



The ABC's of Compass and Map



INSTRUCTORS STUDY GUIDE



Thank you for choosing *The ABC's of Compass and Map* as a method of educating your students in vital navigation skills. These materials will help you prepare an interesting course to teach your students.

Enclosed you will find:

- TruArc3 Brunton compasses
- TruArc3 Instruction manuals
- Instructor's Overhead Projector compass
- Lesson Plan with Field Guide to Compass and Map
- Student workbook that can be copied onto standard size paper

The components will provide you and your students with visual, oral, written and hands-on experience in learning the subject of compass and map use. Each reinforces learning of the other.

As you review the course, you will notice an overview for each exercise is provided. The overview will discuss each exercise and why it is important for the student to learn them. We also provide suggestions on how to illustrate or further explain each topic, so we recommend reviewing the entire Study Guide before presenting to your students.

The course material is complemented by a comprehensive course video, *The ABC's of Compass and Map*. Each section or exercise leads to the next and each question is progressively more difficult. Therefore, it is important to cover each topic in the video.

The video can be viewed on the Brunton YouTube channel www.youtube.com/bruntonoutdoor and found in the "Education" Playlist. There is also a link on the "Instructor Kit" page on Brunton.com.

If you have any questions, please feel free to contact Brunton anytime at 1-800-443-4871.

Video and Compass Instruction Manual

Review *The ABC's of Compass and Map* Video

- Section 1 - Introduction
- Section 2 - Compass Types
- Section 3 - Compass Features
- Section 4 - Taking a Bearing
- Section 5 - Map Features
- Section 6 - Declination
- Section 7 - Compass and Map
- Section 8- Map Orientation
- Section 9 - Poor Weather Travel
- Section 10- Flatland Navigation
- Section 11- Triangulation

Compass Instruction Manual

- Section 1 - Parts of a compass
- Section 2 - Magnetic Declination
- Section 3 - Finding your heading/bearing without a map
- Section 4 - Following a known bearing
- Section 5 - Finding your way using a map
- Section 6 - Finding your position on a map (triangulation)
- Section 7 - Use of inclinometer to measure vertical height

ABC Method - Review

A - *Align* your compass on the map so that the long edge of the base is on a line from your present location to the desired destination.

B - *Bearings* are found by holding the compass steady and rotating the dial (azimuth) so that the "N" on the azimuth is pointed north on the map. Your bearing now appears on the dial at the direction of travel arrow.

C - *Courses* are followed by picking up the compass and holding it in a horizontal position so that the magnetic needle is free to rotate. Pivot yourself until the orienting arrow is aligned with the magnetic needle. The direction of travel arrow now points in the direction you need to travel to reach your desired destination.

EXERCISE 1: Compass Part Identification

Overview: The purpose of this exercise is to familiarize your students with the components or parts of the compass. By being able to identify the parts of the compass, a student will better understand both oral and written instructions. Learning how to use a compass will then be easier.

References: Video Section 3 - Compass Features

Suggestions: While covering this topic, explain how each component/part is used and why it is important, (i.e., the sighting line always points in the direction of travel, azimuth ring has numbers for reading direction or bearing, orienting arrow aligns with the magnetic needle when taking a bearing, etc.).

- Answer:**
- | | |
|--------------------------------|--------------------------|
| 1. E - Orienting Arrow | 5. C - Declination Scale |
| 2. J - Magnetic Needle | 6. H - Vial |
| 3. A - Azimuth Ring | 7. B - Compass Base |
| 4. G - Sighting Line/DOT Arrow | 8. F - Inch/mm scales |

EXERCISE 2: Bearing and Direction

Overview: This exercise will help the student begin to understand bearings and direction and how they are determined by using the azimuth ring. Each student should be familiar with N, S, E, W, as well as NE, SE, SW and NW. Understanding how to read the azimuth is very important because it is the basis for realizing how bearings are found using the "red over red" technique and taking readings at the direction of travel arrow (DOT arrow). These skills will later apply to map use in exercises 6 and 7.

Reference: Video Section 4 - Taking a Bearing

Suggestions: Have your students find N, S, E, and W on the azimuth. Discuss the significance of the azimuth ring with your students and show them how to read it to find any bearing or direction. Teach them how to take a bearing using the direction of travel arrow and the "red over red" technique. Understanding this skill (taking a bearing) is very important and it is very easy to teach. To do so, follow these procedures: (a) Simply point the direction of travel arrow at the object or in the direction you desire to travel. (b) Turn the azimuth until you have aligned "red over red". (c) Now read your bearing at the direction of travel arrow. (Note: Declination is set at 0-for this exercise.)

Have your students take a bearing at several objects in the classroom or out in the field using this method.

Another way to teach this skill is to dial in a bearing (any bearing) at the direction of travel arrow and then turn your body to align the needle "red over red". This will help the student find bearings after they have determined them on a map.

Answer:

DIRECTION	DEGREE READING
A. NORTH	0 - 360
B. SOUTH	180
C. SOUTH EAST	135
D. NORTH WEST	315
E. EAST	90
F. WEST	270
G. NORTH EAST	45
H. SOUTH WEST	225

EXERCISE 3: *Topographical Features*

Overview: This exercise will teach the student how to interpret topographical lines and visualize the physical features they depict. It mainly focuses on contour, as it is very important that a student can determine the best line of travel while understanding the terrain and what difficulties it may impose.

References: Video Section 5 - Map Features

Suggestions: As the exercises in this question help the student begin to interpret contour lines, it is also important to discuss the contour interval of the sample map (40 ft) and how it relates to topographical lines and the terrain. (This topic is also covered in Exercise 7.) Point out difficult areas of travel (steep slopes) and how this could affect travel and course planning.

Also, use a topo symbol guide (available online) to reinforce knowledge of man made features (electrical lines, buildings, etc.), and other features such as water bodies, trails, roads, etc. Explain the importance of how recognizing topographical features can help you in the field and how using a map and compass together can help one know where they are at all times.

It may be helpful to examine a map of your area with your students. This may help them recognize and understand maps better by relating to features that are familiar to them (lakes, peaks, valleys, roads, etc.).

Answers:

- 3A
1. C
2. D
3. A
4. F
5. B

- 3B
1. D
2. A
3. F
4. B
5. C

EXERCISE4: Declination and Isogonic Chart

Overview: This exercise is designed to illustrate the importance of correctly adjusting for declination before a compass and map are used together. This section on the video will explain why the North Pole and the Magnetic Pole are not the same and how this difference could affect your compass reading. When declination has been adjusted, everything on the map will be put in proper perspective to the terrain around you and it will be easier to navigate. (No drawing lines or calculating back and forth.)

Declination values change over time due to variations in the Earth's core. In the provided example, the values are not current which will ensure that your students are getting the answer from the course material instead of an outside source. For current values, see the NOAA website, www.noaa.gov.

Note: All Brunton map compasses have a patented "adjustable declination" feature that requires no tools. (See TruArc Compass Instruction Manual.)

REFERENCE: Video Section 6 - Declination; Section 7 - Compass and Map

Suggestions: Explain thoroughly why the geographic north pole and the magnetic north pole are NOT the same. (Use of a world globe may be helpful.) Explain how important it is to adjust for declination (100 feet error for every 1 degree off in the distance of a mile). Look at and discuss the declination for the different cities in the exercise. Using the isogonic chart, find the declination in YOUR area with your students. Be sure to mention and reinforce that declination is always listed on topographical maps. Show your students how to adjust for declination on their compasses .

Answers:

	<u>DECLINATION</u>	<u>EAST/WEST</u>
1. Portland, OR	20°	East
2. Dallas, TX	7°	East
3. Chicago, IL	0°	West
4. Washington, DC	10°	West
5. Calgary, Canada	21°	East
6. Los Angeles, CA	14°	East
7. Miami, FL	2°	West
8. Toronto, Canada	9°	West
9. Riverton, WY	15°	East
10. Your City		

EXERCISE 5: *Terms*

Overview: This exercise will help your students become more familiar with the terminology that is used in the video and in the Instruction Manual.

References: Video - All Sections

Suggestions: After the students tests are graded, go over this section and discuss the terminology that is used and why it is important to know. Reinforce the use of the terms in this exercise and emphasize the order of the ABC method of using compasses.

- Answers:**
1. F
 2. E
 3. G
 4. A
 5. H
 6. J
 7. D
 8. B
 9. L
 10. C

EXERCISE 6: Bearings

Overview: This section will help your students begin to understand how bearings are found using a compass and map together. It will teach the student the process of taking a bearing from point A to point B on a map, using N (north) reference lines (as found on a map). It will also help them begin to understand how to obtain bearings which can later be applied to triangulation exercises.

References: *Video: Section 6 - Declination; 7 - Compass and Map*

Suggestions: Make sure that the students understand how to properly obtain a bearing from point to point. Be sure to mention that the direction of travel arrow should always point in the intended direction of travel (or reading may be 180° off).

Make sure that they align N on the azimuth with the N lines on the map as illustrated in the instructions and on the video.

Note: Have your students orient their maps to N based on a 0 degree declination for this exercise.

Answers:

X to A 316°

X to B 256°

X to C 216°

X to D 34°

X to E 100°

X to F 156°

EXERCISE 7: Map and Compass

Overview: The exercises in this section will require a culmination of all the skills learned to this point. The students will bring their map and compass skills together as they must understand how to read a map and use a compass in bearing and triangulation exercises.

References: Video - Sections 5 - 8 and 11

Suggestions: As this section may require more time than allowed in the classroom (30 minutes), it may be better to let the students take this exercise home along with a compass and instruction manual (unless you can devote the time in the classroom). At home, the students can devote more time and thought to the questions and their answers can then be graded the following day.

You may also want to allow the students to take their already answered questions home or look at them in the classroom for reference during this exercise. This series of exercises will help you determine how much your students have learned.

Point out that the use of the map legend, instruction manual and helpful hints will be very useful in these exercises.

- Answers:**
- | | |
|------|-------------|
| 1. | E |
| 2. | 9089 Feet |
| 3. | Fossil Hill |
| 4. | T |
| 5. | 6760 Feet |
| 6. | 40 Feet |
| 7. | 8280 Feet |
| 8. | N |
| 9. | 1000 Feet |
| 10. | M |
| 11. | D-26° |
| 12. | C-123° |
| 13. | B |
| 14a. | A |
| 14b. | H |

Summary:

As you review and practice the skills taught in this course, we believe that you will find them to be informative, insightful, interesting, challenging and rewarding. This course is designed to assist you in learning more and effectively teaching your students about compass and map skills.

However, it should be understood that this course covers only the basic skills of learning how to use a compass and map together. We are providing these guidelines in an effort to further assist you in teaching this subject to whomever it may be. We are confident that you will find these guidelines to be useful but we also encourage you to implement some of your own ideas in teaching this course.

Also, please inform your students that this is only an introduction to compass and map. Brunton would like to stress that you urge your students to continue to further their skills in compass and map use through education, reading and practice. Pre-trip planning and outdoor preparedness is essential for a safe trip in the outdoors.

Last, we would like to suggest that each and every instructor take a positive approach in teaching the skills on compass and map use. It can be a very confusing and intimidating subject to learn. But, on the other hand, it can also be a very rewarding and exciting subject to learn if it is made fun. With this subject in particular, you can have a wonderful effect on the students learning.

If you have any questions about this course, please call us anytime at 1-800-443-4871.

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