

## CRM LESSON PLAN REPORT

**BASIC MAP READING (BCT)**  
**071-BT071022 / 5.02 ©**

**Approved**  
**10 Aug 2021**

**Effective Date: 10 Aug 2021**

### **SCOPE:**

This lesson plan focuses on the foundational elements of Basic Map Reading Skills. The Trainees will learn how to plot points, measure distance, compute declination, pace count, identify terrain features, and understand how to read a map. The Trainees will be tested on their knowledge and skills they have learned during the Land Navigation test.

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**Distribution Restriction:** Distribution authorized to the DOD and DOD Contractors only TBD. This determination was made on 13 July 2021.

**Destruction Notice:** Destroy by any method that will prevent disclosure of contents or reconstruction of the document

**Foreign Disclosure: FD2** - This training product has been reviewed by the training developers in coordination with the MCoE G2 foreign disclosure officer. This training product can be used to instruct international military students when the country meets specific criteria. Specify requirement(s) that each country must meet (select all that are appropriate): 1) Must purchase equipment through FMS FMS; 2) Must be a member of a specific group or coalition TBD by MCoE G2; 3) Must have an accepted clearance (must be authorized under an identified general security agreement with the US); 4) May not attend FD3 modules N/A; 5) Other See MCoE.

**SECTION I. ADMINISTRATIVE DATA**

**All Course Masters/POIs Including This Lesson**

<b>Courses</b>				
<u>Course Number</u>	<u>Version</u>	<u>Title</u>	<u>Phase</u>	<u>Status</u>
750-BT	11.0	Basic Combat Training	N/A	Analysis

<b>POIs</b>				
<u>POI Number</u>	<u>Version</u>	<u>Title</u>	<u>Phase</u>	<u>Status</u>
31B10-OSUT	21.0 ©	Basic Military Police	0	Analysis
12C10-OSUT	20.0 ©	Bridge Crewmember	0	Analysis
750-BT	11.0 ©	Basic Combat Training	0	Analysis
12C10-OSUT (ST)	20.0 ©	Bridge Crewmember	0	Analysis

**Task(s) Taught(\*) or Supported**

<u>Task Number</u>	<u>Task Title</u>	<u>Status</u>
<b>Individual</b>		
071-COM-1017 (*)	Compute Back Azimuths	Superseded
071-COM-1000 (*)	Identify Topographic Symbols on a Military Map	Superseded
071-COM-1018 (*)	Determine Grid Azimuth using a Protractor	Superseded
071-COM-1001 (*)	Identify Terrain Features on a Map	Superseded
071-COM-1002 (*)	Determine the Grid Coordinates of a Point on a Military Map	Superseded
071-COM-1008 (*)	Measure Distance on a Map	Superseded
071-COM-1011 (*)	Orient a Map Using a Lensatic Compass	Superseded
071-COM-1016 (*)	Convert an Azimuth	Superseded

**Reinforced Task(s)**

<u>Task Number</u>	<u>Task Title</u>	<u>Status</u>
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**Knowledge**

<u>Knowledge Id</u>	<u>Title</u>	<u>Taught</u>	<u>Required</u>
K7844	Map Reading	Yes	No

**Skill**

<u>Skill Id</u>	<u>Title</u>	<u>Taught</u>	<u>Required</u>
S0206	Using a compass for land navigation	Yes	No
071-NAV-0014	Measure Distance on a Map	Yes	No
071-NAV-0019	Determine Azimuths using a Protractor	Yes	No
071-NAV-0012	Determine the Grid Coordinates of a Point on a Military Map	Yes	No

**Administrative/ Academic Hours**

The administrative/academic (50 min) hours required to teach this lesson are as follows:

<u>Academic</u>	<u>Resident Hours / Methods</u>		
Yes	5 hrs	35 mins	Lecture
Yes	0 hrs	0 mins	Practical Exercise (Hands-On/Written)
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Total Hours(50 min):	5 hrs	35 mins	

**Instructor Action Hours**

The instructor action (60 min) hours required to teach this lesson are as follows:

Hours/Actions

0 hrs	10 mins	Classroom Breakdown
0 hrs	10 mins	Classroom Setup

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Total Hours (60 min): 0 hrs 20 mins

**Test Lesson(s)**

<u>Hours</u>	<u>Lesson Number Version</u>	<u>Lesson Title</u>
None		

**Prerequisite Lesson(s)**

<u>Hours</u>	<u>Lesson Number Version</u>	<u>Lesson Title</u>
None		

**Training Material Classification**

Security Level: This course/lesson will present information that has a Security Classification of: U - Unclassified.

**Foreign Disclosure Restrictions**

FD2. This training product has been reviewed by the training developers in coordination with the MCoE G2 foreign disclosure officer. This training product can be used to instruct international military students when the country meets specific criteria. Specify requirement(s) that each country must meet (select all that are appropriate): 1) Must purchase equipment through FMS FMS; 2) Must be a member of a specific group or coalition TBD by MCoE G2; 3) Must have an accepted clearance (must be authorized under an identified general security agreement with the US); 4) May not attend FD3 modules N/A; 5) Other See MCoE.

**References**

<u>Number</u>	<u>Title</u>	<u>Date</u>
AR 200-1	ENVIRONMENTAL PROTECTION AND ENHANCEMENT	13 Dec 2007
ATP 3-34.5	Environmental Considerations	10 Aug 2015
ATP 5-19	RISK MANAGEMENT, with change 1 dated 8 Sep 2014	14 Apr 2014
STP 21-1-SMCT	SOLDIER'S MANUAL OF COMMON TASKS, WARRIOR SKILLS, LEVEL 1	07 Nov 2019
TC 3-25.26	MAP READING AND LAND NAVIGATION ( <a href="https://armypubs.us.army.mil/doctrine/DR_pubs/dr_c/pdf/tc3_25x26.pdf">https://armypubs.us.army.mil/doctrine/DR_pubs/dr_c/pdf/tc3_25x26.pdf</a> )	15 Nov 2013
TRADOC REG 350-6	Enlisted Initial Entry Training Policies and Administration <a href="http://www.tradoc.army.mil/tpubs/regs/TR350-6.pdf">http://www.tradoc.army.mil/tpubs/regs/TR350-6.pdf</a>	09 Aug 2019

**Student Study Assignment**

TRADOC Pam 600-4 w/ C1 The Soldier's Blue Book [27 Oct. 2014].

**Instructor Requirements**

Must be able to mentor and train Trainees on performing technical and trouble shooting procedures for Land Navigation (Basic Map Reading).  
Be familiar with this Lesson Plan (LP).

**Support Personnel Requirements**

None

**Additional Support Personnel Requirements**

<u>Name</u>	<u>Student Ratio</u>	<u>Qty</u>	<u>Man Hours</u>
Combat Lifesaver Remarks:	1:50		6.0

**Equipment  
Required  
for Instruction**

<u>ID - Name</u>	<u>Student Ratio</u>	<u>Instructor Ratio</u>	<u>Spt</u>	<u>Qty</u>	<u>Exp</u>
* GTA 05-02-012 - Coordinate Scale and Protractor Remarks:	1:1		0	0	No
* GTA 05-02-013 - How to Find Your Way Remarks:	1:1				No
* V791X14774 - MAP SHEETS (TENINO) 1:50,000 (Local TADSS – Not in TSMATS/PAM 25-30) Remarks:	1:1				No
2320-01-549-8577 - Truck Cargo: without Winch M1078A1P2 Remarks:	0:0	0:0	Yes	1	No
2330-01-108-7367 - Trailer Water: M149A2 Remarks:	0:0	0:0	Yes	1	No
4110-01-485-3626 - Chest, Ice Storage, White, 48 Quart Capacity 2S Remarks:	0:0	0:0	Yes	4	No
5820-01-017-3742 - Radio Set Base Station: L43BBB-3100AM Remarks:	0:0	0:0	Yes	1	No
5820-01-243-4960 - Radio 10 Channel, Portable, Motorola: MDL-Q2 Remarks:	0:0	0:0	Yes	8	No
5820-01-440-2552 - MONITOR,TELEVISION Remarks:	0:0	0:0	Yes	4	No
6515-01-363-4495 - THERMOMETER,CLINICAL,HUMAN Remarks:	0:0	0:0	Yes	4	No
6530-01-260-1222 - Rescue and Transport System, Patient Remarks:	0:0	0:0	Yes	4	No
6545-01-532-3674 - Medical Equipment Set, Combat Lifesaver, Version 2005, UA 245A Remarks:	0:0	0:0	Yes	4	No
6665-01-381-3023 - Wet Bulb-Globe Temperature Kit Remarks:	0:0	0:0	Yes	1	No
6675-00-266-6880 - Protractor, Rectangular, 6 X 1-3/4 Inch Remarks:	1:1	0:0	No	0	No
6730-00-577-4813 - Screen, Projection Remarks:	0:0	0:0	Yes	1	No
6730-01-551-9773 - Projector, Multimedia: Epson Powerlite 760C Remarks:	0:0	0:0	Yes	2	No
6840-01-493-7334 - Camouflage Face Paint with DEET Insect Repellent 12S Remarks:	1:1	0:0	No	0	No
7010-01-279-0139 - Computer System, Digital Remarks:	0:0	0:0	Yes	1	No
7210-00-081-1417 - Sheet, Bed, Cotton-Polyester, White, 104 X 72 Inches, Solid, Plain, Flat Remarks:	0:0	0:0	Yes	8	No
7240-00-089-3827 - Can, Water, Military: Plastic, 5-Gallon Capacity Remarks:	0:0	0:0	Yes	20	No
8960-01-430-4378 - Ice, 8 Pounds Remarks:	0:0	0:0	Yes	8	No

*(Note: Asterisk before ID indicates a TADSS.)*

**Materials Required**

*Instructor Materials:*

Drill Sergeants will use the Center for Army Lessons Learned (CALL) website at <http://call.army.mil/> to get the most current and relevant information on Tactics, Techniques, and Procedures (TTPs) used in the Operational Environment(OE).

**Instructor Materials:**

- Map, of local training area, 1:50,000 scale.
- Coordinate Scale and Protractor.
- Lensatic Compass.

*Student Materials:*

TRADOC PAM 600-4, IET Soldiers Handbook.

**Per Soldier:**

- Map of local training area, 1:50,000 scale.
- Coordinate Scale and Protractor.
- Practical Exercise Worksheets.
- Lensatic Compass.
- Pencil.

**Classroom, Training Area, and Range Requirements**

<u>ID - Name</u>	<u>Quantity</u>	<u>Student Ratio</u>	<u>Setup Mins</u>	<u>Cleanup Mins</u>
17710-50 Maneuver/Training Area, Light Forces, 50 Acre Remarks:		1:200	0	0
17120-M-2590-70 Classroom, Multipurpose, 2590 Square Feet, 70 Students Remarks:		1:200	0	0

**Ammunition Requirements**

<u>DODIC - Name</u>	<u>Exp</u>	<u>Student Ratio</u>	<u>Instruct Ratio</u>	<u>Spt Qty</u>
None				

**Instructional Guidance/Conduct of Lesson**

**NOTE:** Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

The company command team will implement concurrent training plan including basic map readings skills and plotting grid coordinates. The concurrent training plan reinforces skills and knowledges learned in (Basic Map Reading).

Trainees need to become familiar with basic map reading skills, terrain association, pace count, and the use of the lensatic compass and protractor in a classroom environment which will include practical application exercises and will be reinforced with a land navigation practical application exercise during "ANVIL."

The Land Navigation Practical Exercise will still be a Graduation Standard IAW TP 350-70-14.

**Proponent Lesson Plan Approvals**

<u>Name</u>	<u>Rank</u>	<u>Position</u>	<u>Date</u>
Joseph Hiner	Not available	Approver	10 Aug 2021

## SECTION II. INTRODUCTION

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Method of Instruction: Lecture  
Mode of Delivery: Resident Instruction  
Instr Type (I:S Ratio): Military - NON-ICH (1:50)  
Time of Instruction: 5 mins

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### Motivator

Map reading is one of the most important skills that you must develop as a leader. You may know all there is to know about tactics, but if you can not find the objective to engage the enemy, your tactics are of no use. It is your duty as a Trainee to learn the fundamentals of basic map reading. Someday you and/or your unit may depend on your ability to effectively read a map.

The battlefield is forever changing. As Trainees, you must be able to perform under any condition anywhere around the world. Knowing or having a basic idea of what to expect based on the Operational Environment (OE) better prepares you as a Trainee to meet the challenges faced during a time of war. The Drill Sergeants will use their experience and various scenarios that represent the Operational Environment (OE) in places the military may operate around the world.

### Terminal Learning Objective

**NOTE.** Inform the students of the following Terminal Learning Objective requirements.

At the completion of this lesson, you [the student] will:

Action:	Conduct Basic Map Reading.
Conditions:	In a classroom environment, given a standard 1:50,000 topographic map of the area, a compass, coordinate scale and protractor, and a requirement sheet.
Standards:	Conduct Basic Map Reading by: 1. Identifying topographic symbols. 2. Identifying terrain features (5 major, 3 minor and 2 supplementary). 3. Determining grid coordinates of a point (4 digit, 6 digit and 8 digit). 4. Measuring distance on a map (straight line and curved distances). 5. Determining a grid azimuth with a coordinate scale protractor. 6. Converting azimuths (grid to magnetic and magnetic to grid).
Learning Domain - Level:	Cognitive - Understanding
No JPME Learning Areas Supported:	None

### Safety Requirements

Safety must be paramount in the complex outdoor environment. During the training process, Commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken while replicating realistic battlefield conditions.

**INSTRUCTOR NOTE: The Instructor will brief the Trainees on the unit/facility SOP for classroom contingencies (i.e., what door will be used to exit the classroom, rally points, severe weather, etc).**

**INSTRUCTOR NOTE: The Instructor will brief the unit/site SOP and Deliberate Risk Management Worksheet for all potential contingencies encountered during that training period/event (i.e., severe weather, fire, evacuation, rally points, etc).**

### Risk Assessment Level

**Low - Refer to Leader Actions.**

Assessment: Refer to Leader Actions.

Controls: Refer to Leader Actions.

Leader Actions: Refer to completed DD Form 2977; Deliberate Risk Assessment Worksheet, Jan 2014.

### **Low - Hyponatremia.**

Assessment: Review the symptoms of Hyponatremia.

Controls: Drill Sergeants will monitor Trainee water consumption. Ensure the safety brief includes the symptoms of Hyponatremia.

Leader Actions: Ensure DD 2977 is updated with appropriate controls. Ensure Drill Sergeants have the appropriate information prior to the safety brief.

### **Low - Dehydration.**

Assessment: Make sure Drill Sergeants check Trainees water is topped off prior to entering the classroom.

Controls: Drill Sergeants will include symptoms of dehydration in their safety brief. Drill Sergeants will monitor Trainees water Consumption.

Leader Actions: Ensure DD 2977 is updated with appropriate controls. Ensure Drill Sergeants have the appropriate information prior to the safety brief.

### **Low - Tripping over classroom furniture, items on the ground.**

Assessment: Prepare classroom prior to the execution of training. Ensure floor is clear of obstructions that could lead to injuries.

Controls: The Drill Sergeants will ensure an orderly entrance and exit from the classroom.

Leader Actions: Ensure DD 2977 is updated with appropriate controls. Ensure Drill Sergeants have the appropriate information prior to the execution of training.

## **Environmental Considerations**

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**NOTE:** Instructor should conduct a risk assessment to include environmental considerations IAW the current environmental considerations publication, and ensure students are briefed on hazards and control measures.

Units and installations will prepare an environmental risk assessment using the before, during, and after checklist found in ATP 3-34.5 MCRP 4- 11B, AUG 2015. The checklist should supplement local and state environmental regulations applicable to your area.

## **Instructional Lead-in**

Through the mastery of the skills presented today, you will be better prepared to proceed successfully through the complex and operational type of instruction that will follow. In the near future you will be required to navigate from one point on the ground to another while dismounted. Today you will learn to identify topographic symbols, determine grid coordinates, identify terrain features on a map, and measure distance. Later you will learn how to determine azimuth, and resection. It all starts with marginal information.

## SECTION III. PRESENTATION

**NOTE:** Inform the students of the Enabling Learning Objective requirements.

### A. ENABLING LEARNING OBJECTIVE

<b>ACTION:</b>	Identify topographic symbols on a military map.
<b>CONDITIONS:</b>	In a classroom, given a standard 1:50,000 scale military map, and protractor.
<b>STANDARDS:</b>	<p>Trainees will identify topographic symbols on a military map by:</p> <ol style="list-style-type: none"> <li>1. Identifying marginal information on a military map.</li> <li>2. Identifying colors on a military map.</li> <li>3. Identifying topographic symbols on a military map.</li> </ol>
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS SUPPORTED:</b>	None

ELO A - LSA 1. Learning Step / Activity ELO A - LSA 1. Identify marginal information, topographical symbols, and colors of a map.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))

Time of Instruction: 45 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

#### **Marginal Information**

The Army defines a map as "a graphic representation of a portion of the earth's surface drawn to scale, as seen from above." Because the map is a graphic representation, you'll need a written explanation of the graphic elements. You'll find that explanation in the margins of the map: the marginal information. (Chapter 3 of TC 3-25.26 explains all the marginal information in detail.)



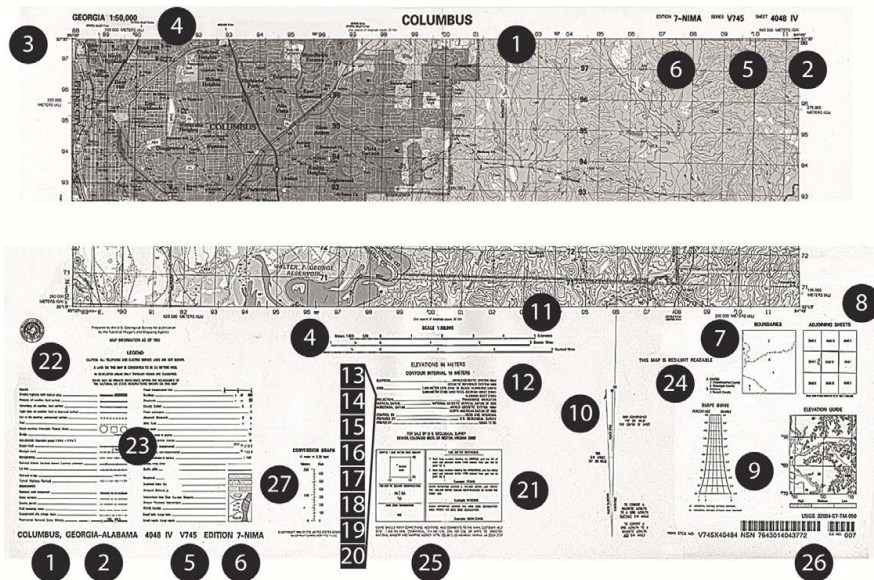


Figure 1  
Marginal Information

It is important that Soldiers know how to read maps, and the place to begin is the marginal information and symbols, where useful information about the map is located and explained. All maps are not the same, so it is necessary to examine the marginal information carefully each time a different map is used.

**Sheet name (1).**

The sheet name is found in bold print at the center of the top and in the lower left area of the map margin. A map is generally named for the largest settlement contained within the area covered by the sheet, or for the largest natural feature located within the area at the time the map was drawn.

**Sheet number (2).**

The sheet number is found in bold print in the upper right and lower left areas of the margin, and in the center box of the adjoining sheets diagram found in the lower right margin. To link specific maps to overlays, operations orders, and plans, use the sheet number as reference. For maps at 1:100,000-scale and larger, the sheet numbering system is arbitrary and makes possible the ready orientation of maps at scales of 1:100,000, 1:50,000, and 1:25,000.

**Series name (3).**

The map series name is found in bold print in the upper left corner of the margin. The name given to the series is generally that of a major political subdivision such as a state within the United States or a European nation. A map series usually includes a group of similar maps at the same scale and on the same sheet lines or format. They are designed to cover a particular geographic area and may be a group of maps that serve a common purpose, such as military city maps.

**Scale (4).**

The scale is found in the upper left margin after the series name and in the center of the lower margin. The scale note is a representative fraction that gives the ratio of a map distance to the corresponding distance on the earth's surface. For example, the scale note 1:50,000 indicates that one unit of measure on the map equals 50,000 units of the same measure on the ground.

**Series number (5).**

The series number is found in the upper right margin and the lower left margin. It is a sequence reference expressed either as a four-digit numeral (1125) or as a letter followed by a three- or four-

digit numeral (M661, T7110).

Edition number (6).

The edition number is found in bold print in the upper right area of the top margin and the lower left area of the bottom margin. Editions are numbered consecutively; if there is more than one edition, the highest numbered sheet is the most recent. Most military maps are now published by the NGA, but older editions of maps may have been produced by the U.S. Army Map Service. Still others may have been drawn, at least in part, by the U.S. Army Corps of Engineers, the U.S. Geological Survey, or other agencies affiliated or not with the United States or allied governments. The credit line, revealing who produced the map, is just above the legend. The map information date is found immediately below the word "LEGEND" in the lower left margin of the map. This date is important when determining how accurately the map data might be expected to match what is encountered on the ground.

Index to boundaries (7).

The index to boundaries diagram appears in the lower or right margin of all sheets. This diagram, which is a miniature of the map, shows the boundaries that occur within the map area such as county lines and state boundaries.

Adjoining sheets diagram (8).

Maps at all standard scales contain a diagram that illustrates the adjoining sheets. On maps at 1:100,000 and larger scales and at 1:1,000,000-scale and smaller, the diagram is called the index to adjoining sheets. It consists of as many rectangles representing the adjoining sheets as are necessary to surround the rectangle that represents the sheet under consideration. The diagram usually contains nine rectangles, but the number may vary depending on the locations of the adjoining sheets. All represented sheets are identified by their sheet numbers. Sheets of an adjoining series, whether published or planned, that are at the same scale are represented by dashed lines. The series number of the adjoining series is indicated along the appropriate side of the division line between the series.

Declination diagram (10).

The declination diagram is located in the lower margin of large-scale maps and indicates the angular relationships of true north, grid north, and magnetic north. On maps at 1:250,000-scale, this information is expressed as a note in the lower margin. In recent edition maps, there is a note indicating the conversion of azimuths from grid to magnetic and from magnetic to grid next to the declination diagram.

The declination diagram is very important and needs to be identified every time you get a new map.

a) True north : True north is defined as a line from any point on the earth's surface to the North Pole.  
b) Magnetic north: Magnetic north is the direction to the north magnetic pole, as indicated by the north-seeking needle of a magnetic instrument. The magnetic north is usually symbolized by a line ending with half of an arrowhead. Magnetic readings are obtained with magnetic instruments such as lensatic and M2 compasses.

c) Grid north: Grid north is the north that is established by using the vertical grid lines on the map.

Bar scales (11).

Bar scales are located in the center of the lower margin. They are rulers used to convert map distance to ground distance. Maps have three or more bar scales, each in a different unit of measure. Care should be exercised when using the scales, especially in the selection of the unit of measure that is needed.

**Contour interval note (12).**

The contour interval note is found in the center of the lower margin normally below the bar scales. It states the vertical distance between adjacent contour lines of the map. When supplementary contours are used, the interval is indicated. In recent edition maps, the contour interval is given in meters instead of feet.

**Grid note (14).**

The grid note is located in the center of the lower margin. It gives information pertaining to the grid system used and the interval between grid lines, and it identifies the UTM grid zone number.

**Grid reference box (21).**

The grid reference box is normally located in the center of the lower margin. It contains instructions for composing a grid reference.

**Legend (23).**

The legend is located in the lower left margin. It illustrates and identifies the topographic symbols used to depict some of the more prominent features on the map. The symbols are not always the same on every map. Always refer to the legend to avoid errors when reading a map.

**Topographic symbols**

Mapmakers draw maps so you can visualize the landscape with the features in the right place. Your map legend defines the topographic symbols the mapmakers have used to identify the man-made and natural features on the map (Figure 2 - Topographic Symbols).

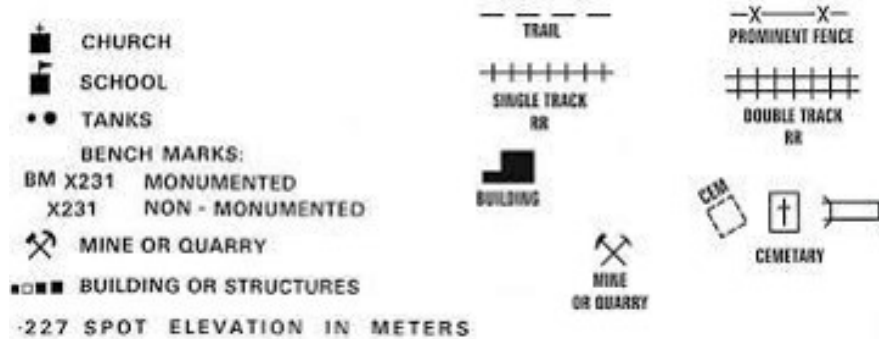


Figure 2  
Topographic Symbols

**Colors on a military map**

1. Black indicates cultural (man-made) features such as buildings, railroads, and roads.
2. Red and brown combinations identify cultural features (such as major roads), relief features, and contour lines on red-light readable maps.
3. Blue identifies water: lakes, swamps, rivers, and coastal waters.
4. Green identifies vegetation such as woods, orchards, and vineyards.
5. Brown identifies cultivated land on red-light readable maps—on older maps, brown represents relief features and elevation such as contours.
6. Red was used on older maps to mark populated areas, main roads, and boundaries.
7. Other colors may show special information. Check the legend.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning

prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**1. What is a map?**

A map is a graphic representation of a portion of the earth's surface drawn to scale, as seen from above.

**2. What are the basic colors of a map?**

Black, red and brown combinations, blue, green, brown, red, other colors.

**3. What are the basic colors of a map, and what does each color represent?**

Lower left margin.

**4. What shape are the contour lines that indicate a hill?**

Contour lines forming a valley are either U-shaped or V-shaped.

**5. What shape are the contour lines that indicate a valley?**

A hill is shown on a map by contour lines forming concentric circles. The inside of the smallest closed circle is the hilltop.

**6. What do topographic symbols represent?**

Man-made and natural features.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

**CHECK ON LEARNING (ELO A):**

Conduct a check on learning and summarize the ELO.

**REVIEW SUMMARY(ELO A):**

Conduct a Summary Review.

**B. ENABLING LEARNING OBJECTIVE**

<b>ACTION:</b>	Determine azimuths using a protractor.
<b>CONDITIONS:</b>	Given a standard 1:50,000-scale military map with two known points plotted on the map, a protractor, a straight-edge, a pencil, and requirement to determine the azimuth from your location (point A) to another point (point B) on the map.
<b>STANDARDS:</b>	Trainees will have converted azimuths by: - Converting a grid azimuth to a magnetic azimuth. - Converting a magnetic azimuth to a grid azimuth. - Computing back azimuths.
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS</b>	None

<b>SUPPORTED:</b>	
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ELO B - LSA 1. Learning Step / Activity ELO B - LSA 1. Convert azimuths.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))

Time of Instruction: 30 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

### **Performance Steps**

1. The direction from one point to another, either on the map or on the ground, is called an azimuth.

Azimuths are given in degrees or mils in a clockwise direction from north, and all azimuths taken from a map are grid azimuths.

a. An azimuth in degrees can be any number up to 360, as there are 360 degrees in a circle. Due east is 90 degrees, due south is 180 degrees, due west is 270 degrees, and due north is 360 degrees or 0 degrees.

b. An azimuth in mils can be any number up to 6400, as there are 6400 mils in circle. Due east is 1600 mils, due south is 3200 mils, due west is 4800 mils, and due north is 6400 mils or 0 mils.

2. Use the protractor.

a. Plot the location of two points on the map.

b. Using a straight-edge, draw a straight line (azimuth line) from point A to point B.

c. Place the index of the protractor at the point where the azimuth line crosses one of the vertical (north-south) grid lines. This procedure allows greater accuracy in aligning the index line to a true reading where the azimuth line crosses the protractor scale.

d. Start at the 0-degree or 0-mil mark on the protractor and read to the right (clockwise) until you reach the point where the azimuth line crosses the scale(s) of the protractor.

e. Read the azimuth where the azimuth line crosses the scale(s).

### **Converting azimuths/Compute back azimuths**



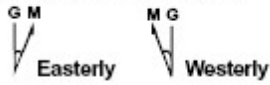
CONVERTING AZIMUTHS - GRID TO MAGNETIC/MAGNETIC TO GRID	
STEP	ACTION
1	<p><b>GRID TO MAGNETIC:</b> (map to compass)            for easterly G-M angle subtract G-M angle from grid azimuth; for westerly G-M angle add G-M angle to grid azimuth</p> 
2	<p><b>MAGNETIC TO GRID:</b> (compass to map)            for easterly G-M angle add G-M angle to compass azimuth            for westerly G-M angle subtract G-M angle from compass azimuth</p> 
<p><b>Note:</b> On G-M angle diagram, if conversion direction is to the Left, ADD; if conversion is to the Right, SUBTRACT  <b>LARS</b> - left add right subtract</p> 	

Figure 3  
 Converting azimuths

**Performance Steps**

1. Determine a back azimuth using degrees. Suppose you follow a 65-degree azimuth from point A to point B and then want to go back to your original location. To do this, you use a back azimuth. You simply add 180 to the first azimuth. Your back azimuth is  $65 + 180 = 245$  degrees.
2. Determine a back azimuth using mils. You move from point A to point B on an azimuth of 1150 mils. Should you wish to return to point A, you would follow a back azimuth. To determine the back azimuth you simply add 3200 mils to 1150:  $3200 + 1150 = 4350$ .

**NOTE:** The rule to remember to determine a back azimuth is as follows:

- Degrees: Less than 180 degrees, add 180 degrees. More than 180 degrees, subtract 180 degrees.
- Mils: Less than 3200 mils, add 3200 mils. More than 3200 mils, subtract 3200 mils.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**1. What is an azimuth?**

A horizontal angle, measured in a clockwise manner from a north base line, expressing direction.

**2. What are two methods of measuring an azimuth?**

Compass and a protractor.

**3. What is a back azimuth?**

The opposite direction of an azimuth.

**4. How do you obtain a back azimuth?**

To obtain a back azimuth from an azimuth, add 180 degrees if the azimuth is 180 degrees or less; subtract 180 degrees if the azimuth is 181 degrees or more.

**5. What is the distance between grid lines on a combat map?**

1 kilometer or 1000 meters.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

**CHECK ON LEARNING (ELO B):**

Conduct a check on learning and summarize the ELO.

**REVIEW SUMMARY(ELO B):**

Conduct a Summary Review.

**C. ENABLING LEARNING OBJECTIVE**

<b>ACTION:</b>	Identify terrain features on a map.
<b>CONDITIONS:</b>	In a classroom, given a standard 1:50:000 scale military map.
<b>STANDARDS:</b>	Identify terrain features on a map by: 1. Identifying the five major terrain features. 2. Identifying the three minor terrain features. 3. Identifying the two supplementary terrain features.
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS SUPPORTED:</b>	None

ELO C - LSA 1. Learning Step / Activity ELO C - LSA 1. Identify terrain features on a map.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))

Time of Instruction: 30 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

**Five major terrain features**

The five major terrain features are hills, saddles, valleys, ridges, and depressions. They are uniquely represented on maps.

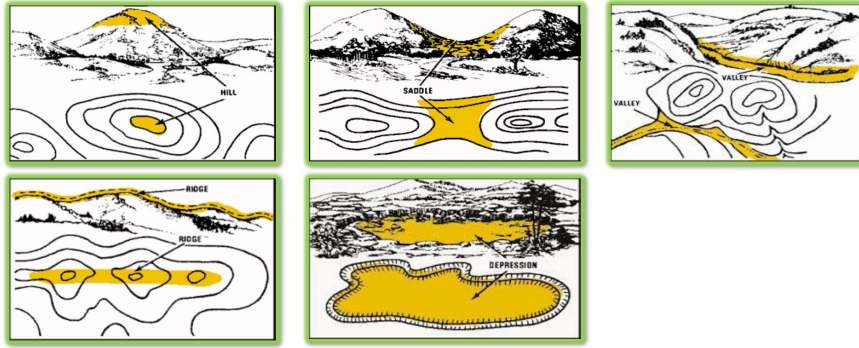


Figure 4  
Five major terrain features.

1. **A hill** is an area of high ground. From a hilltop, the ground slopes down in all directions. A hill is shown on a map by contour lines forming concentric circles. The inside of the smallest closed circle is the hilltop.
2. **A saddle** is a dip or low point between two areas of higher ground. A saddle is not necessarily the lower ground between two hilltops; it may be simply a dip or break along a level ridge crest. If you are in a saddle, there is high ground in two opposite directions and lower ground in the other two directions. A saddle is normally represented as an hourglass.
3. **A valley** is a stretched-out groove in the land, usually formed by streams or rivers. It begins with high ground on three sides and usually has a course of running water through it. If standing in a valley, three directions offer high ground, while the fourth direction offers low ground. Depending upon its size and where a person is standing, it may not be obvious that there is high ground in the third direction, but water flows from higher to lower ground. Contour lines forming a valley are either U-shaped or V-shaped. To determine the direction water is flowing, look at the contour lines. The closed end of the contour line (U or V) always points upstream or toward high ground.
4. **A ridge** is a sloping line of high ground. The centerline of a ridge normally has low ground in three directions and high ground in one direction, with varying degrees of slope. If a ridge is crossed at right angles, a Soldier climbs steeply to the crest and then descends steeply to the base. When moving along the path of the ridge, depending on the geographic location, there may be either an almost unnoticeable slope or a very obvious incline. Contour lines forming a ridge tend to be U-shaped or V-shaped. The closed end of the contour line points away from high ground.
5. **A depression** is a low point in the ground or a sinkhole. It could be described as an area of low ground surrounded by higher ground in all directions, or simply a hole in the ground. Usually, only depressions that are equal to or greater than the contour interval is shown. On maps, depressions are represented by closed contour lines that have tick marks pointing toward low ground.

**Three minor terrain features**



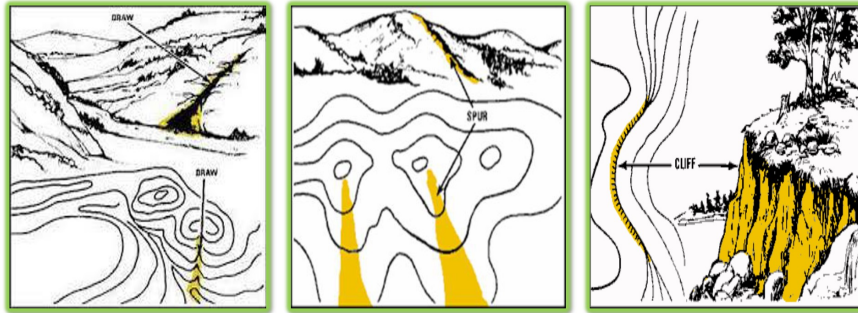


Figure 5  
Three minor terrain features

1. **A draw** is a stream course that is less developed than a valley. In a draw, there is essentially no level ground and little or no maneuver room within its confines. In a draw, the ground slopes upward in three directions and downward in the other direction.

A draw could be considered as the initial formation of a valley. The contour lines depicting a draw are U-shaped or V-shaped, pointing toward high ground.

2. **A spur** is a short, continuous sloping line of higher ground normally jutting out from the side of a ridge. A spur is often formed by two roughly parallel streams cutting draws down the side of a ridge.

The ground slopes down in three directions and up in one.

Contour lines on a map depict a spur with the U or V pointing away from high ground.

3. **A cliff** is a vertical or near-vertical feature that is an abrupt change of the land.

When a slope is so steep that the contour lines converge into one "carrying" contour of contours, this last contour line has tick marks pointing toward low ground.

Cliffs are also shown by contour lines very close together and, in some instances, touching each other.

#### Two supplementary terrain features

Supplementary terrain features include cuts and fills.

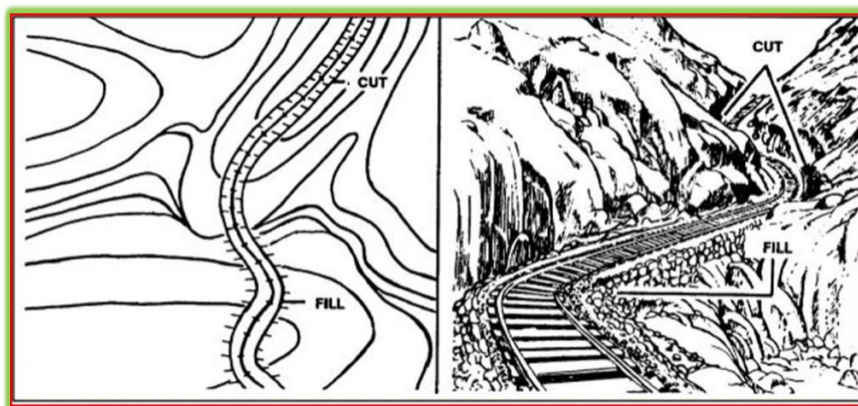


Figure 6  
Two supplementary terrain features

1. **A cut** is a man-made feature resulting from cutting through raised ground, usually to form a level bed for a road or railroad track. Cuts are shown on a map when they are at least 10 feet high, and they are drawn with a contour line along the cut line. This contour line extends the length of the cut and has tick marks that extend from the cut line to the roadbed, if the map scale permits this level of detail.

**2. A fill** is a man-made feature resulting from filling a low area, usually to form a level bed for a road or railroad track. Fills are shown on a map when they are at least 10 feet high, and they are drawn with a contour line along the fill line. This contour line extends the length of the filled area and has tick marks that point toward lower ground. If the map scale permits, the length of the fill tick marks are drawn to scale and extend from the base line of the fill symbol.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**1. What are five major terrain features found on a map?**

Hill, ridge, valley, saddle, depression.

**2. What are the three minor terrain features found on a military map?**

Draw, spur, cliff.

**3. What are the two supplementary terrain features found on a military map?**

Cut, fill.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

**CHECK ON LEARNING (ELO C):**

Conduct a check on learning and summarize the ELO.

**REVIEW SUMMARY(ELO C):**

Conduct a Summary Review.

**D. ENABLING LEARNING OBJECTIVE**

<b>ACTION:</b>	Determine the grid coordinates of a point on a military map.
<b>CONDITIONS:</b>	In a classroom given a standard 1:50,000 scale military map and coordinate scale and protractor.
<b>STANDARDS:</b>	Determine the grid coordinates of a point on a military map by: <ol style="list-style-type: none"> <li>1. Determining the four-digit grid coordinate for the point on the map with a 1000-meter tolerance (must contain the correct 100,000-meter identifier).</li> <li>2. Determining the six-digit grid coordinate for the point on the map with a 100-meter tolerance (must contain the correct 100,000-meter identifier).</li> <li>3. Determining the eight-digit grid coordinate for the point on the map with a 50-meter tolerance ( must</li> </ol>

	contain the correct 100,000-meter identifier).
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS SUPPORTED:</b>	None

ELO D - LSA 1. Learning Step / Activity ELO D - LSA 1. Determine the grid coordinates of a point on a military map.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))

Time of Instruction: 1 hr

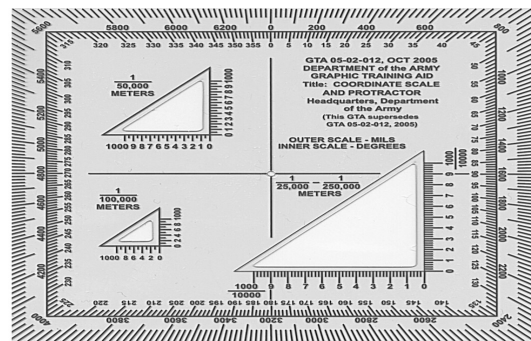
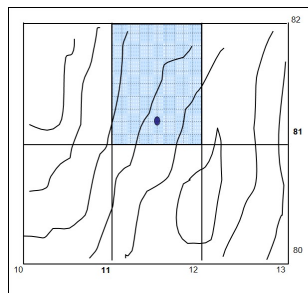
Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

### Using four and six-digit grid coordinates

Grid coordinates are very important to the daily life of the Soldier. Soldiers use grid coordinates to find locations or convey locations on maps to others. They use grid coordinates to navigate, report enemy activity, request medical evacuation, or call for additional supplies and ammunition.



**Figure 7**  
**Grid Line, Protractor**

#### 1. Protractor

A protractor is a tool for marking precise distance on a map. Protractors have an index mark in the center and divide a 360-degree circle into units of angular measure that are marked on two scales (degrees and mils) along the outside edge. The index mark is the center of the protractor circle, from which you measure all directions.

#### 2. It has four major parts:

- 1) A cross-hair in the middle, which you use to reference the north-south and east-west grid lines on a map.
- 2) Three scales - 1:100,000; 1:50,000; and 1:25,000.
- 3) An inner scale of 360 degrees, which you use to plot azimuths (You'll learn more about azimuths in the next section.).
- 4) An outer, mils scale. (There are 6400 mils in a circle. You'll learn to use this scale for indirect fire.)

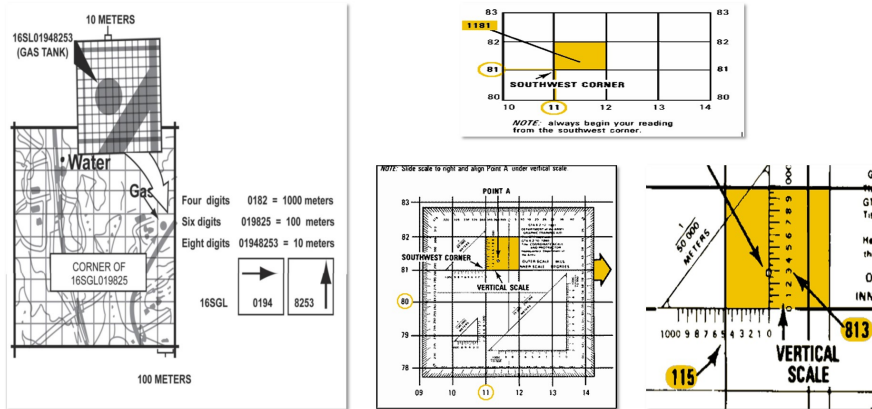


Figure 8

## Using four and six-digit grid coordinates

### Four and six-digit grid

The critical rule is to read right and then up. Notice how the example reads right and then up: Grid square 0182 was to the right of line 01 and above - up from - line 82.

Follow these five steps to identify a more specific location:

1. Make sure you are using the appropriate scale (check the scale in the map's marginal information) and make sure the scale is right side up.
2. Place the protractor scale with the zero-zero point at the lower left corner of the appropriate grid square.
3. Keep the horizontal line of the protractor's scale directly on top of the horizontal, left-to-right, or "easting" grid line, and slide the protractor, and its scale, to the right until the left vertical line of the grid square touches the point on the protractor scale for the coordinate you want.
4. Read up the vertical scale until you reach the coordinate you want.
5. Mark the location.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

#### **1. What are the major parts on the protractor?**

- 1) A cross-hair in the middle, which you use to reference the north-south and east-west grid lines on a map.
- 2) Three scales - 1:100,000; 1:50,000; and 1:25,000.
- 3) An inner scale of 360 degrees, which you use to plot azimuths.
- 4) An outer, mils scale. (There are 6400 mils in a circle.)

#### **2. What is the general rule for reading military grid coordinates?**

Right and up

#### **2. How close will a six-digit grid coordinate get you to your point?**

100m

Review Summary:

1. Confirm how to determine a four-digit grid location of an object on a military map.
2. Confirm how to determine a six-digit grid location of an object on a military map.

3. Confirm how to identify a four-digit grid coordinate on a military map.
4. Confirm how to identify a six-digit grid coordinate on a military map.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**CHECK ON LEARNING (ELO D):** Conduct a check on learning and summarize the ELO.

**REVIEW SUMMARY(ELO D):** Conduct a Summary Review.

**E. ENABLING LEARNING OBJECTIVE**

<b>ACTION:</b>	Measure distance on a map.
<b>CONDITIONS:</b>	In a classroom, given a standard scale military map, a strip of paper with a straight-edge, and a pencil.
<b>STANDARDS:</b>	Measure distance on a map by: <ol style="list-style-type: none"> <li>1. Determining the straight-line distance in meters between two points with no more than 5% error.</li> <li>2. Determining the road distance (curved distance) between two points with no more than 10% error.</li> </ol>
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS SUPPORTED:</b>	None

ELO E - LSA 1. Learning Step / Activity ELO E - LSA 1. Determine straight-line distance on a map.

Method of Instruction: Lecture  
 Mode of Delivery: Resident Instruction  
 Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))  
 Time of Instruction: 30 mins  
 Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction  
 Other Media: Unassigned  
 Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

**Graphic (BAR) scales:**

A graphic scale is a ruler printed on the map that is used to convert distances on the map to actual ground distances. The graphic scale is divided into two parts. To the right of the zero, the scale is marked in full units of measure and is called the primary scale. To the left of the zero, the scale is divided into tenths and is called the extension scale.

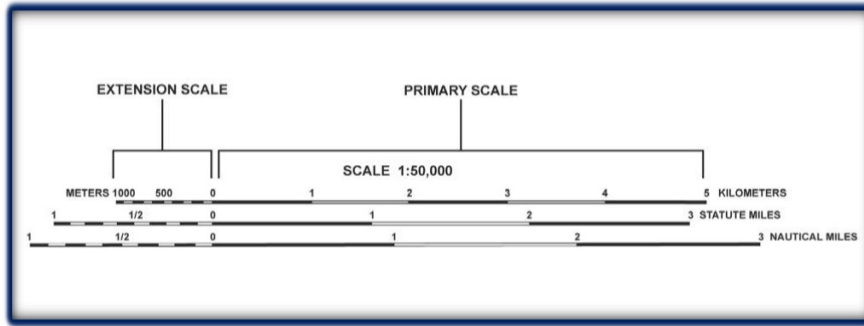


Figure 9  
Graphic BAR Scale

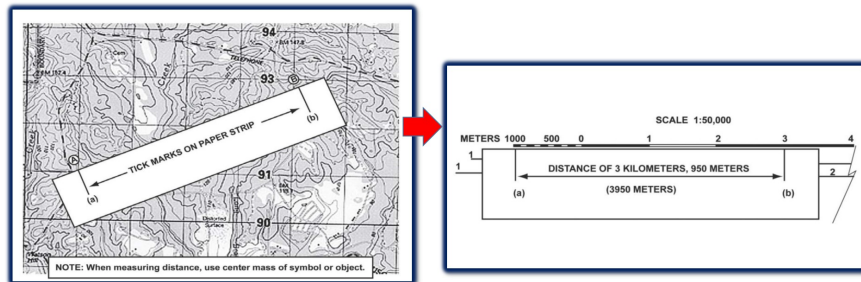


Figure 10  
Measured straight-line distance on a map

1. To determine the straight-line distance between two points on a map, lay a straight-edged piece of paper on the map so that the edge of the paper touches both points and extends past them. Make a tick mark on the edge of the paper at each point.
2. To convert the map distance to a measured ground distance, move the paper down to the graphic bar scale, and align the right tick mark (b) with a printed number in the primary scale so that the left tick mark (a) is in the extension scale. The primary scale provides the whole unit distance, while the extension scale provides the divided scale used to determine smaller increments of measure.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**1. What would you use on a map to measure actual ground distance?**

The bar scale.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (1:25)(Drill Sergeant(s))

Time of Instruction: 30 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

To measure distance along a road, stream, or other curved line, the straight edge of a piece of paper is used. In order to avoid confusion concerning the point to begin measuring from and the ending point, an eight-digit coordinate should be given for both the starting and ending points.

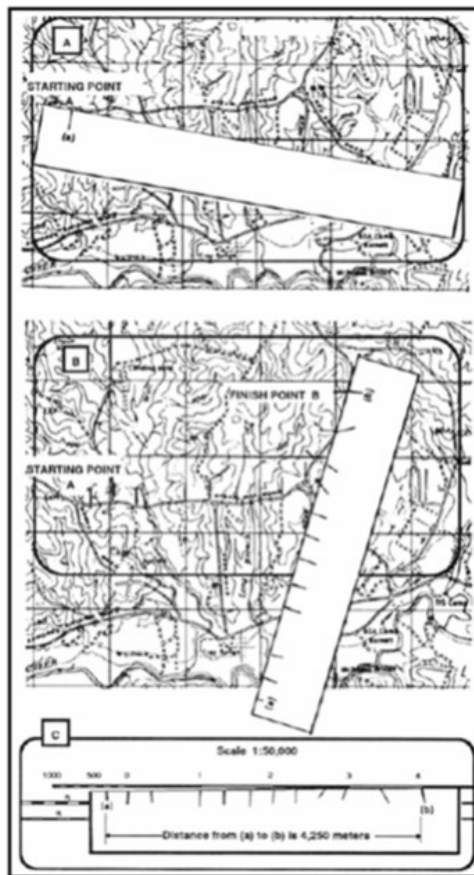


Figure 11

### Measured curved line distance on a Map

1. Place a tick mark on the paper and map at the beginning point from which the curved line is to be measured. Align the edge of the paper along a straight portion and make a tick mark on both map and paper when the edge of the paper leaves the straight portion of the line being measured.
2. Place the point of the pencil close to the edge of the paper on the tick mark to hold it in place. Then, pivot the paper until another straight portion of the curved line is aligned with the edge of the paper. Continue in this manner until the measurement is completed.
3. When the distance is completely measured, move the paper to the graphic scale to determine the ground

distance. The only tick marks being measured are (a) and (b). The tick marks in between are not used.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**How do you measure a curved line on a map?**

1. Place a tick mark on the paper and map at the beginning point from which the curved line is to be measured. Align the edge of the paper along a straight portion and make a tick mark on both map and paper when the edge of the paper leaves the straight portion of the line being measured.

2. Place the point of the pencil close to the edge of the paper on the tick mark to hold it in place. Then, pivot the paper until another straight portion of the curved line is aligned with the edge of the paper. Continue in this manner until the measurement is completed.

3. When the distance is completely measured, move the paper to the graphic scale to determine the ground distance. The only tick marks being measured are (a) and (b). The tick marks in between are not used.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

**CHECK ON LEARNING (ELO E):**

Conduct a check on learning and summarize the ELO.

**REVIEW SUMMARY(ELO E):**

Conduct a Summary Review.

**F. ENABLING LEARNING OBJECTIVE**

<b>ACTION:</b>	Determine a magnetic azimuth.
<b>CONDITIONS:</b>	In a classroom, given a lensatic compass and a reference point.
<b>STANDARDS:</b>	Determine a magnetic azimuth by: 1. Utilizing the center-hold technique (within 3 degrees). 2. Utilizing the compass-to-cheek technique (within 3 degrees). 3. Take the written exam.
<b>LEARNING DOMAIN - LEVEL:</b>	Cognitive - Understanding
<b>No JPME LEARNING AREAS SUPPORTED:</b>	None



ELO F - LSA 1. Learning Step / Activity ELO F - LSA 1. Determine a magnetic azimuth.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (2:50)(Drill Sergeant(s))

Time of Instruction: 30 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

### Determine a magnetic azimuth

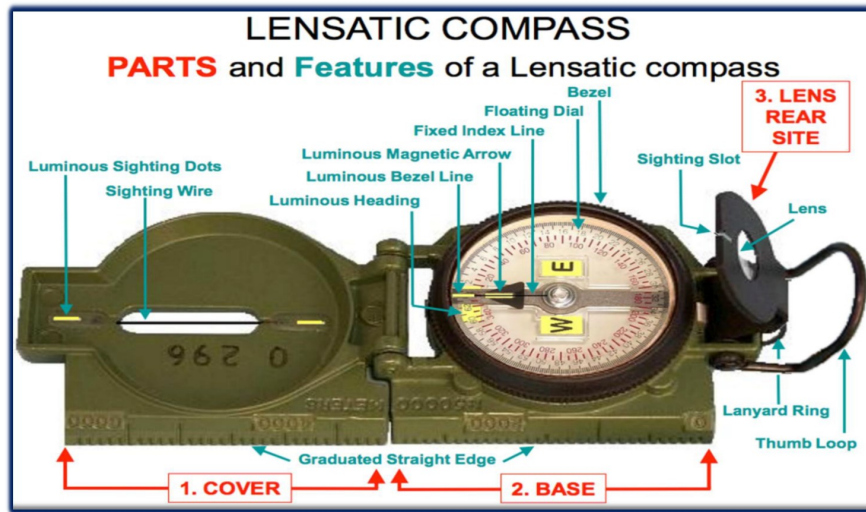


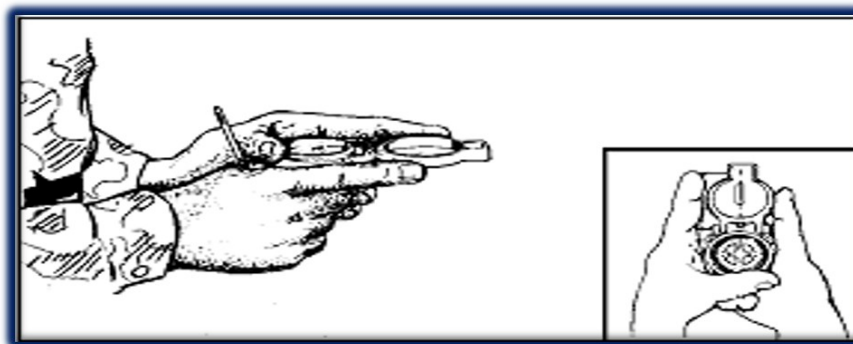
Figure 12  
Lensatic compass

### Using a lensatic compass

Magnetic azimuths are determined using magnetic instruments such as lensatic and M2 compasses.

Employ the following techniques when using the lensatic compass:

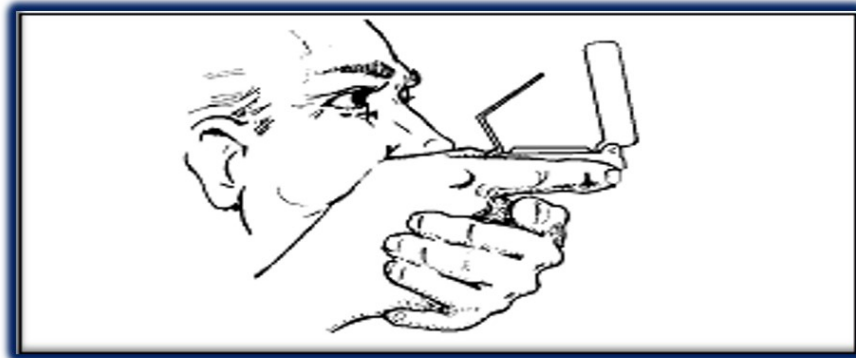
1. Center hold technique.



**Center Hold technique**

Figure 13  
Center hold technique

2. Compass-to-cheek technique.



**Compass-to-Cheek technique**

Figure 14  
Compass-to-cheek technique

**NOTE:** The compass-to-cheek technique is used almost exclusively for sighting. It is the best technique for this purpose.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**1. How many mils/degrees are there in a circle?**

6400 mils / 360 degrees

**2. Which north is used when using a military map?**

Grid north when using the map and  
magnetic north when using a compass.

**3. Name two ways to hold a compass.**

Center-hold method, compass-to-cheek method

**4. The arrow on a compass always points in what direction?**

Magnetic north

**5. How many units of measurement are there on a compass? What are they?**

Two; Mils and degrees

**6. On a lensatic compass there are two rings, an outer black ring and an inner red ring, what are they used for?**

The inner red ring is used to find degrees, and the outer black ring is used to find mils.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

ELO F - LSA 2. Learning Step / Activity ELO F - LSA 2. Orient the map using a lensatic compass.

Method of Instruction: Lecture

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (2:50)(Drill Sergeant(s))

Time of Instruction: 30 mins

Media Type: Actual Equipment / Equipment Based Instruction / Oral Presentation / Practical Exercise / PowerPoint Presentation / Situational Based Instruction

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

### **Orienting the map with the landscape (magnetic north and true north)**

#### **1. Technique # 1: true north.**

- 1) Identify several landmarks on the map and on the terrain.
- 2) Visually orient the map landmarks with the terrain landmarks.
- 3) The map is oriented to true north.

#### **2. Technique # 2: magnetic north (MN) with compass & map.**

- 1) Lay the compass on the MN line on the map.
- 2) Rotate the map and compass together until the compass bearing reads 0° degrees magnetic north (compass and MN line on the map are aligned / parallel).
- 3) The map is oriented to MN.

#### **3. Technique # 3:**

- 1) Find magnetic declination value in the map margin (bottom left corner). example East 11.5°.
- 2) Place compass edge on edge of map North/South line with front of compass facing the top of the map.
- 3) Rotate map and compass together until the north arrow is 11.5° east of the black index line.

**NOTE:** The black index line is aligned with  $348.5^\circ(360^\circ - 11.5^\circ = 348.5^\circ)$ , the map is oriented to true north.

#### **4. Technique # 4: when your position on the map is known.**

- 1) Select a terrain feature on the ground that you can find on the map, example the HILL.
- 2) With the compass, sight the azimuth to the hill (295 °) from your position.
- 3) Align the compass edge through the hill and your position.
- 4) Rotate the map and compass together until 295° is aligned with the Black Index Line. Map is oriented MN.

### **Pace count**

#### **1. A pace is equal to one natural step, about 30 inches long.**

To use the pace count method accurately, a Soldier knows how many paces it takes to walk 100m. To determine this, walk an accurately-measured course and count the number of paces it takes to reach 100m. (A pace course can be as short as 100m or as long as 600m.) The pace course, regardless of length, is on similar terrain as that to be walked over. It does no good to walk a course on flat terrain and then try to use that pace count on hilly terrain. To determine the pace count on a 600m course, count the paces it takes to walk the 600m, then divide the total paces by 6. The answer gives the average paces it takes to walk 100m. It is important that each person who navigates while dismounted knows their pace count.

**2. Certain conditions affect your pace count in the field, and you must allow for them by making adjustments.**

**1) Slopes:** Your pace lengthens on a downslope and shortens on an upgrade. Keeping this in mind, if it normally takes you 120 paces to walk 100m, your pace count may increase to 130 or more when walking up a slope.

**2) Winds:** A head wind shortens the pace and a tail wind increases it.

**3) Surfaces:** Sand, gravel, mud, snow, and similar surface materials tend to shorten the pace.

**4) Elements:** Falling snow, rain, or ice cause the pace to be reduced in length.

**5) Clothing:** Excess clothing and boots with poor traction affect the pace length.

**6) Visibility:** Poor visibility, such as in fog, rain, or darkness, will shorten your pace.

**NOTE:** The base of the compass has a straight edge that you can use to measure distance. Today we will place the straight edge on a north/south grid line. Now rotate the map, keeping the compass straight edge on the north/south grid line, until the compass north-seeking arrow is directly under the black fixed index line. Your map is now oriented north.

**NOTE:** Demonstrate this with the map.

**NOTE:** Have Trainees orient their map.

Check on Learning:

Conduct a check on learning by asking questions, soliciting answers from Trainees and correcting misunderstandings. The following questioning prompts can be utilized to determine if the Trainees have achieved the desired level of learning and are capable of applying the information taught during this lesson:

**How many techniques are there to orient the map with the landscape?**

1. Technique # 1 (true north).
2. Technique # 2 (magnetic north) with compass & map.
3. Technique # 3: find magnetic declination value in the map margin (bottom left corner)
4. Technique # 4: when your position on the map is known.

Review Summary:

**NOTE:** Repeat the terminal learning objective of the lesson and summarize the learning step activity.

**NOTE:** Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainees questions and correct misunderstandings.

**NOTE:** Reiterate the Performance Enhancement Component(s) that can be utilized to accomplish the intended learning outcome(s).

ELO F - LSA 3. Learning Step / Activity ELO F - LSA 3. Administer written evaluation.

Method of Instruction: Practical Exercise (Hands-On/Written)

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - NON-ICH (3:50)

Time of Instruction:

Media Type: Handout / Practical Exercise

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security

In a classroom or covered training area, the Instructor will issue the written evaluation to each Trainee allowing 50 minutes to finish.

The written evaluation is NOT a controlled item and does NOT require a Test Control Officer (TCO).

**NOTE:** Print the test from the parent file. If the map is photocopied the map representation will become smaller and the Trainee may get the wrong answer, even though they did the procedures correctly.

Check on Learning: Use the Trainee's performance on the evaluation to check on learning.

Review Summary: Review evaluation and reinforce as needed.

**CHECK ON LEARNING (ELO F):** Conduct a check on learning.

**REVIEW SUMMARY(ELO F):** Summarize the learning objective.

## SECTION IV. SUMMARY

Method of Instruction:	Lecture
Mode of Delivery:	Resident Instruction
Instr Type(I:S Ratio):	Military - NON-ICH (1:50)
Time of Instruction:	5 mins

### Check on Learning

Determine if the Trainees have learned the material presented by soliciting Trainee questions and explanations.

### Review/ Summary

Determine if Trainees have learned the material presented by soliciting Trainee questions and explanations. Ask the Trainee questions and correct misunderstandings.

**INSTRUCTOR NOTE:** Land Navigation Practical Exercise will be conducted during "ANVIL."

## SECTION V. STUDENT EVALUATION

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### Testing Requirements

Performance on this terminal learning objective will be evaluated with a hands-on Requirements test in a later lesson and reinforced during the field training exercise. Trainee's must receive a "GO" on the test and be able to satisfactorily accomplish the tasks in a field environment.

**NOTE:** Refer Trainee to the Individual Soldier Assessment Plan (ISAP).

### Feedback Requirements

The Trainee will receive timely feedback from the instructors during all practical exercises, hands-on performance evaluations, and written examinations through mentoring and reflective discussions. The Trainee will be counseled (positive and/or negative) based on their performance on evaluations and classroom participation. Score the Trainee in accordance with the ISAP. If the Trainee fails any step, show or tell him/her what was done wrong and show them how to do it correctly then provide an opportunity for supervised practices to ensure understanding and application. Document feedback for training developer(s), especially pertinent information that can improve training.

**Appendix A - Viewgraph Masters**

**Basic Map Reading (BCT)  
071-BT071022 / Version 5.02 ©**

<b>Sequence</b>	<b>Media Name</b>	<b>Media Type</b>
None		



## Appendix B - Assessment Statement and Assessment Plan

**Assessment Statement: None.**

**Assessment Plan: None.**

**Appendix C - Practical Exercises and Solutions**

**PRACTICAL EXERCISE(S)/SOLUTION(S) FOR LESSON 071-BT071022 Version 5.02 ©**

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**Appendix D - Student Handouts**

**Basic Map Reading (BCT)**  
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<b>Sequence</b>	<b>Media Name</b>	<b>Media Type</b>
None		