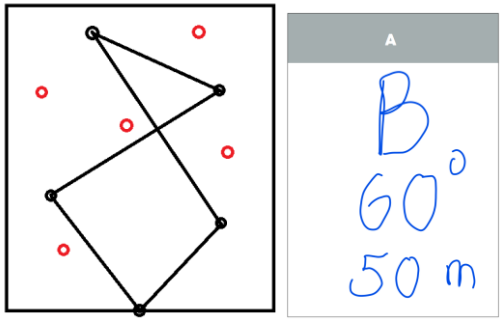
- ✓ One compass per student
- ✓ Tent Pegs (grass) or Cones (tarmac)
- ✓ Laminated Blank Cards

## 4.3.2 Method

**Setup**

Using the space available, set up a series of waypoints.

Micro Navigation Route showing Dummy Cones and Card




Set up the route using tent pegs/cones and blank cards.

Once the route has been confirmed, write on the blank laminated cards, using a Sharpie:

- ✓ A letter
- ✓ A Bearing
- ✓ Distance

The route should be:

- ✓ 6 – 10 waypoints
- ✓ Each waypoint should have a letter on it. These letters should spell a word – this is used as confirmation.
- ✓ The distances between waypoints should be consistent, depending on the size of the area, so 5, 10, 15 metres: or 50, 100, 150 metres, etc.
- ✓ To avoid students cheating and simply walking onto the 'obvious' cone. Put out several dummy cones with the words 'Wrong – Go Back'
- ✓ Have at least two start positions that go to different waypoints. The route can merge after the second waypoint.
- ✓ Students set off in order, with enough time for them to reach the first waypoint before setting off to the next.
- ✓ Staff should be posted on each side of the 'square' to assist and to block students who wander off target.

Night Version

The same exercise can be re-run in the dark. To run at night:

- ✓ Demonstrate 'charging' a compass
- ✓ Do not allow head torches
- ✓ Allow at least 20 minutes for the students' eyes to adjust to the dark
- ✓ Each waypoint and dummy should have an activated Cyalume stick, but to avoid it being easily seen bury all but the top 3cms.
- ✓ At the end of the exercise confirm all students and staff are back.

### 4.3.3 Student Briefing

You will start at the start position.

This is a solo activity. You will need your compass.

Each waypoint has a card that will give you a bearing and how far to walk on that bearing.

At the end of the leg, there will be another card with another bearing and distance.

Continue until you get to the Finish

Each card has a letter on it, the letter will form a word. I will ask you for that word to confirm that you have completed the test correctly.

## 4.4 Blind Man's Bluff

### 4.4.1 Overview

**Subject:** Pacings

**Aim:** To develop confidence with bearings and pacing.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already familiar with pacing and bearing

**Resources**

- ✓ One compass per student
- ✓ Notepad and Pen
- ✓ Cones

### 4.4.2 Method

**Setup**

**Note – Students only need to count steps. They do not need to have paced 100m.**

Using the space available, in a clear area (no obstacles), set up a series of waypoints. Each Waypoint should have two cones about one metre apart. Four or more waypoints can be used (subject to time and space).

Pair off the students, Student A has a compass, Student B has a notepad and pen.

Student A takes a bearing from the start to the next waypoint and tells Student B, who writes it down.

Student A carefully paces to the first waypoint and tells Student B how many paces were taken, Student B writes it down.

This is repeated for the whole course. Effectively the pair have recorded an accurate route around the course.

The pair return to the start and Student A puts a jacket over his/her head. When ready, Student B tells Student A the bearing and paces to take. Student A, still with a jacket on their head, then follows this bearing for the number of paces – if it goes well this should return the pair to the first waypoint. Repeat for all waypoints.

Safety – Student B must ensure that Student A is walking safely.

### 4.4.3 Student Briefing

Pair off the students.

One of you will have a compass, the other a notepad and paper.

From the starting position, carefully measure the bearing to the first waypoint and write it down.

Then pace to the waypoint, when you arrive write down how many paces you took.

Once you have completed the course you should have an accurate route through the course.

Get all the students to map the route.

To prove how accurate bearings and pacings can be we will now do the exercise in the dark. To simulate this, the person with the compass must put a jacket over their head so that they can only see the compass and their feet.

Now repeat the exercise, your partner will tell you the bearing and pacings for each waypoint.

**People with the pads – make sure you watch your partner and make sure that they are walking safely.**

### 4.4.4 Instructor Notes

This exercise demonstrates how accurate bearings and pacings can be. If time permit swap the pair's role.

Discuss with the students why this is an important skill:

- ✓ Demonstrates accuracy
- ✓ Micro navigation
- ✓ Navigation at night

# 4.5 Box It Off

## 4.5.1 Overview

**Subject:** Boxing an Obstacle

**Aim:** Practice boxing around an obstacle.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Familiar with bearings

**Resources**

- ✓ 8 Cones

## 4.5.2 Method

Select an area for the exercise. Create an obstacle about one-third of the area (but no bigger than 10m), represented by a chalk line, day sacks, a tarpaulin or anything else that you have at hand (you may even have a readymade obstacle like an area of grass or 6-yard box).

Then set cones in four coloured pairs around the obstacle at the edge of the exercise area. Each pair should align with the centre of the 'obstacle'.

Each student goes to one of the cones. Sets a bearing to the other cone of the same colour. The student then approaches the obstacle walking on the bearing, as the student nears the obstacle they will box it.

## 4.5.3 Student Briefing

This is an exercise in boxing an obstacle.

I will demonstrate how it works.

(Demonstrate)

Now you have seen a demonstration:

- ✓ Go and stand next to an unoccupied cone
- ✓ Take a bearing on the cone of the same colour on the other side of the obstacle
- ✓ Box off the obstacle
- ✓ Repeat for each cone – in both directions

### 4.5.4 Instructor Notes

In the demonstration discuss:

- ✓ Why the boxing technique is used
- ✓ That, if done correctly, you should finish on the other side of the obstacle on the same line

Specifically, demonstrate the technique below:

- ✓ Set the bearing – then do not alter the compass again.
- ✓ Approach the obstacle then box either left or right. Physically turn the body 90 degrees left or right. Then accurately set the compass – do this by aligning the red compass needle with the nearest WEST or EAST.

| Bearing 140 | Same but Red Needle Aligned West |
|---|---|
|  |  |

- ✓ Walk on the bearing counting steps until the obstacle is cleared.
- ✓ Return to the original bearing and walk until the obstacle is cleared.
- ✓ Turn 90 degrees in the OPPOSITE direction than before, accurately set the compass on the nearest WEST or EAST and then walk for the SAME number of steps as before.
- ✓ Return to the original bearing and you should be looking straight at the other cone.

Added Points:

**Quick Methods:** If you can see a feature from where you start, you can box off until it lines up with your back bearing. If two features line up on the required bearing on both sides of the obstacle, like a tree or a hill. Simply note the two features, walk around the obstacle and when you are back in line with the obstacles – you are back on course.

**Pacing:** If you are pacing the leg, then ignore the steps that move you left and right but count the steps that are on your bearing.

# 4.6 Room with a View

## 4.6.1 Overview

**Subject:** Bearings, Map Work

**Aim:** To develop an understanding of the real world versus mapping.

**Time**: 30 - 60 minutes

**Audience**

- ✓ Up to 8 Students
- ✓ Already competent navigators (map symbols, grids, bearings, distance)

**Resources**

- ✓ Map and compass (1 per pair/student)
- ✓ Pictures of Surrounding Area
- ✓ Binoculars (Optional)

## 4.6.2 Method

Using a location with a view locate:

- ✓ Locations from photos
- ✓ Location from grids

**Setup**

Use a series of A4 laminated photos and separate grid references of the surrounding area to challenge the student's navigation skills to:

- ✓ Indicate the location
- ✓ The bearing
- ✓ Visual estimation of distance target
- ✓ Actual Map distance to the target

Create a set of five pictures and five grid references for a specific view: from a football pitch, car park, or classroom window.

Room with a View Example Picture:

From this view:

### 4.6.3 Student Briefing

You will be given either a picture or a grid reference of a feature that you can see from here. Can you:

- ✓ Show me the location on the map and real-world
- ✓ Tell me the bearing from here
- ✓ Estimate the distance on the ground to the target
- ✓ Calculate the distance to the target

Swap the tasks until you have completed the full set.

### 4.6.4 Instructor Notes

This is an excellent opportunity to discuss:

- ✓ When trees are not shown
- ✓ How buildings are often approximated

# 5 Teaching Navigation

Here are some tips and inspiration to help you teach navigation to your students.

## 5.1 Build Confidence

The aim of this book is to give our students the skills and the confidence to use them.

So, a lot of this is about confidence – here are a few simple steps to build that confidence.

### 5.1.1 This is Really Easy!

Some of these exercises are easy and the students will tell you so. The exercises are easy because they are understood, this is a good thing. As enthusiastic instructors, we sometimes want to push on to the 'harder' stuff. For me, the most useful exercises in this book are the easy ones. The student will walk away full of confidence in their ability.

### 5.1.2 Pairs then Solo

These exercises are well suited to be done in pairs. So let the students do each exercise in pairs and then progress onto solo.

### 5.1.3 Failure is Learning

Really support failure. When teaching navigation, I talk a lot about how often I have been lost or got things wrong – it's one of the most powerful learning techniques.

When a student makes a mistake, emphasise how useful that is. Remember – keep building their confidence.

### 5.1.4 Stretch Goals

As instructors we enjoy the more challenging activities, rather than handrailing an easy path to a junction, we would prefer to be contouring for 250m to a kink on the contour line.

The problem is when we 'challenge' our better students to do navigation that is beyond the course level. It's important to challenge students, but if they fail on a 'challenge' we run the significant risk of impacting their confidence.

So, if possible, try and phrase the task at two levels, like this:

"Can you take me to this wall junction ..... and for an extra challenge the small hillock near it."

While really emphasizing that this assessment only requires the first activity.

## 5.2 There's too much Maths

When we sold the vision of the great outdoors: climbing up rugged hills, skipping through mountain streams, being mesmerized by wonderful wildlife; no student ever said 'Yeah, but can we do more maths!'.

**If you are doing anything other than adding and simple multiplication – then you are teaching Navigation WRONG!**

Some of our students are not great at school, some of them have dyslexia, dyscalculia, or other barriers to learning. They can, however, **EXCEL** at navigation if we help them.

### 5.2.1 The Serious Risk of Maths

Calculation errors will occur in direct proportion to:

- ✓ The complexity of the maths
- ✓ The mental pressure the navigator is under such as: Fatigue, Poor weather, Lack of confidence, Responsibility (safety of party), Fear of failure, Old fashioned fear.

So, when you have had little sleep, you've been on your feet for 12 hours walking the hills, it's dark and raining, and you are not sure where you are. Then a one of your group starts to come down with hypothermia and you decide to get off the hill; this is not the moment to calculate your time for a 450m leg at 3.5 KPM! (See Naismith's below).

### 5.2.2 Bearings

Most times when we take bearing we don't care about the number. You take a quick map bearing to make sure that the path you are on is the right path. Why would you ever read off the actual bearing?
**Whenever you ask for confirmation from a student, do it by getting them to line up in the appropriate direction.**

It is surprisingly hard to read a bearing – and it will be a barrier for some of our students.

### 5.2.3 Back Bearings (Back-Snaps)

The normal method of taking a back bearing is to take a regular bearing from where you have just been and then subtract 180° from it. This is surprisingly difficult to do correctly.

A much better solution is the reverse the needle. When taking a back bearing, use the White end of the needle and then no maths are required. So instead of Red in the Shed, its White in the Shed.

### 5.2.4 Boxing

Have a look at the 'Box It Off' for an explanation of a 'math-free' method of Boxing.

### 5.2.5 Naismith's

There is little benefit in discussing pace in terms like 4 km/h or 6 km/h. Asking questions like:

- ✓ How long will it take to walk 300m at 6 km/h?
- ✓ If I walk at 4 km/h for 20 minutes, how far will I travel?

Students only need to understand the 100m timings, i.e. 1 min per 100m, 1.5 min per 100m or 2 min per 100m. So, when you get your students to do 100m pacings, get them to time it as well.

If the group agree on a pace of 2m per 100m, then 300m takes them 6 minutes – that's it.

A group walking at 2 min per 100m, will cover 1,000m in 20 minutes.

Timing/Pace Table

| Min/100m | KM/H | Description |
|---|---|---|
| 1.0 | 6 | Face pace – hard to maintain |
| 1.5 | 4 | Good pace |
| 2.0 | 3 | Suggested pace for any extended period. |
| 3.0 | 2 | Appropriate pace for less fit/focused walkers |
| 4.0 | 1.5 | A leisurely bimble |

This method also enables a navigator to adjust their timing on each leg, i.e. we were walking at 1.5 minutes per 100m, but we have been short on the last two legs – so I will adjust to 2 minutes.

### 5.2.6 Counting Pacings

Make sure students count their paces for each 100m and then start again. So, if a student is pacing 350m with a pace count of 63, they should count to 63 for each hundred, then 32 paces for the last set.

Some students will do complex maths, i.e. 3.5 times 63 and then count the whole amount – this is an overly complicated method; so, make

sure you have demonstrated a method for tracking the '100s', such as pebbles, knots or toggles.

### 5.2.7 Pacing – Lambex Method

In all the books that I have read on navigation (and that's quite a lot); I have only found one decent explanation of varying pacings based on the ground, angle, etc. Most explanations vaguely suggest that you just need to practice and somehow 'know' the adjustments.

So, I have included this guide, which is easy to remember, does not have much maths and is reasonably accurate. Try it out and adjust it to match your individual needs.

More importantly, it's based on how you are walking and not on hill angles or descriptions of the ground.

#### Lambex Pacing

Measure your flat 100m pacing (counting every other step).

For example, 60 paces.

Divide this by ten and go to the nearest whole number -this is your Extra.

In our example, the Extra is 6

| Extra | Mode | Description |
|---|---|---|
| +0 | Easy | Walking normally |
| + 1 | Moderate | Noticeably leaning forward or back<br>And/or<br>Looking at the ground a couple of paces ahead because it is broken |
| +2 | Hard | Looking at the ground where your next step will land because it is either very broken or steep. |
| +3 | Very Hard | Going uphill you are lifting your knees beyond horizontal |

If you are carrying weight and/or getting tired – move up a group.

**Walking up a moderate hill. You are noticeably leaning forwards and 60 + 6 = 66 paces for 100m**

## 5.3 Things We Don't Need to Teach

### 5.3.1 GMA

Grid Magnetic Angle or GMA is no longer taught in the UK as it's practically ZERO. So, unless your students are super keen on science then we don't need to discuss it.

If you do, it's better to go with the saying '**West is Best, East is Least**' rather than '**Grid to Mag – Add, Mag to Grid – Get Rid**' as the first one works anywhere in the world and gives a better understanding of the problem.

If you are planning to take students somewhere exotic where GMA is a thing, it's better to get a world compass with declination on it, better yet, get one where declination can be set.

### 5.3.2 Mils

There is no reason to discuss Mils with students.

Mils is an alternative to degrees used by the military, where 360 degrees are replaced by 6,400 increments. Fun fact – Russian forces use 6,000 Mils and the Swedish used to have 6,300; when there are actually 6,283. As a navigator, **you** might find it is an interesting thing to learn about because mils, unlike degrees, are associated to the distance- this is how reticles (graticules) binoculars and scopes can estimate range.

Make sure that NONE of your compasses have Mils on them, even the ones that have both degrees and Mils.

## 5.4 Tabletop Navigation

"Help – I don't even have a car park to train in!"

It's not ideal, but we can still deliver some useful skill-based training on a desk in a classroom or even on the floor of a tent.

When we think about it, what is a map – it's a bird's eye view of an area drawn to scale. The key term here is **scale**. Bearings on a map work in the real world because they are not affected by scale. This means that any of the exercises described in the book that are bearing-based can be used on a tabletop scale; whilst some of the others work just as well if we change the props.

Below is a list of the exercises in the book that will work on a tabletop; with some additional notes to make it work.

Any paper-based exercise that requires bearings will have to be aligned North/South. To ensure it stays aligned fix it to the table with Sellotape. Try to make sure the tables don't move once the paper has been set up.

| Title | Notes |
|---|---|
| Simon Says | Not Appropriate |
| Hand Hill | No Change |
| Glove Hill | No Change |
| Bergen Mountain | Swap out the day sacks for play dough or sand |
| Maze Runner | Swap out the cones for counters |
| Nav Runner | Swap out the cones for counters |
| Square Dance | Swap out the cones for counters |
| X Marks the Spot | Swap out the cones for counters |
| Treasure Hunt | Swap out the cones for counters |
| Resection | Swap out the cones for counters |
| Back Bearings | Swap out the cones for counters |
| Hill Running | No Appropriate |
| Attack Point | Swap out the cones for counters |
| Chain Gang | Not Appropriate |
| Minefield | Swap out the cones for counters |
| Micro Navigation | Swap out the cones for counters |
| Blind Man's Bluff | Not Appropriate |
| Box It Off | Swap out the cones for counters |
| Room with a View | No change – if you have a view. |

# 6 Assessing Students in the Field

How to organise student assessments and make them enjoyable and effective.

## 6.1 Planning

As part of the training syllabus, we need to take the students out onto the ground and assess their navigation. So, what are the decisions that you will take when organising an assessment? This does not replace the documentation that you need to produce for an event in your organisation.

### 6.1.1 Where

There are three types of locations that you can train on:

- ✓ **Normal:** Lowland areas which are not more than 30 minutes from a refuge (a road accessible by a road-going ambulance or a permanently inhabited building served by such a road).
- ✓ **Wild Country (Moorland):** Open, uncultivated, non-mountainous high or remote country enclosed by well-defined geographical or man-made boundaries, and where movement on steep and rocky terrain, planned or unplanned, is not required.
- ✓ **Wild Country (Mountainous):** Mountainous areas containing steep rocky ground requiring technical skill and exposed to harsh and unpredictable weather, where walkers are dependent on themselves and remote from immediate help.

### 6.1.2 Safety

When I was going through my Hill and Moorland Training, I learnt a great phrase:

**"Getting to the top of a hill is optional, getting back down is mandatory"**

This phrase nicely sums up our general aim, we want to challenge our students, but we also want to make sure that they stay safe.

Legally, what you can do with your friends and family it not the same as what you can do when leading a group of students. Just because you walk regularly in the hills – does not mean you can take students to the hills. There are many stories in the press of poorly lead groups leading to injuries and even death. So, make sure you understand what you are qualified to do and not qualified to do. Each youth organisation has its own rules for how walking should be managed, so make sure you are familiar with yours.

Always make sure that you have the following for the ground/weather that you will be leading a group:

- ✓ the correct qualification
- ✓ the correct leader to student ratio
- ✓ the correct planning and preparation
- ✓ the correct equipment

### 6.1.3 Experience

There is a good reason that you need 40+ quality days in the hills or mountains to become a walking leader. Hopefully, in those days you will have seen a lot go wrong – getting lost, injuries, losing the light, hyperthermia, etc. These issues give you an increased awareness of the risks and improve your planning and risk mitigation when leading others.

So, get more experience and always plan thoroughly.

To paraphrase the scuba diving mantra:

Plan the walk, walk the plan.

### 6.1.4 Planning your Weekend

A navigation training and assessment weekend will follow the same structure. Inevitably, on a weekend the night assessment must be run on Saturday night; this ends the assessment – Sunday can then be used for consolidation.

#### Friday

Assemble – Briefing

#### Saturday

- ✓ Morning – refresher/instruction exercises from this book
- ✓ Afternoon – navigation assessment on planned route
- ✓ Evening – night navigation assessment on planned route

#### Sunday

- ✓ Consolidation training
- ✓ More advanced Exercises

Generally, run the assessments in Spring and Autum. Winter is cold and wet; with an increased risk of weather bad enough to stop your event. Summer sounds appealing, but it does not go dark until 23:00 by the end of June – that's quite late to start a night navigation exercise.

## 6.2 Routes

A key element of navigation is route planning and this should be assessed. Students, depending on level, will normally be expected to create a route plan that should demonstrate ground awareness, safety, distances, and timings. This is, however, an academic and quite separate activity from the actual assessment.

There are two important points to make:

- ✓ The navigation assessment will be a route provided by the assessor; then everybody is using a the same, well written route card.
- ✓ Route waypoints and navigation waypoints are quite different. A 5KM route might have 5 or 6 waypoints at key locations like path junctions and farms houses); whilst an assessment could have twice as many, some of which are 'off route' and may be much more subtle features, like gates, change of slope angle or grouse butts.

### 6.2.1 Not an Expedition

A Duke of Edinburgh expedition is defined as:

".. planning, training for and completing an adventurous self-sufficient journey as part of a team"

Whereas navigation is an individual's skill to move confidently, efficiently, and safely from point A to point B.

A navigation assessment is not an expedition assessment and vice versa. It's important that we do not confuse the two, particularly as it is normally the same staff delivering them.

### 6.2.2 Don't be Constrained by the Route Card

The key point here is that the assessor will follow the planned route, but will:

- ✓ Deviate off route to hit interesting features. (Subject to having the appropriate qualifications to do so).
- ✓ The assessor will, whilst following the route, decide on the next waypoint based on many factors, but mainly the ability of the student being assessed.

## 6.3 Assessing Navigation

Most syllabuses will require students to demonstrate their navigation abilities by participating in a group navigation of a route with several legs, with each student leading at least one leg.

The ground, complexity and distance of these legs will differ depending on the level; but good assessment practices should be applied to all of them, these include:

- ✓ Increase the student's enjoyment of the activity
- ✓ Increasing the student's confidence
- ✓ Ensure each student is assessed independently
- ✓ Keep the whole group engaged and practicing their skills

So how do we run a more structured and effective assessment?

### 6.3.1 Group Sign Off

Sadly, a common feature of navigation testing is the 'group' sign-off. This is when the assessor checks that the 'group' navigates the route rather than each individual.

There are many causes for this issue, like:

- ✓ The instructor is concentrating on going the right way
- ✓ The students are not at the level that they should be, so the instructor spends time teaching
- ✓ Confident students lead, the others follow
- ✓ Not everyone has a map and compass

### 6.3.2 The 4Ds

We will share the 'Roles' on each leg using the 4Ds, which are:

- ✓ Distance: how far is it?
- ✓ Duration: how long will it take to get there?
- ✓ Direction: what direction is it?
- ✓ Description: what will we see on route?

Some trainers use a fifth D – Danger; but this is more relevant in challenging terrain.

The 4Ds will vary depending on the level:

4Ds Assessment

| Student | Beginner | Intermediate | Advanced |
|---|---|---|---|
| **Distance** | Give a distance | Pacing | Accurate Pacing |
| **Duration** | Measure Time Taken | Predict and measure Time | Accurately predict and measure Time. |
| **Direction** | Orientate map and point in the correct direction | Take a map bearing and face in the correct direction | Confirm with additional bearings on route (Back-Snaps) |
| **Description** | Linear collecting features like paths and roads | Other features like houses, woods, powerlines<br>Include Catching Features | Subtle features like slope change.<br>Resection |

### 6.3.3 Preparation

Prepare **BEFORE** the assessment, as follows:

- ✓ Ensure the assessors fully understand the route, preferable pre-walk it.
- ✓ Use the exercises in this book as either practice or confirmation and get an understanding of the standard of each student.
- ✓ All students have:
  - Compass
  - Map
  - Timer (watch or mobile)
- ✓ Keep group sizes down 4 to 6 is ideal.
- ✓ Explain the 4Ds that you will be assessing

### 6.3.4 On the Assessment

On each leg:

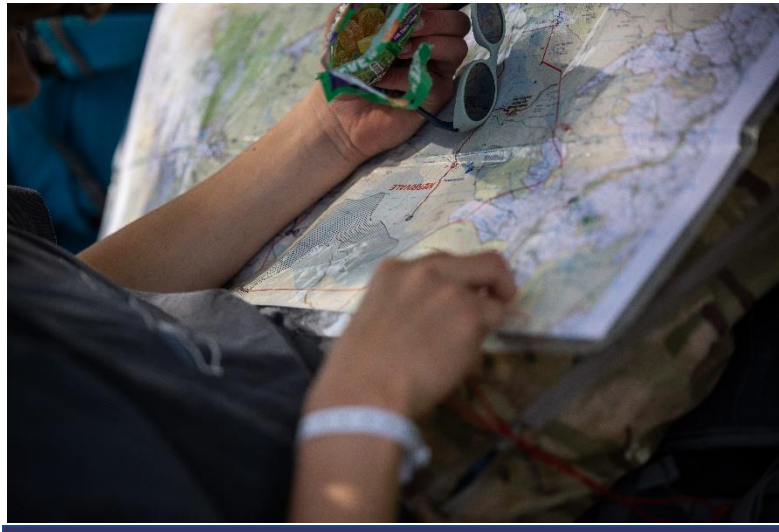
- ✓ Assign a new leader
- ✓ The assessor re-confirms that the leader knows exactly where they are.

- ✓ The assessor asks the leader to take the group to a point on the map.
- ✓ The leader takes a little time to work out the 4Ds. You can take the pressure off the leader by 'distracting' the rest of the group with some instruction on an interesting navigation or walking point of interest.
- ✓ When the leader is ready (there's no rush), the leader describes the 4Ds to the group.
- ✓ The leader delegates the 4Ds to the group (Assessor ensures everyone is getting a turn at each)
- ✓ The leader leads the group to the next leg. Depending on the level, the leader can ask the others to give them updates, i.e. "Shout out every 100m walked"
- ✓ When the leader thinks that they have arrived, the leader gives an explanation as to why this is the location.
- ✓ Each team member confirms (or not) the location and gives the information on the D that they were given. i.e. We said it would take 4 minutes and it took five.

### 6.3.5 Additional Notes for the Assessor

For each leg, have a think about the following:

- ✓ Start the first few legs as pairs – so everyone has a go in a pair before going solo.
- ✓ Legs are about quality, not distance. Use lots of short legs with a quick turnover of roles.
- ✓ Make sure everyone gets the opportunity to demonstrate their skills and allow the weaker students to repeat their roles on other legs.
- ✓ Make sure you understand the required level. Often, your experience of an assessment will have been at a higher level – see next point.
- ✓ Feel free to challenge capable students with navigation above that required level of the assessment. But be careful to say that it is a higher level and make sure you don't break their confidence.



# 7 Appendix

Some useful resources to improve your teaching, including cards, books, and teaching aids.

# 7.1 Resources

## 7.1.1 Navigation in a Car Park

Visit the website https://www.navinacarpark.co.uk

There are some great resources here including:

- ✓ Free PDF of this book
- ✓ Free PDF of the cards – ready for printing and laminating
- ✓ How to connect to our Facebook page

## 7.1.2 Selected Books

This is a brief list of suggested reading to improve your knowledge and/or teaching practices:

| Book | Description |
|---|---|
| Teaching Navigation (NNAS)<br>Nigel Williams | The NNAS book explaining how to teach Navigation. |
| Ultimate Navigation Manual<br>Lyle Brotherton | If you are going to get one book on skills – get this one. There is a section on all the skills you need and much more. |
| Hill Walking<br>Steve Long | The Official Handbook of the Mountain Leader and Walking Group Leader Schemes, including Lowland, Hill and Moorland Leader and Mountain Leader |

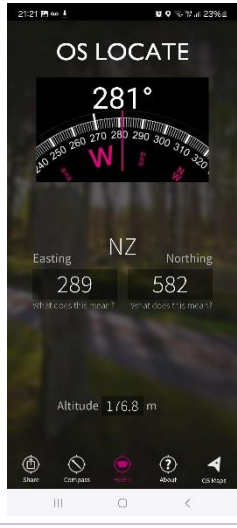
## 7.1.3 Teaching Aids

A few teaching aids that you might find useful:

- ✓ OS Get Started Web Site
- ✓ Learn how to Map Read with Steve Backshall Videos
- ✓ OS Flash Cards
- ✓ Silva Giant Demo Compass

## 7.2 Technology

There are lots of great technologies: mapping tools, route planners, GPS, star maps, plant identifiers, etc. available; but the go-to apps are definitely the Ordnance Survey tools.

| OS Maps on Mobile | OS Locator | Locator taking a bearing on a real map |
|---|---|---|
|  |  |  |

OS tool supports route planning and the printing of OS maps for a small monthly fee.

The mobile app version allows the maps to be downloaded – so you don't need to be connected. The app will accurately put your position on the map. Why is this so useful?

- ✓ When you are training – you can navigate (properly) to a position and then confirm your position with the app (without a Mountain Leader next to you).
- ✓ When you are teaching – you can focus on teaching and use to tool to quickly and accurately re-locate.

Another great tool is OS Locator. If you or your students don't have a compass, then download the free app. It will give you a good-looking compass and give you a 6-figure grid reference. This app can even use your phone's camera to take a bearing off a real map.

## 7.3 UK Army Cadet Forces

### 7.3.1 Ground and Ratios

The Army Cadets (ACF) and Combined Cadet (CCF) are currently governed by "Army Cadets Expeditions and Adventurous Training Manual" (AC71849) This document describes the requirements, qualifications, ratios, etc. for leading groups of Cadets.

In the summary below, note the difference between Navigation and DofE Expeditions. The first is led by a qualified instructor, the second is remotely monitored and hence has lower ratios.

If you are in any doubt, please contact your TSA.

#### Normal Country

Minimum Qualification: Expedition Supervisor
Ratio: 1:10 for Navigation (1:7 DofE)

#### Wild Country (Moorland)

Minimum Qualification: Hill and Moorland Leader or Mountain Leader
Ratio: 1:8 for Navigation (1:7 for DofE)

#### Wild Country (Mountainous)

Minimum Qualification: Mountain Leader
Ratio: 1:8 for Navigation (1:6 Winter)

#### MOD Training Area

Minimum Qualification: No specific navigation qualification, but closely governed by fieldcraft controls, i.e. EASP, etc.

### 7.3.2 Personal Development

There are many different courses that you can attend and whilst I support all training – some courses deliver more to the Cadets than others. For example, Gold NNAS does not 'enable' any delivery whilst Mountain Leader (ML) (the gold standard) is a challenging course, whilst Hill and Moorland Leaders (H&ML) supports all Cadet Navigation.

The H&ML is an achievable course that delivers huge benefits. To qualify, the following must be completed:

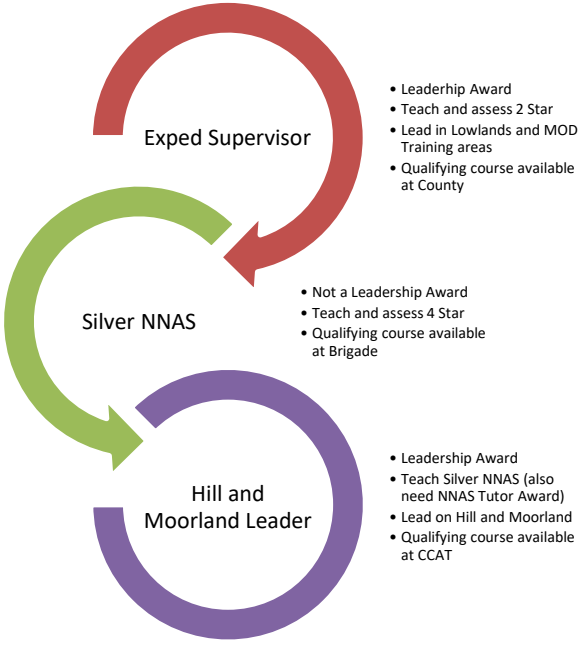
- ✓ 20+ quality Hill, Moorland or Mountain days. A quality day is 4 hours on a hill (or mountain) where you planned, navigated on new ground or new conditions. You can count any trips in the past

and most keen walkers will already be around this number. Unlike the ML, you can probably find a hill or moorland suitable near where you live.

- ✓ A challenging but enjoyable weekend assessment at CCAT.
- ✓ 40+ quality days – this includes the 20+ that you already have.
- ✓ A weekend assessment. There is some homework to do before you get there.
- ✓ H&ML qualifies for your first promotion, like a skill at arms course. It also qualified you to be Count Navigation officer (you get a year to pass it after taking on the role).

Please reach out to your County Navigation officer if you have any questions and specifically about navigation in your county.

### Navigation Progression Schematic



## 7.4 Credits

This book was written with the invaluable support of the 4th Brigade. The adult instructors of the ACF and CCF have collectively thousands of hours of experience teaching navigation to young people. The cadets have equally played their part as enthusiastic guinea pigs for these exercises.

### The Authors

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