



ROYAL CANADIAN ARMY CADETS
GREEN STAR
INSTRUCTIONAL GUIDE



SECTION 1

EO M122.01 – IDENTIFY TYPES OF MAPS

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TPs 1, 2 and 3 to introduce the cadets to the purpose, the various types, and the maintenance of maps.

A demonstration and performance was chosen for TP 4 as it allows the instructor to explain and demonstrate the folding of a map while providing cadets the opportunity to practise under supervision.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this period the cadet shall be expected to identify different types of maps, care for maps, and properly fold a topographical map sheet.

IMPORTANCE

It is important to know the different map types and their uses in order to select the correct map for the task. Also, knowing how to fold and maintain these maps properly will keep them serviceable and in good condition.

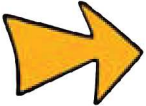
Teaching Point 1**Explain the purpose of a map.**

Time: 5 min

Method: Interactive Lecture

PURPOSE OF A MAP

The purpose of a map is to pass on specific information. A map is a scale, or proportionately smaller, representation of the ground that uses internationally accepted symbols to represent both physical and man-made features found on the ground. They identify locations such as towns, lakes, and rivers by name. Map designs reflect the individual needs of the users (e.g. urban planners, travelers, education and cadets).



The art and science of making maps is called cartography. The oldest known maps are preserved on Babylonian clay tablets from about 2300 B.C.

CONFIRMATION OF TEACHING POINT 1**QUESTIONS**

Q1. The purpose of a map is to present a picture of what?

ANTICIPATED ANSWERS

A1. The ground as it exists.

Teaching Point 2**Describe the various types of maps.**

Time: 5 min

Method: Interactive Lecture



During this lesson, the first four map types (denoted with an asterisk) are a must know, as they are the ones cadets will use most often. The remainder are additional maps to which a cadet may be exposed.

*** TOPOGRAPHICAL MAP**

This type of map is commonly used by the military. The purpose of a topographical map is to present a picture of the ground as it really exists. Topographical maps show as much detail as the scale allows, generally 1:25 000, 1:50 000, or 1:250 000.

- **Physical features** of the ground, such as **natural features** (i.e. rivers, woods, and hills with the heights and shapes) as well **man-made features** (i.e. roads, railways, towns, villages and buildings etc.) are shown.
- **The names of specific features** such as towns, villages, rivers, and descriptive names of general features such as railways, fords and post offices are also found on topographical maps.

*** ORIENTEERING MAP**

Through the International Orienteering Federation (IOF), specific rules and standards have been set for the production of orienteering maps, including colour, symbols, and scales. They are much more detailed than regular topographic maps, both with reference to vegetation and landforms.

*** STREET AND ROAD MAP**

Street and road maps are designed to assist commuters and tourists to locate key site such as roads and highways, police stations, fire halls, hospitals, schools, parks and more.

*** RELIEF MAP**

Relief maps are a three dimensional representation, usually of terrain. The terrain elevation is usually exaggerated by a factor between five and ten. This helps to visually recognise the terrain features.

DIGITAL MAP

Digital maps, such as those found on computer programs and when using a GPS, are useful as reference tools as they are updated regularly. This allows for a generally more accurate reference.

POLITICAL MAP

Political maps show countries, provinces or other political borders (e.g. globes and atlases).

STATISTICAL MAP

Statistical maps show statistical information such as the production levels of crops or minerals across a country.

OUTLINE MAP

Outline maps show only borders, rivers, coastlines, etc.

AIR PHOTO MAP

Air photomaps are actual pictures used in reconnaissance or to create many of the maps listed.



Where local resources are available, the instructor may show actual copies of the above listed types of maps to cadets.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. What type of map is most commonly used by the military?
- Q2. Orienteering maps are similar to, though more detailed with references to vegetation and landforms than, what other type of map?
- Q3. What is a street and road map used for?

ANTICIPATED ANSWERS

- A1. Topographical maps.
- A2. Topographical maps.
- A3. Assist commuters and tourists to locate key sites.

Teaching Point 3**Describe the care of a topographical map.**

Time: 5 min

Method: Interactive Lecture

CARE OF THE MAP

Some maps being produced are already waterproof; however, most maps are printed on normal paper. Paper maps are expensive and easily damaged. You must take precautions to protect them from water, dirt and wind. Maps, when exposed to water, will become soggy, deteriorate and tear.

Waterproofing a Map. Preparing a map for the elements is a vital step to prolong the life of the map. Ways to prepare a map for waterproofing include:

- **Zipper Bag Method.** This method requires a large heavy weight zipper bag and waterproof tape (duct or packing tape). Cut enough tape to completely adhere to one edge of the bag from corner to corner. Stick one half of the tape from corner to corner. Flip the bag over and fold the tape down on itself and the other side of the bag. Perform each step twice more to the other sides of the bag.
- **Contact Paper (Map Tac).** Covering the map with contact paper will waterproof the map; however, it will become very stiff. A permanent marker or grease pencil will be required to write on the map. Use rubbing alcohol to remove permanent marker from the contact paper.
- **Chemical Coatings.** Chemical coatings will be effective in waterproofing maps; however, they must be handled carefully in a well-ventilated area. They are applied with a brush, to a map on a flat surface, and must be allowed to fully dry before attempting to use them.

Drying a Map. If a map gets wet, let it dry completely on a flat clean surface.

Opening a Map. A map should never be fully opened in a strong wind. It should be opened to the area you are using, and refolded along the original fold lines.

Writing on a Map. Use only pencil to mark your maps and erase all markings gently. Maps that are protected by plastic can be marked using grease pencils or fine tipped markers.

Storing a Map. Maps should be stored in a dry place, rolled, folded, or laid flat.



Instructors should demonstrate examples of waterproofed maps, as resources permit.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. What are three things we should protect maps from?
- Q2. What can we use to write on maps?
- Q3. How are maps to be stored?

ANTICIPATED ANSWERS

- A1. Water, dirt and wind.
- A2. Pencil, if protected with plastic, then grease, pencil or erasable marker.
- A3. Maps should be stored in a dry place, rolled, folded, or laid flat.

Teaching Point 4**Explain and demonstrate how to fold a map.**

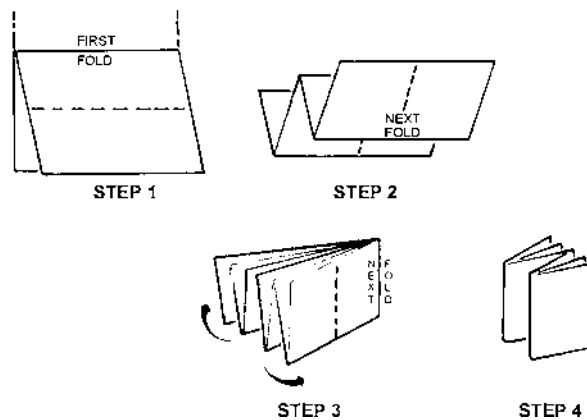
Time: 10 min

Method: Demonstration and Performance

FOLDING A MAP

To properly fold a map, the following steps are to be followed:

1. Lay the map face up, then fold map in half by bringing the top (north) of the map sheet down to the bottom (south) of the map sheet. Crease where the bend in the map has occurred; this is the centre of the map (see Figure 1, Step 1).
2. Fold the top half of the map sheet into half again, then turn the map over and fold the bottom half to match the top half (see Figure 1, Step 2).
3. Fold the ends of the map into half from left to right (see Figure 1, Step 3).
4. Fold each of the open ends back into half again so that the map name and index to adjacent map sheet appears on the outside (the map should look like the letter M). (see Figure 1, Step 4).



A-CR-CCP-121/PT-001, Royal Canadian Army Cadets Reference Book

Figure 1 Folding of a Map

CONFIRMATION OF TEACHING POINT 4

Have each cadet practice folding the topographical map sheet (located in the Green Star Handbook) in the method described above. An easy way to remember how to fold a map is north to south, south to north, east to west and west to east.

END OF LESSON CONFIRMATION

QUESTIONS

- Q1. What are some of the common maps discussed during this lesson?
- Q2. How do we dry a map when it gets wet?
- Q3. Using a piece of paper, fold it as you would a map.

ANTICIPATED ANSWERS

- A1. Topographical, orienteering, street and road, relief, political, statistical, outline and air photo.
- A2. Lay flat on a dry clean surface, and let dry completely.
- A3. Demonstrate.

CONCLUSION

HOMEWORK/READING/PRACTICE

The instructor shall have cadets practice folding a piece of paper as they would a map.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

It is important to know the different map types and their uses, so that cadets can select the correct map for their needs. Also, knowing how to fold and maintain maps properly will keep them in good condition for a long time.

INSTRUCTOR NOTES/REMARKS

Types of maps will be limited to what is available at the corps level. Instructors should attempt to obtain as many examples as are available. Where local resources allow, products such as clear contact paper and chemical coating may be demonstrated.

Actual maps are not required to practise folding a map. A topographical map worksheet, 8-1/2-inch by 11-inch sheet of paper, newspaper, or retail flyer may be used to represent a map.

REFERENCES

A2-004 B-GL-382-005/FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.



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SECTION 2

EO M122.02 – IDENTIFY MARGINAL INFORMATION AND CONVENTIONAL SIGNS

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to orient the cadets to marginal information and generate interest.

An in-class activity was chosen for TP 2 as an interactive way to provoke thought and stimulate interest in conventional signs.

INTRODUCTION

REVIEW

The pertinent review for this lesson, from EO M122.01 (Section 1), Identify Types of Maps, will include:

- Q1. What type of map is most commonly used by the military?
- Q2. What are three things we should protect maps from?
- Q3. How are maps to be stored?

ANTICIPATED ANSWERS

- A1. Topographical.
- A2. Water, dirt, and wind.
- A3. Maps should be stored in a dry place, and rolled, folded, or laid flat.

OBJECTIVES

By the end of this lesson the cadet shall be expected to identify map features to include: marginal information, and conventional signs found on a topographical map.

IMPORTANCE

Cadets shall be able to identify features on the map as they relate to objects on the ground. The cadets will apply this knowledge during training where any type of map is to be used.

Teaching Point 1**Identify marginal information found on a topographical map.**

Time: 20 min

Method: Interactive Lecture

MARGINAL INFORMATION

The margins provide information important to the full understanding and use of the map. Before using any unfamiliar map, it is important to have a good look at the information contained in its margins. The layout and contents of the marginal information should be in relatively the same area for all topographical maps. This information includes:

- name of map sheet,
- number of the map and index of adjoining maps,
- date of map data,
- map scale,
- scale bars or graphic linear scales,
- contour interval,
- military index number, normally found at the top right corner of the map sheet, which is used for ordering additional maps,
- declination diagram,
- Universal Transverse Mercator Grid System (UTM), and
- legend of conventional signs.

Name of Map Sheet. For ease of reference the name of the map is usually a major community or district the map covers (you will find this at the bottom centre of the margin, as well as in the bottom right corner).



B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 1 Name of Map Sheet

Number of the Map and Index of Adjoining Maps. A diagram showing the position of the map sheet in relation to adjoining sheets is shown near the lower right hand margin. The diagram shows the sheet numbers of the adjoining sheets and accentuates the sheet in hand.

94 A/2	94 A/1	84 D/4
93 P/15	93 P/16	83 M/13
93 P/10	93 P/9	83 M/12

B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 2 Index of Adjoining Maps

Date of Map Data. Helps to indicate the amount of change that may have occurred since the map was printed (you will find it in the copyright information in the bottom left and right corners).

**PRODUCED BY THE CANADA CENTRE FOR MAPPING,
DEPARTMENT OF ENERGY, MINES AND RESOURCES.
FROM ARIAL PHOTOGRAPHS TAKEN IN 1981.
CULTURE CHECK 1984. PUBLISHED IN 1989.**

B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 3 Date of Map Data

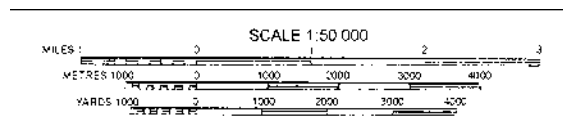
Map Scale. The scale of the map, e.g. 1:50 000, is shown prominently in the bottom margin.

Scale 1:50 000

B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 4 Map Scale

Scale Bars. Used to help measure distance on the map (you will find them under the map scale, bottom centre). Notice how the left end of the scale bars is divided into tenths for measuring accurate distances.



B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 5 Scale Bars

Contour Interval. Used to indicate a set distance between the contour lines. The contour interval could be in feet or metres (you will find this in the bottom margin, just right of the scale bars).

CONTOUR INTERVAL 10 METRES
ELEVATIONS IN METRES ABOVE MEAN SEA LEVEL
NORTH AMERICAN DATUM 1927
TRANSVERSE MERCATOR PROJECTION

B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 6 Contour Interval

Military Index Number for Ordering This Map. The index is found in the top right corner of the map sheet; used for ordering additional maps, and includes the following information:

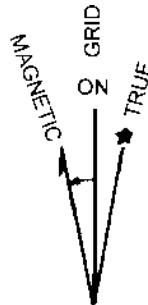
- Map series number, which identifies both the area and the scale of the map and the series number taken from the map catalogue.
- Sheet numbers or name to identify the map (identity by sheet name is rare).
- Edition designation (identifies the currency of the information shown on the map; the edition number will increase with each revision).

Military users, refer to this map as:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">SERIES</td> <td style="padding: 2px 5px;">A 751</td> </tr> <tr> <td style="padding: 2px 5px;">MAP</td> <td style="padding: 2px 5px;">31 D/2</td> </tr> <tr> <td style="padding: 2px 5px;">EDITION</td> <td style="padding: 2px 5px;">5 MCE</td> </tr> </table>	SERIES	A 751	MAP	31 D/2	EDITION	5 MCE
SERIES	A 751						
MAP	31 D/2						
EDITION	5 MCE						

B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 7 Military Index Number

Declination Diagram. Each map contains the information necessary to relate the true, grid, and magnetic bearing of any line within the area covered by the map sheet. This information is given in the form of a diagram with explanatory notes. The diagram is in the right side margin.

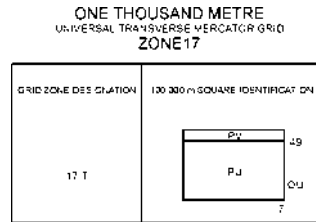


B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 8 Declination Diagram

Universal Transverse Mercator (UTM) Grid System. The UTM grid is divided into “zones”, each covering six degrees of longitude and eight degrees of latitude. The 60 longitude bands are numbered and the 20 latitude

bands are lettered. Each grid zone is one rectangle of the grid pattern, established by the bands and designated by the figures of the longitude band followed by the letter of latitude band (e.g. 17T).



B-GL-382-005/FP-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 9 UTM Grid System

Conventional Signs. A table showing the conventional signs used on the sheet in their correct colours with their descriptions is shown in the bottom or side margin, plus in a more complete list on the back of the map.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. Where are the map name, scale, and scale bar found?
- Q2. Where is the date of map data found?
- Q3. Where is the declination diagram found?

ANTICIPATED ANSWERS

- A1. At the bottom centre of the map sheet.
- A2. Bottom right and bottom left corner of the map sheet.
- A3. Right side of the map sheet.

Teaching Point 2

Identify conventional signs.

Time: 30 min

Method: In-Class Activity

BACKGROUND INFORMATION

Conventional Signs

The information in this teaching point is presented to provide the instructor with background knowledge of conventional signs. The instructor may choose to review the information with the cadets prior to the commencement of the activity outlined below.

A number of symbols are used to indicate an object or item of detail that cannot be shown either by outline or by a line symbol. Most have been established through long usage and standardization agreements. The meaning of most symbols is obvious. If there is doubt however, consult the table of conventional symbols located on every map. Located on the back of most maps you will find many additional conventional signs.

Map reading not only involves the ability to interpret the symbols shown on the map and to understand the information given in pictorial or written form, but it also involves a true understanding of the ground portrayed and an appreciation of the reliability and value of the particular map being used.

Where the symbol may have more than one meaning, the sign or symbol will be accompanied by a descriptive word (e.g. tank or tower).

The use of different colours is a major means of showing and distinguishing detail of any or all types of detail.

Man-made Features by Colour










Red is used to identify paved roads and highway numbers. Red is also used to shade in areas of urban development.

Road paved surface 2 lane; 1 lane (red)	
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Orange is used to represent unpaved roads.

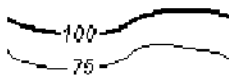


Road loose surface 2 lane; 1 lane (orange)	
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Black is used for cultural features, toponyms (place names), some symbols and precise elevations.

Tunnel	
Railway (single track)	
Railway (multiple track) with station	
Road/Track	
School	
Fire Department	
Police Station	
Church	
Buildings	

Natural Features by Colour


Brown is used for contour lines, contour elevations, spot elevations, sand, cliffs, and other geological features.

Contours (dark)	
Cliff (dark)	
Sand (brown)	

Blue is used for water or permanent ice features (i.e., rivers, lakes, swamps and ice fields), names of water features and the grid lines.

River with arrow indicating direction of flow	
Rapids	

Green, which is used for vegetation features (i.e., woods, orchards and vineyards).

Orchard (green)	
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Additional Features by Colour

Grey is used for the legend of conventional signs on the back of the map.

Purple is used for updates that are made over top of the original map information.

ACTIVITY – BUILDING MAPVILLE

Time: 31 min

OBJECTIVE

- By the end of this lesson, the cadet shall be expected to identify and draw conventional signs.

RESOURCES

- Flipchart/whiteboard.
- Markers/dry erase markers.

ACTIVITY LAYOUT

This activity will be a participative exercise designed to involve the cadets, while teaching the various conventional signs found on a topographical map. The cadets will design and draw the map for a new town called Mapville.

Activity Instructions:

- The instructor will draw a large outline of a topographical map on the flipchart/whiteboard at the front of the room.
- The cadets will be asked to approach the front, one at a time, and draw a conventional sign on the developing map of Mapville.
- The cadets must explain what the sign is for and why they chose to put it where they did.
- No sign may be used more than once.
- The instructor may choose to take a photograph of the finished product, to display around the parade area.

SAFETY

- This is a supervised activity.

INSTRUCTOR GUIDELINES

- Instructors are to continuously supervise and monitor the activity to ensure the material being presented is being utilized correctly.
- In the event of misplaced or misused conventional signs, the instructor shall stop the cadets, correct the problem, and have the cadets return to their seats. Have the cadets attempt another sign at the end of the activity.
- The instructor is to observe carefully, as this activity will constitute the final confirmation of the lesson.

CONFIRMATION OF TEACHING POINT 2

The activity outlined above will serve as the confirmation of this teaching point.

END OF LESSON CONFIRMATION

The activity at the end of TP2 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

Nil.

METHOD OF EVALUATION

The cadet will be required to properly identify marginal information and conventional signs found on a topographical map.

CLOSING STATEMENT

The information presented in this lesson will enable the cadet to identify features on the map as they relate to objects on the ground. The cadets will apply this knowledge during any training where any type of map is to be used.

INSTRUCTOR NOTES/REMARKS

Nil.

REFERENCES

A2-004 B-GL-382-005-FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.



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SECTION 3
EO M122.03 – INTERPRET CONTOUR LINES

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for this lesson to orient the cadets to the interpreting of contour lines.

INTRODUCTION

REVIEW

The pertinent review for this lesson will include a review of EO M122.02 (Section 2).

- Q1. What kind of information is found in the margin of a map?
- Q2. What is a conventional sign?
- Q3. Which natural features are shown in brown on a map?

ANTICIPATED ANSWERS

- A1. Any from the list below:
- name of map sheet;
 - number of the map and index of adjoining maps;
 - date of map data;
 - map scale;
 - scale bars or graphic linear scales;
 - contour interval;

- military index number;
- declination diagram;
- Universal Transverse Mercator Grid System (UTM); and
- legend of conventional signs.

A2. A symbol used to indicate an object or item of detail that cannot be shown either by outline or by a line symbol.

A3. Brown is used for contour lines, contour elevations, spot elevations, sand, cliffs, and other geological features.

OBJECTIVES

By the end of this lesson the cadet shall be expected to interpret contour lines in order to identify the shape of the ground as depicted on a map.

IMPORTANCE

This information allows the cadet to be able to identify features on the map as they relate to the shape and elevation of the ground. Cadets will apply this knowledge during training where any type of map is to be used. Knowing the shape of the ground will allow cadets to identify major landforms that may be nearby, thereby helping to identify their position on the map.

Teaching Point 1**Explain and demonstrate how contour lines indicate the shape of the ground.**

Time: 25 min

Method: Demonstration and Performance



The teaching of relief on a blackboard or plane surface should be avoided if at all possible. The construction of simple three-dimensional models such as those made out of putty or soft earth can help, but there is no substitute for outdoor instruction.

DEFINITION OF RELIEF ON A MAP

“Relief,” or elevation, is the shape of the ground in a vertical plane. Relief on a map is the showing of the heights and shapes of the ground, above mean sea level, in feet or metres.

There are two distinct elements in the representation of relief. These are:

- **Representation of Height.** This is a fact-based representation of the height of the land and of landforms. Differences in appearance on the map will arise from the type, density and accuracy of the information provided.
- **Representation of Shape.** This may be largely artistic, and the methods used will vary between maps.

CONTOUR LINES AND INTERVALS

A contour is a line on the map joining points of equal elevation in relationship to sea level, and is the standard method of showing relief on topographical maps.

Contours are shown at a regular vertical interval (difference in height between contours lines) that is called the contour interval. The contour interval is always stated in the margin of the map, normally near the graphic scales.

Contours are normally drawn as continuous brown lines. Every fourth or fifth contour is called an “Index Contour” and is shown by a thicker brown line; this helps in reading and counting the contours to determine a height.

INTERPRETING CONTOUR LINES

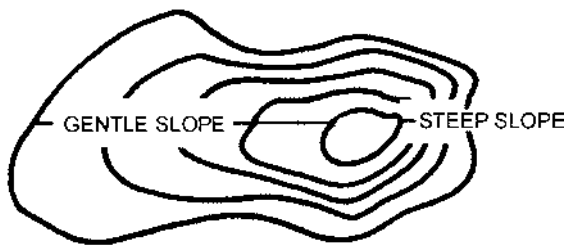
Interpreting contour lines provides a visualization of the shape of the ground, which is shown on the map by contour lines and contour intervals. Correct interpretation of the shape of the ground from contour lines requires practice and practical experience on the ground. It is essential to study various features, comparing the map to the ground in each case.

SLOPES

The instructor shall explain the following landforms by identifying the depiction on the map, followed by showing the landform in the field. In the event that models are being used in place of real ground, the model shall be introduced as the respective landform is presented. Where putty is used, fishing line can be used to slice through the landform model illustrating the concept of a contour line.

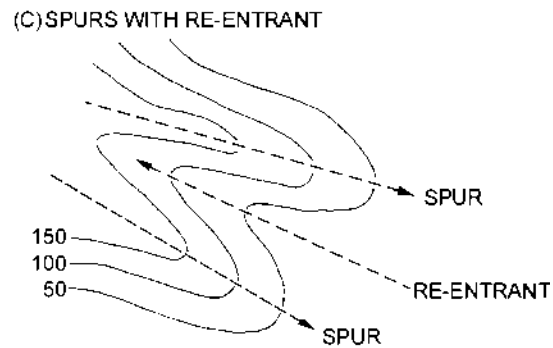
The distance between contour lines on the map will indicate to you the type of slope on the ground.

- **Steep Slope.** When the contour lines are spaced closely together there is less distance to travel to gain or lose elevation (see Figure 1).
- **Gentle Slope.** When the contour lines are further apart there is a greater distance to travel to gain or lose elevation (see Figure 1).
- **Uniform Slope.** When the contours are an equal distance apart. The slope remains constant in its decline, whether steep or gentle (see Figure 1).
- **Spurs.** A contour feature that extends out from a slope (see Figure 2).
- **Re-entrants.** A contour feature that cuts back into a slope (see Figure 2).
- **Concave Slope.** When the spacing of the contours gets further apart at the bottom. The middle of the slope seems to depress inward – appearing concave (see Figure 3).
- **Convex Slope.** When the spacing of contours down a slope gets close together at the bottom. The middle of the slope seems to bulge outward – appearing convex (see Figure 4).



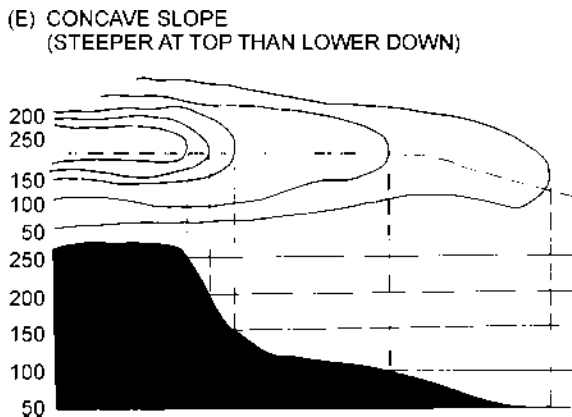
Basic Map Using A-CR-CCP-108/PT-001

Figure 1 Gentle/Steep Slopes



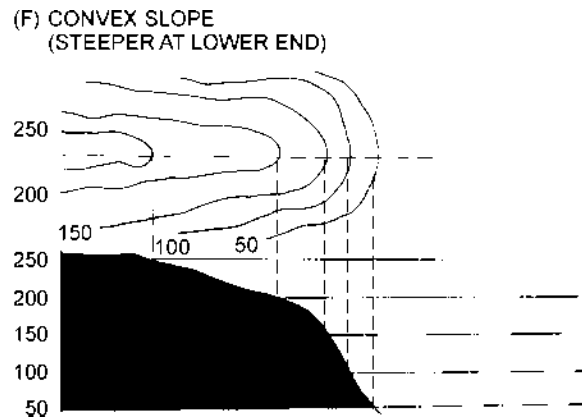
Map Field Sketch and Compass B-GL-382-005-FP-001

Figure 2 Spur and Re-entrant



Map Field Sketch and Compass B-GL-382-005-FP-001

Figure 3 Concave Slope



Map Field Sketch and Compass B-GL-382-005-FP-001

Figure 4 Convex Slope

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. The relief on a map shows what two elements?
- Q2. What is the name given to the difference in height between contours lines?
- Q3. What are some of the different types of slopes identified on a map?

ANTICIPATED ANSWERS

- A1. The height and shape of the ground.
- A2. The contour interval.
- A3. Steep, gentle, uniform, concave and convex.

END OF LESSON CONFIRMATION

The information learned in this is EO can be practiced with the activity found at Attachment A. Allow cadets to complete the activity found at Attachment A, then have them switch sheets for correcting.

Alternately, the instructor may choose to have the cadets identify the respective features on a map of an area being used for an upcoming exercise.



A correctly labelled diagram is located at Page M122.03A-2 of Attachment A.

CONCLUSION

HOMEWORK/READING/PRACTICE

Nil.

METHOD OF EVALUATION

During the confirmation activity for EO M122.CA, Follow a Route Led by a Section Commander (A-CR-CCP-701/PG-001, Chapter 4, Section 11), the cadets shall be expected to identify their positions by relating major landmarks in the immediate vicinity to what is portrayed on the map. Relief types and landforms are excellent points of reference for this task.

CLOSING STATEMENT

Knowing how to interpret contour lines allows cadets to visualize the shape of the ground by reading a map.

INSTRUCTOR NOTES/REMARKS

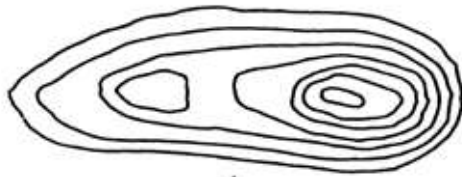
This lesson shall be taught in an outdoor setting. The instructor should use actual elevation and relate it to the contour lines on the map. Although the use of simple models may help, it is not a substitute to outdoor instruction.

REFERENCES

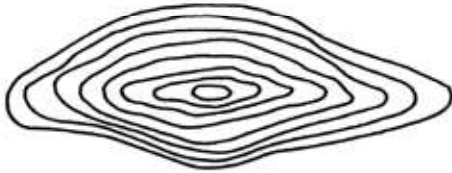
A2-004 B-GL-382-005-FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.

INTERPRETING CONTOUR LINES

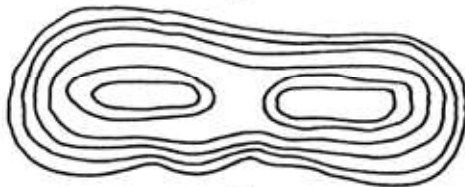
Match the contour diagram on the left to the applicable depiction of a landform on the right.



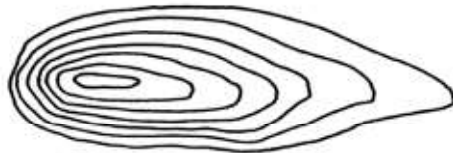
1



2



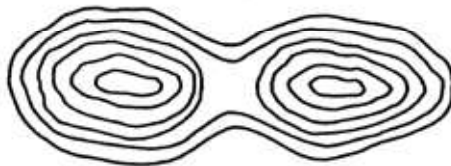
3



4



5



6



A



B



C



D



E



F

1. _____

2. _____

3. _____

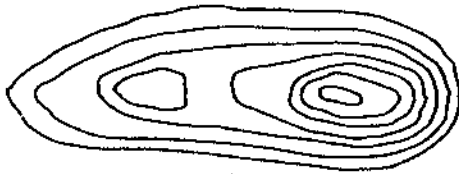
4. _____

5. _____

6. _____

INTERPRETING CONTOUR LINES

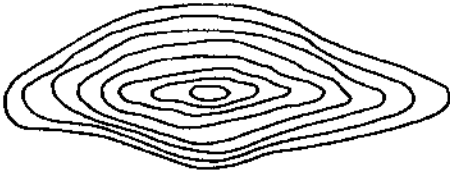
ANSWER KEY



1



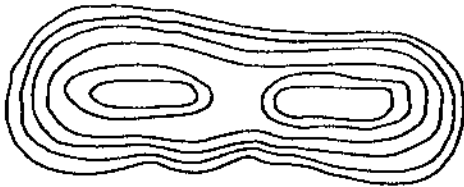
A



2



B



3



C



4



D



5



E



6



F

1. B

4. C

2. E

5. F

3. D

6. A



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SECTION 4

EO M122.04 – ORIENT A MAP BY INSPECTION

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to orient the cadets to the purpose of orienting a map by inspection.

A demonstration and performance was chosen for TP 2 as it allows the instructor to explain and demonstrate the procedure for orienting a map by inspection while providing an opportunity for the cadets to practice this skill.

INTRODUCTION

REVIEW

The pertinent review for this lesson from EO M122.03 (Section 3) will include:

QUESTIONS

- Q1. The relief on a map represents what two elements above mean sea level?
 Q2. What is the difference in height between contour lines called?

ANTICIPATED ANSWERS

- A1. The height and shape of the ground.
 A2. The contour interval.

OBJECTIVES

By the end of this lesson the cadet shall be expected to properly orient a map by inspection.

IMPORTANCE

Orienting a map by inspection makes it easy to relate information on the map to features on the ground. It is important to have the map oriented when moving over a complex route in order to reach your destination.

Teaching Point 1**Explain the purpose of orienting a map by inspection.**

Time: 5 min

Method: Interactive Lecture

ORIENT A MAP BY INSPECTION

Orienting a map by inspection means to turn the map so that, visually, the map directions and map detail correspond with that which is on the ground. This is the simplest and quickest way of orienting a map, provided you have a general idea of your own position.

Orienting the map does a number of things:

- it makes it easy to relate the map to the ground when direction and distance on the map corresponds to the ground;
- it helps you find your location or direction if you are in doubt; and
- when moving over a complex route, or when traveling over long distances, orienting the map will keep you on the right track.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What does “orienting a map” by inspection mean?

Q2. What three things does orienting a map do?

ANTICIPATED ANSWERS

A1. To turn the map so that visually the map directions and map detail corresponds with that which is on the ground.

A2. Three things are:

- it makes it easy to relate the map to the ground when direction and distance on the map corresponds to the ground;
- it helps you find your location or direction if you are in doubt; and
- when moving over a complex route, or when traveling over long distances, orienting the map will keep you on the right track.

Teaching Point 2**Explain and demonstrate how to orient a map.**

Time: 20 min

Method: Demonstration and Performance

ORIENT A MAP

In order to orient your map by inspection the following steps should be followed:

1. identify your approximate location on the map;
2. identify two or three prominent objects or landmarks on the ground and find them on the map. Try to use landmarks in different directions;

3. rotate your map until all identified objects on the map line-up with the direction in which objects are located on the ground; and
4. check visually to ensure that all features to your front are in front of your position on the map.

CONFIRMATION OF TEACHING POINT 2



The cadets shall practice orienting their maps by inspection. In the event of inclement weather, a mock field environment can be simulated to practice this skill (e.g. placing pictures depicting prominent objects on the walls corresponding to their location on the map).

END OF LESSON CONFIRMATION

QUESTIONS

Q1. What are the four steps to orienting a map by inspection?

ANTICIPATED ANSWERS

A1. In order to orient your map by inspection, you would:

- (1) identify your approximate location on the map;
- (2) identify two or three prominent objects or landmarks on the ground and find them on the map. Try to use landmarks in different directions;
- (3) rotate your map until all identified objects on the map line up with the direction in which objects are located on the ground; and
- (4) check visually to ensure that all features to your front are in front of your position on the map.

CONCLUSION

HOMEWORK/READING/PRACTICE

Nil.

METHOD OF EVALUATION

The cadet will be required to orient a map by inspection using a topographical map during a field navigation exercise.

CLOSING STATEMENT

Knowing how to visually set your map so that features on the map match those on the ground is important as it enables you to determine the location of an object, or oneself.

INSTRUCTOR NOTES/REMARKS

Nil.

REFERENCES

A2-004 B-GL-382-005-FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.

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SECTION 5

EO M122.05 – DETERMINE A GRID REFERENCE

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for TP 1 to orient the cadets to grid lines and to the difference between eastings and northings.

A demonstration and performance was chosen for TPs 2 to 5 as it allows the instructor to explain and demonstrate how to determine 4 and 6 figure GR while providing an opportunity for the cadets to practice those skills.

INTRODUCTION

REVIEW

The pertinent review for this lesson from EO M122.04 (Section 4) will include:

- Q1. What are the vertical (X-axis) blue lines on a map called?
- Q2. What are the horizontal (Y-axis) blue lines on a map called?
- Q3. When the writing on a map is the right way up, where is north normally located?

ANTICIPATED ANSWERS

- A1. Eastings.
- A2. Northings.
- A3. At the top of the map.

OBJECTIVES

By the end of this lesson the cadet shall be expected to determine four and six figure Grid Reference (GR) (within +/- 1000 and 100 metres accuracy, respectively), for a series of features on a topographical map.

IMPORTANCE

As an army cadet it is important to know how to use the grid system. Since the grid system is the basis of map reading, the concept of a four-figure and six-figure GR will be a stepping stone to becoming a strong map-reader. A GR details the location of a grid square on a map, and prevents confusion about location. Communication about exact locations over the radio is made possible with an understanding of a GR.

Teaching Point 1**Explain the use of grid lines.**

Time: 5 min

Method: Interactive Lecture

USE OF GRID SYSTEM

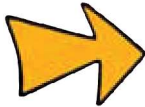
The grid system is a rectangular network of intersecting vertical and horizontal blue lines superimposed on a topographical map. Maps are normally printed so that north is at the top of the sheet when the writing is the right way up. The lines of the grid system are drawn evenly spaced so that one set of lines run north to south (vertically) and the second set of lines run east to west (horizontally). These lines are assigned a sequential number starting in the bottom left corner. The intersecting grid lines at the lower left corner designate a grid square.

EASTINGS

Because the vertical lines are numbered from east to west, they are called **eastings**. Eastings are a series of parallel lines plotted as an overlay to the map sheet, with a two-digit number at the top and bottom end of each line in the margins.

NORTHINGS

Because the horizontal lines are numbered from the equator toward the north, they are called **northings**. Northings are a series of parallel lines plotted as an overlay to the map sheet, with a two-digit number at the left and right end of each line in the margins.



The most southerly point of Canada is Middle Island in Lake Erie, approximately 4 620 000 metres from the equator at latitude 41° 41' north.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. When the writing on a map is the right way up, where is north normally located?
- Q2. What are the vertical blue lines on a map called?
- Q3. What are the horizontal blue lines on a map called?

ANTICIPATED ANSWERS

- A1. At the top of the map.
- A2. Eastings.
- A3. Northings.

Teaching Point 2**Explain and demonstrate a four-figure GR.**

Time: 10 min

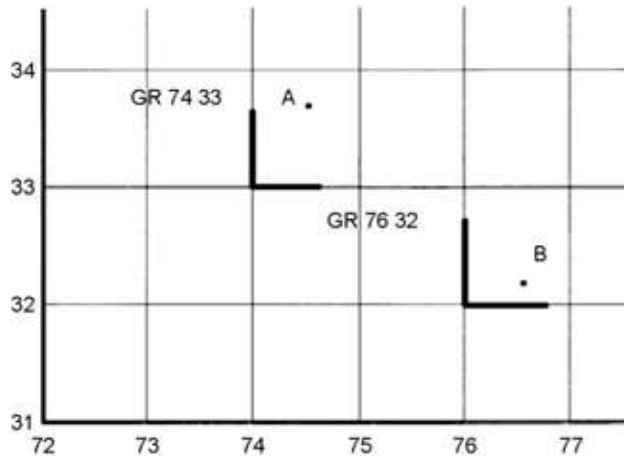
Method: Demonstration and Performance

GRID REFERENCE

The military traditionally identify grid lines by stating the two-digit number of each grid line. When a location is identified using the grid system it is called a "Grid Reference" (GR). When giving a GR to a square, the reference is always to the southwest (bottom left) corner of the square. GRs are always given with the easting value first, followed by the northing value.

FOUR-FIGURE GR

A four-figure GR is used to identify a specific 1000 metres by 1000 metres grid square. It will have four numerical digits derived from the numbers assigned to the eastings on the X-axis, and the northings on the Y-axis, where the grid lines intersect at the bottom left corner of the grid square.



B-GL-382-005/PF-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 1 Four-figure GR



The instructor will provide a minimum of three practice points for the cadets to use in determining a four-figure GR. It is important for the cadet to be equally able to identify a location on a map when given the GR and to determine the GR for a location indicated on a map.

CONFIRMATION OF TEACHING POINT 2**QUESTIONS**

- Q1. When giving a GR, the reference is always to which corner of the square?
- Q2. When giving a four-figure GR, in what order are the numbers given?
- Q3. A four-figure GR identifies a grid square of what size?

ANTICIPATED ANSWERS

- A1. Southwest or bottom left corner.
 A2. Eastings then northings, or X-axis then Y-axis.
 A3. 1000 metres by 1000 metres.

Teaching Point 3**Explain and demonstrate how to determine a six-figure GR.**

Time: 10 min

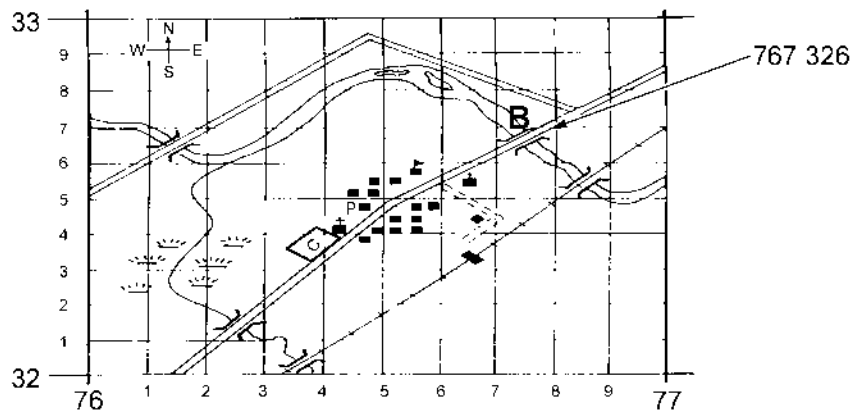
Method: Demonstration and Performance

ACCURACY OF A GRID REFERENCE

The accuracy of a four-figure GR on a topographical map sheet is 1000 metres. When a more precise location is required, a six-figure GR is used which is accurate to 100 metres.

SIX-FIGURE GR

A six-figure GR is used to determine a more accurate location within a specific grid square. It is necessary to break up the grid square shown on the map into 100 subdivisions (10 in each direction). By creating an imaginary grid inside a grid square, we can use the same principles of the four-figure grid reference to make a more accurate statement of location. Each small easting and northing is numbered 1 to 9, from west to east and from south to north respectively. This imaginary grid inside a square can be estimated, or you can measure accurately using a tool called a "romer".



B-GL-382-005/PF-001, Military Training, Volume 8, Maps, Field Sketching and Compasses

Figure 2 Six-figure GR



Figure 2 shows the detail within the square 7632, which contains Point "B", a bridge. The centre point of this bridge is in the small square whose southwest corner is 7/10 east of easting 76, and also 6/10 north of northing 32. Its easting is thus 76.7 and its northing 32.6 units. Omitting the decimal points, the GR is thus written as 767 326.



Using Figure 2, the instructor will provide three points for the cadets to use to estimate a six-figure GR and give three six-figure GR cadets can use to locate a point on the map.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. Is a six-figure GR more accurate than a four-figure GR?
- Q2. To get a six-figure GR, the grid square is divided into how many smaller squares?
- Q3. In what order are the numbers given?

ANTICIPATED ANSWERS

- A1. Yes.
- A2. 100.
- A3. Eastings then northings.

Teaching Point 4

Define a romer and its use.

Time: 10 min

Method: Demonstration and Performance

ROMER

A romer is used to accurately measure a six-figure GR. Using a romer provides a more accurate GR, and can be used in place of estimating.

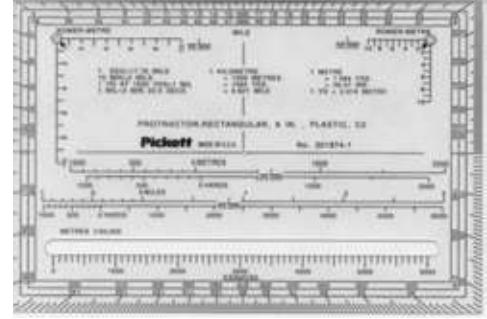
TYPES OF ROMERS

Romers for 1:25 000 and 1:50 000 scales in metres are included on the base plate of the compass and are also found on the Protractor C2. If these romers are not available, one can be easily made from a clean piece of paper with a square edge.



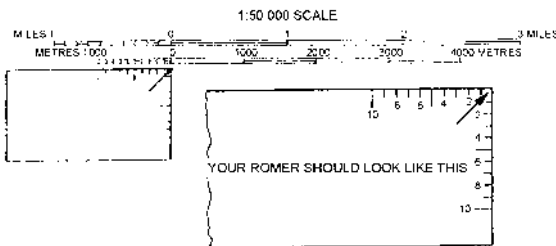
A-CR-CCP-121/PT-001

Figure 3 Compass



A-CR-CCP-121/PT-001

Figure 4 Protactor C2



A-CR-CCP-121/PT-001

Figure 5 Constructing a Romer

CONSTRUCT A ROMER

A romer can be easily constructed for determining a six-figure GR:

- select a clean piece of paper with a square edge;
- starting at the corner of the GR, place the paper along the 100 m map scale;
- mark off 10 equal sub-divisions, starting at the corner and working outward;
- number the markings from zero (at the corner of the paper) to 10;
- repeat the first four steps on the adjacent edge of the corner of paper.



The instructor shall provide cadets with blank pieces of paper and ensure sharp pencils are available. Stress the importance of always using a sharp pencil when using a map.

CONFIRMATION OF TEACHING POINT 4



Have cadets construct a romer by following the process outlined above.

Teaching Point 5**Explain and demonstrate how to determine a six-figure GR with a constructed romer.**

Time: 15 min

Method: Demonstration and Performance

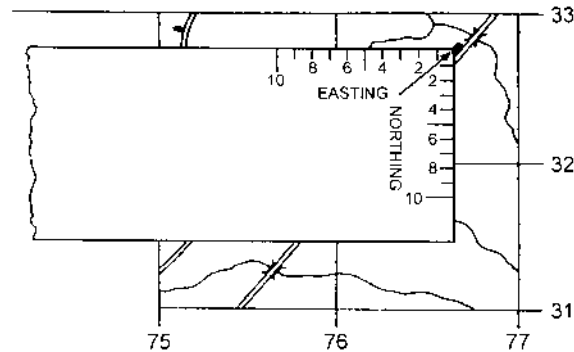
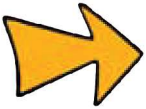
DETERMINE A SIX-FIGURE GR

Figure 6 Determining a Six-figure GR with a Romer

A six-figure grid reference can be determined using a constructed romer by following these steps:

- place the corner of the constructed romer on the grid square;
- move the constructed romer **IN** the number of tenths required to align the romer directly below the conventional sign, or the location for which the GR is being determined;
- move the constructed romer **UP** the number of tenths required for the corner of the romer to be positioned on the conventional sign, or location for which the GR is being determined;
- read the value along the X-axis of the romer where it crosses the easting of the grid square (the value at this intersection becomes the third digit of the six-figure GR); and
- read the value along the Y-axis of the romer where it crosses the northing of the grid square (the value at this intersection become the sixth digit if the six-figure GR).



When completing Point d and e above, ensure cadets are aware that they will always round down to the closest third digit. Grid references should be written in the format GR XXX/XXX to help illustrate how the first half of the GR relates to the Easting and the second half relates to the Northing.

CONFIRMATION OF TEACHING POINT 5

The instructor shall provide the cadet a minimum of three practice points to use in determining a six-figure GR and three GR to use to locate a prominent object.

END OF LESSON CONFIRMATION

1. The instructor shall provide two points for the cadets to use in determining four-figure GRs.
 2. The instructor shall provide two points to use in determining six-figure GRs.
-

CONCLUSION

HOMEWORK/READING/PRACTICE

Nil.

METHOD OF EVALUATION

The cadet will be required to determine a four-figure GR and a six-figure GR using a constructed romer on a topographical map, as part of the confirmation activity for EO M122.CA, Follow a Route Led by a Section Commander (A-CR-CCP-701/PG-001, Chapter 4, Section 11).

CLOSING STATEMENT

Knowing how to determine a four-figure and a six-figure GR is essential for functioning safely in the field, for determining the accurate location of an object or oneself, and for communicating that position to others.

INSTRUCTOR NOTES/REMARKS

Cadets are to be provided with adequate time during field training exercises to practice this skill.

REFERENCES

A2-004 B-GL-382-005-FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.

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SECTION 6

EO M122.06 – FOLLOW A ROUTE LED BY A SECTION COMMANDER

Total Time:

30 min

THERE IS NO INSTRUCTIONAL GUIDE PROVIDED FOR THIS EO

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SECTION 7

EO C122.01 – PRACTICE NAVIGATION AS A MEMBER OF A TEAM

Total Time:

90 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-701/PG-001, *Green Star Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A practical activity was chosen for this lesson as it is an interactive way to allow the cadets to experience navigation in a safe and controlled environment. This activity contributes to the development of navigational skills in a fun and challenging setting.

INTRODUCTION

REVIEW

The pertinent review for this lesson will include:

- a. A review of EO M122.01 (Section 1), Identify Types of Maps.
 - Q1. What are some common types of maps used?
 - Q2. What can we use to write on maps?
- b. A review of EO M122.02 (Section 2), Identify Marginal Information and Conventional Signs.
 - Q1. What is the purpose of marginal information?
 - Q2. What is the purpose of conventional signs?

ANTICIPATED ANSWERS

- a. Review of EO M122.01 (Section 1)
 - A1. Topographical, orienteering, street and road, relief, political, outline, and air photo.
 - A2. Pencil (If protected with plastic, grease pencil or erasable marker).
- b. Review of EO M122.02 (Section 2)
 - A1. Marginal information gives information important to the understanding and use of the map.
 - A2. A symbol used to indicate an object or item of detail that cannot be shown either by outline or by a line symbol.

OBJECTIVES

By the end of this lesson the cadet shall be expected to be better prepared to participate in a short navigation exercise under the supervision of a senior cadet.

IMPORTANCE

The experience of practicing the skills learned in previous lessons will help to enhance the cadets' navigation skills. Map reading is a skill, which must be learned by practice on the ground. This practice is essential to building up experience, and developing a "feel" for maps, which will allow map reading to become instinctive.

BACKGROUND KNOWLEDGE

ACTIVITY 1 – NAVIGATION USING A STREET MAP

The EO's covering the information required to conduct this exercise are EO M122.01 (Section 1), Identify Types of Maps, EO M122.02 (Section 2), Identify Marginal Information and Conventional Signs, and EO M122.05 (Section 5), Determine a Grid Reference. Refer to the specified Instructional Guides for further information.

ACTIVITY 2 – NAVIGATION SCAVENGER HUNT

The EO's covering the information required to conduct this exercise are EO M122.01 (Section 1), Identify Types of Maps, EO M122.02 (Section 2), Identify Marginal Information and Conventional Signs, and EO M122.04 (Section 4), Orient a Map by Inspection. Refer to the specified Instructional Guides for further information.

ACTIVITY 3 – PHOTO NAVIGATION HUNT

The EO's covering the information required to conduct this exercise are EO M122.01 (Section 1), Identify Types of Maps, EO M122.02 (Section 2), Identify Marginal information and Conventional Signs, and EO M122.04 (Section 4), Orient a Map by Inspection. Refer to the specified Instructional Guides for further information.

ACTIVITY 4 – TRAIL MAP NAVIGATION

The EO's covering the information required to conduct this exercise are EO M122.01 (Section 1), Identify Types of Maps, EO M122.03 (Section 3), Interpret Contour Lines, and EO M122.05 (Section 5), Determine a Grid Reference. Refer to the specified Instructional Guides for further information.

ACTIVITY 1 – NAVIGATION USING A STREET MAP

Time: 90 min

OBJECTIVE

By the end of this activity the cadet shall be expected to be able to navigate using a street map.

RESOURCES

- Localized street maps for an optimal group size of four to six cadets.
- Detailed task placard for each checkpoint.
- Compass.

ACTIVITY LAYOUT

Using a street map, groups of four to six cadets will navigate within a 2 km radius of the corps location. Predetermined checkpoints set out on prominent objects, located 150 to 250 m apart, will have detailed navigation tasks at each point (e.g. fold a map, identify conventional signs, identify landform, relief type indicated, ect.), allowing cadets to practice skills taught. This activity shall be conducted in three 30 minute periods, allowing for a 15 minute debrief session.

SAFETY

Some rules are to be put in place to ensure the safety of cadets in populated areas with vehicle traffic, as this exercise will be conducted during evening hours. They shall include; but not be limited to:

- have set boundaries determined so cadets do not get lost;
- cadets shall obey all local laws and respect personal property;
- a staff member shall be present at each checkpoint; and
- have a set end time to return for debrief.

INSTRUCTOR GUIDELINES



At this point the instructor shall brief the cadets on any safety rules or any other guidelines pertaining to the activity.

- The instructor, with the assistance from senior cadets, shall supervise the cadets.
- A staff member shall be present at each checkpoint.
- Roaming advisor(s) shall move along the route to allow cadets to seek assistance if required.

ACTIVITY 2 – NAVIGATION SCAVENGER HUNT

Time: 90 min

OBJECTIVE

By the end of this activity the cadet should be more comfortable with navigating with a topographical map.

RESOURCES

- Topographical map.
- Compass.

ACTIVITY LAYOUT

Using a topographic map, groups of three to four cadets shall navigate to identified points on the map, and have the task of collecting items/information from these points (e.g. a napkin from a fast food location (with store's permission), river rock, phone number from a sign, etc.). Cadets are assigned points based on what items/information they are able to obtain. This activity shall be conducted in three 30 minute periods, allowing for a 15 minute debrief session.

SAFETY

Some rules are to be put in place to ensure the safety of cadets in populated areas with vehicle traffic, as this exercise will be conducted during evening hours. They shall include but not be limited to:

- have set boundaries determined so cadets do not get lost;
- cadets shall obey all local laws and respect personal property;
- a staff member shall be present at each checkpoint; and
- have a set end time to return for debrief.

INSTRUCTOR GUIDELINES



At this point the instructor shall brief the cadets on any safety rules or any other guidelines pertaining to the activity.

- The instructor, with the assistance from senior cadets, shall supervise the cadets.
- A staff member shall be present at each checkpoint.
- Roaming advisor(s) shall move along the route to allow cadets to seek assistance if required.

ACTIVITY 3 – PHOTO NAVIGATION HUNT

Time: 90 min

OBJECTIVE

By the end of this activity the cadet should be more comfortable navigating with a topographical map.

RESOURCES

- Topographical map.
- Compass.
- Romer.

ACTIVITY LAYOUT

Using a topographic map, groups of three to four cadets are given a handout showing a series of photos (e.g. sign, door, bridge, unique tree) taken in the local area. Cadets search out the location of the object in the photo, and record the six-figure grid reference of that location. Points are assigned based on difficulty of finding the object. This activity shall be conducted in three 30 minute periods, allowing for a 15 minute debrief session.

SAFETY

Some rules are to be put in place to ensure the safety of cadets in populated areas with vehicle traffic, as this exercise will be conducted during evening hours. They shall include but not be limited to:

- have set boundaries determined so cadets do not get lost;
- cadets shall obey all local laws and respect personal property;
- a staff member shall be present at each checkpoint; and
- have a set end time to return for debrief.

INSTRUCTOR GUIDELINES



At this point the instructor shall brief the cadets on any safety rules or any other guidelines pertaining to the activity.

- The instructor, with the assistance from senior cadets, shall supervise the cadets.
- A staff member shall be present at each checkpoint.
- Roaming advisor(s) shall move along the route to allow cadets to seek assistance if required.

ACTIVITY 4 – TRAIL MAP NAVIGATION

Time: 90 min

OBJECTIVE

By the end of this activity the cadet shall be expected to understand the layout and use of trail maps.

RESOURCES

- Localized map showing an organized trail system.
- Compass.

ACTIVITY LAYOUT

Using a trail section of a map, groups of three to six cadets follow a route along an organized trail system. This activity shall be conducted in three 30 minute periods, allowing for a 15 minute debrief session.

SAFETY

Some rules are to be put in place to ensure the safety of cadets if in areas with hiking and cycling traffic, as this exercise may be conducted during evening hours. They shall include but not be limited to:

- have set boundaries determined so cadets do not get lost;
- have a set safety bearing;
- cadets shall obey all local laws and respect personal property;
- a staff member shall be present at each checkpoint; and
- have a set end time to return for debrief.

INSTRUCTOR GUIDELINES



At this point the instructor shall brief the cadets on any safety rules or any other guidelines pertaining to the activity.

- The instructor, with the assistance from senior cadets, shall supervise the cadets.
- A staff member shall be present at each checkpoint.
- Roaming advisor(s) shall move along the route to allow cadets to seek assistance if required.

REFLECTION

Time: 15 min

GROUP DISCUSSION



Instructors shall ensure that all lesson objectives are drawn out towards the end of the reflection stage.

DISCUSSION QUESTIONS



TIPS FOR ANSWERING/FACILITATING DISCUSSION

- Ask questions that help facilitate discussion; in other words, avoid questions with yes or no answers.
- Prepare questions ahead of time.
- Be flexible (you are not bound to only the prepared questions).
- Encourage cadets to participate by using praise such as “great idea” or “excellent response, can anyone add to that?”
- Try to involve everyone by directing questions to non-participants.

SUGGESTED QUESTIONS

- Q1. What did this activity teach you about navigation?
- Q2. What did you enjoy most about this activity?
- Q3. What skills did you feel most comfortable using?
- Q4. What skills do you feel you require more practice with?



Other questions and answers will develop throughout the reflection stage. The discussion should not be limited to only those suggested. Cadets should be given sufficient time to tell stories of their adventures, and ask questions about any navigation issues that came up during the activity.

CONCLUSION

REVIEW

Upon completion of the group discussion, the instructor will conclude by summarizing to ensure that all points have been covered. The instructor must also take this opportunity to explain how the cadet will apply this knowledge and/or skill in the future.

MAIN TEACHING POINTS

Nil.

HOMEWORK/READING/PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Map reading is a skill, and true proficiency will only be achieved by practice on the ground. The skills you have learned during this PO can be used in situations outside of the Cadet Program as well. Practice makes perfect!

INSTRUCTOR NOTES/REMARKS

This complementary activity can be conducted more than once, in various forms over supported complementary days, or over sessions.

REFERENCES

A2-004 B-GL-382-005-FP-001 Canadian Forces. (1976). *Maps, Fields, Sketching, and Compasses* (Vol. 8). Ottawa, ON: National Defence.